

Circular Business Approach-Practices and Opportunities in Electronic and Electrical Sector in India

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ABSTRACT

The electronics sector is one among the others automobile, construction, and agriculture that has the largest growth potential and majority of household expenditure is on these sectors. Urbanization requires construction and more than 2/3 of the construction is yet to be started in India. The ownership of passenger cars is predicted to increase from 20 vehicles per 1000 to 175 by 2040. India is experiencing digital revolution and is the second largest market for smartphones apart from United States. This sector will provide the maximum advantage through the application of circular economy and enablers like- tracking, Sharing. This paper focuses on the framework for different principles of circular economy and some business practices that are followed in India. The main aim of the study is to understand the application of circularity principle for Electronics & Electrical Equipment sector in India.

Key words: Circular Economy, Waste Management, Sustainability, Business Model, e Waste

I INTRODUCTION

The relevance to the circular model has gained significance long back; still there are not many researches in this area primarily because of the importance given to the linear growth models.

The focus has been shifted from linear to circular after 2005 when a significant mismatch between future demand and supply had been investigated in a

scenario with finite availability of resources. The Google search for circular economy clearly indicates the significant role a circular economy framework holds in the development of strategies and policies for sustainability by business entities and policy makers.

A closed loop ECOSYSTEM is created by the circular economic model for effective consumption and utilization of resources.

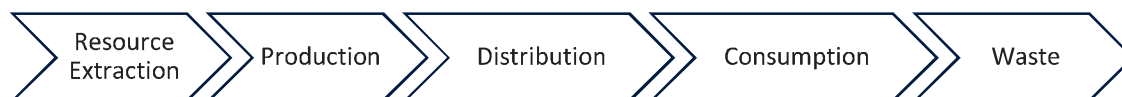


Fig. 1: Linear Economy

The circular model configures an ecosystem which adopts the paradigms of reduce, reuse and recycle and is resilient and waste free. (Espito et al,2-015, Geng & Doberste in 2008, Mathew et al 2011, Tse et al 2015, 2016, Yong 2007).

The Ellen MacArthur Foundation has worked very hard at accurately defining circular economy as an industrial system which can be regenerated or restored by an intention and design. The definition provided by the Ellen MacArthur Foundation attempts to focus on three key pillars¹ that together set the base for creating a closed system. This closed system would be one where materials are used in a manner to ensure their highest utility along with minimal environmental damage. It also includes preserving natural capital while fostering effectiveness all across the entire system (Ellen

MacArthur Foundation, 2015). Circular economy as a concept is the key in grouping different range of waste resource management approaches by very efficiently drawing the attention towards the capacity of prolonging resource use (Blomsma& Brennan, 2017). Circular economy is more of a holistic framework that attempts to unify different strategies for sustainability (Murray et al., 2017). The inclusive and comprehensive stance of circular economy model has allowed for it to be linked with sustainable development. It has also linked an economy which attempts to work in synchronization with the socioeconomic and environmental systems in which it is imbedded, for a better and sustainable future (Brundtland 1987; Webster 2013; Kirchherr et al., 2017).

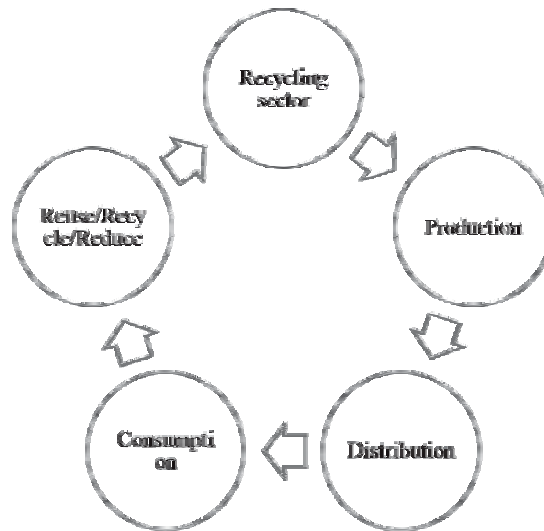


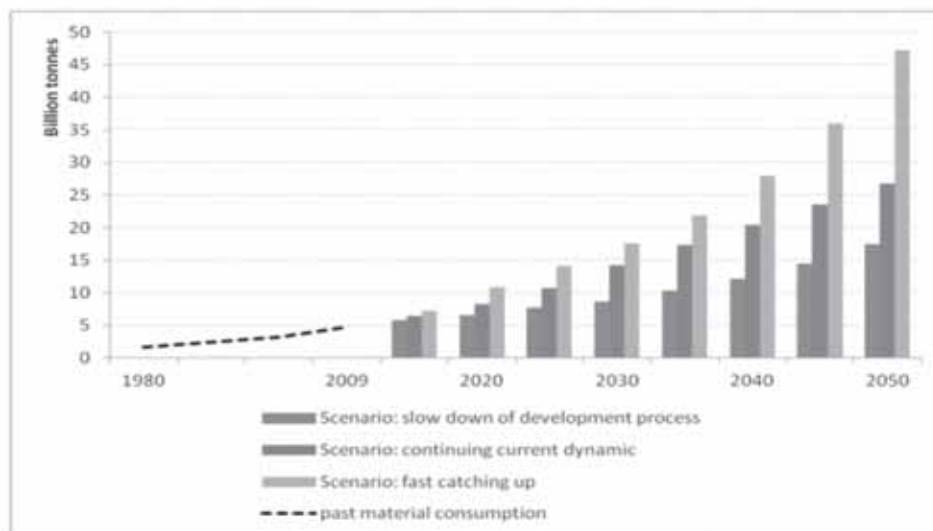
Fig. 2: Circular Economy

Researchers have linked certain attributes that connect the circular economy model and the concept of sustainability. Both concepts have global reach; both include innovations and focus on new product designs, cooperation among the various stakeholders across different sectors (Geissdoerfer et al.,2017). The advocates of circular economy believe that it is paradigm shift that aims to improve the ecological, social and economic value of the environment. It attempts to provide a global solution for the issue at hand (Kopina& Blewitt, 2015). The basic idea of circular economy has been around since the 1970’s, although the need for it did not exist at that time as there was a sufficient supply of natural resources at that time (Webster, 2013). The need for circular can be attributed to the following reasons:

- (a) The scarcity of natural resources.
- (b) The advancement of information technology that has enabled the tracking of materials within the loop.

- (c) There has been a shift in the pattern of consumer behavior which has made us more ready for access than ownership.

The world is on the edge of making a very important decision for the future. The selection of an incorrect option, the impact on the ecosystems globally can be very drastic (Larsson et al., 2011). In the present scenario there exists a combination of crisis in different areas of industries across the world. To effectively tackle these crises, one must try and look at the bigger picture. To analyses the crisis and develop a solution for the same a holistic perspective would be beneficial. One of the fastest growing sectors in India is the Electronic and Electrical Equipment Sector in India. Therefore, it becomes imperative to study the principle of circularity in this sector.



(Source: IGEP, 2013)

Fig. 1 India’s past material demand and future projections until 2050

To move in the direction of circular economy, the way things are produced and consumed requires a paradigm shift. Industries must attempt to incorporate a closed loop thinking at the heart of their current business models which will have a significant implication on our society, since the current methods of how we develop things not only decides how we work but also what we buy as well. (Womack, 1990). Circularity concept is not just recycling it is basically a system which is restorative in the industrial processes which treats the waste as a resource. It implies that once a in the product life cycle the product's life ends attempts should be made to utilize them by creating a value of it (Ellen Mc Arthur 2015). The transition from tradition to circular requires the changes in the functioning of organizations and reshaping of the supply chain process by infusing the mindset of sustainability in product designers.

The concept of circular economy provides sustainability approach to business practices through reversing the depletion of resources and waste generation. The World Economic Forum, Governments and business leaders have championed the circular economy movement. Unfortunately, the skepticism remains as to whether the required changes to business models and consumption patterns are feasible. Transition to a circular economy requires co-operation and co-ordination across multiple spheres of influence.

The policies in India are still focusing on the themes relating to individual areas and the approach followed is not well structured and systematic. The policy focus is majorly on extraction and mining rather than resource efficiency or SRM (NITI AAYOG, 2017). The National Design Policy of 2007 directly relate with resource efficiency and secondary resource management but is related to value the strategic content of material in the product, which is crucial for resource recovery. The goals of sustainability and inclusiveness can be achieved through emphasizing the need for RE and SRM by integrating innovation with the developments in science and technology. The businesses willing to adopt the principle of circularity finds this integration challenging. Business involving circularity approaches viz, substituting the scarce and hazardous material/ resources with the restorative, cleaner and more regenerative ones involves huge financial resources which they lack. There is an urgent required for not only technological but financial eco system also that can help India to adopt circular economy. For sustainable growth along with the creation of job opportunities manufacturing sector is gaining. Enhancement in resource efficiency and

promoting SRM usage has vast potential in creation of not only environmental benefits but also creating economic opportunities in the production processes. The policy in India has failed to promotion of resource efficiency and SRM in the manufacturing sector in spite of such promising environmental and economic benefits.

II ELECTRONIC AND ELECTRICAL EQUIPMENT IN INDIA

Consumer's in India are looking forward to improving the lifestyle and their standard of living including their homes as the composition of middle-class population and the youth aged below 35 years or less has been increased. This radical transformation in demographics along with the fall in prices of consumer electronics has brought about a transformation in the white goods market in India. According to the National Electronics Policy 2019, the global electronics production is estimated to be US\$1,740 billion in 2017 and has registered a growth rate of 5%. The India electronic hardware production in the year 2017-18 has been around US\$59 billion with the growth of 26.7%. In the global hardware electronics production, the share of India is 3.4%. In the India's GDP the share of domestic electronics is 2.3%. For the year 2017-18 the imports of electronic goods were of about US \$ 53 billion in 2017-18. It is expected that the demand for electronic hardware will increase to US\$400 billion by the year 2023-24. This is not in favor of India and hence the promotion of domestic electronic hardware manufacturing becomes very crucial. The Domestic production has increased considerably over the past few years and the production of LED products, LCD/LED Televisions and mobile handsets have increased significantly. In the last few years, the PMP (Phased Manufacturing Programme) for mobile handsets and related subassemblies components manufacturing has created robust manufacturing eco system in India.

Several schemes have been launched to promote electronics manufacturing in India. For the development of the ESDM sector, the National Policy on Electronics aims to provide and ecosystem through hosting a few policies to reduce the dependence on Imports and development of infrastructure for the growth of the sector.

The e waste in India is currently growing per annually is increasing at a growth rate of 30% (Pandit, 2016). In India the unorganized sector manages more than 95% of e -waste, who down cycle the end of the life product (burning or dumping in water bodies of useless materials) and does not recycle it, while only around 2% is being recycled.

Table 1
Potential Value of raw Materials in ewate in 2016

Material	kilotons (kt)	Million €
Fe	16,283	3,582
Cu	2,164	9,524
Al	2,472	3,585
Ag	1.6	884
Au	0.5	18,840
Pd	0.2	3,309
Plastics	12,230	15,043

Source: NITI Aayog, 2019

III VALUE CHAIN IN ELECTRONICS AND ELECTRICAL EQUIPMENT SECTOR

The extraction and raw materials supply, sub-components production, product designing and manufacturing, distribution of product and retailing, use phase of product, waste management and recycling of waste are the various value chains in the Indian Electronic and electrical equipment sector. The potential to energy saving is huge in the input stage itself if recycled material is used in place of extracted virgin material. Disposing off the hazardous material continues to be a major concern. It is also essential to design the consumer appliances which can be easily re-paired, and its life can be prolonged easily. Thus, the call of the hour is to develop an effective and efficient infrastructure for reverse logistic network and recycling because of the toxic nature of e waste and its potential effects on environment and health. Nokia one of the mobile phone manufacturer has made serious efforts in e-waste collection and disposal which is in accordance with CPCB and authorized by Extended Producer Responsibility in India.

(a) **Resource Extraction and supply of raw material** - In the first phase of resource extraction and supply of raw materials, the composition of the material used has changed significantly due to technological advancements which includes not only usage of miniature components but also understanding the impacts of hazardous components. Like, replacing the metal components with plastic has decreased the weight of the product and banning of hazardous materials in the production along with the use of new rare materials. There is more use, although in smaller quantity of exotic metals which has a very low recovery value (NEW, INNONET, 2016). There is demand more use of recycled material as compared to virgin material. Few

companies have started production without use of PVC and BFR as their commitment towards environmental cause namely Apple, Google and HP. Dell is also in process of making their commitment to go 100% green.

- (b) **Design Stage** In today's consumerism world companies are producing single use short life span products as they are facing market saturation accelerating the replacement cycle, however the need is to provide and design products which extends the usage life. The material resource can only be saved through extended use life along with the spread of carbon print over many years. It is also desired that the product should be repairable and can be easily upgraded. There is huge potential for repair works and business offering repair works and sharing platforms will be creating more jobs and affecting the environment and social front in the positive way.
- (c) **Best Practices during the input stage:** Dell uses the closed-loop plastics derived from water bottles and old computers sourced from the policy of take back. They are the first company that offers computers produced with certified by UL Environment recycled plastic and their own sourced used old electronics. The process that Dell follows extends the life of plastic, reduces the cost and carbon emission.
- (d) **End of Life Stage:** The formal recycling system can only work if the proper infrastructure to the reverse logistics is in proper shape. The system of recycling should be cost effective and the quality of recycling process is should also be efficient. It is the mandate under the E- waste management Rules 2016 and amendment 2018 that it is the producer's responsibility to make arrangement for getting the products back under the effective and efficient waste management mechanism. Deposit Refund Scheme (DRS) is being recommended (through implementation through dealers and retailers) to be provided to

the customers from the producer so that customer returns the end of life equipment. The task to channelization of e waste for recycling and dismantling is assigned to the Urban Local Bodies.

(i) **Bhopal e -waste clinic-** India's first e waste clinic to enable segregation of waste, its waste and disposal of waste from both household and commercial is being set up by the Municipal Corporation of Bhopal and CPCB. The waste collection services extended by the e waste clinic include both doors to door as well as anyone can deposit directly at the clinic in exchange for a fee. The clinic has been developed in accordance with the e Waste Management Rules of

2016 and the CPCB is being extending assistance to this clinic for technology.

(ii) **Envirocare, India -** E waste Management and Handling services are provided by Envirocare in the entire India Subcontinent. They deal in the e waste which may be of any type and any stage – final disposed after the life, not continued in use broken, outdated etc. are being collected by the company for safe segregation, transport, dismantling and disposing. The company is authorized and has license from SPCB and CPCB. The main goal of the organization is conservation resources and environmental protection. The company offers recycling of e waste, implements EPR for products and acts as a PRO (Producer responsibility Organization) for them.

Overview

Company	Envirocare
Year of foundation	2009
Founded	Hafiz Ansari
Reach	PAN Indian
Contribution to circular economy	<ul style="list-style-type: none"> Provision of value addition innovation in e waste recycling services Focusing on provision of environmental safety, security and healthy and creating green and clear earth
Process	RECYCLING, Envirocare's e-waste disposal process is a complete recycling process starts from collection, Sorting, dismantling, disassembly, Physical and mechanical separation of complex materials, and disposal of hazardous waste material
Positives	<ul style="list-style-type: none"> Envirocare has presence in PAN India: Dealing comprehensively in Management and services e waste sector. Collection of all types of e waste including desktops, laptops, mobile handsets, and all other types of electrical and electronic equipment. and at all stages of disposal: end of life, working, non - working, distorted. SPCB and CPCB authorisation for collection, Sorting, dismantling, disassembly, Physical and mechanical separation of complex materials, and disposal of hazardous waste material The organization focusses on conservation resources and environmental protection Services spectrum ranges from Recycling of E-waste to Implementing EPR (Extended Producer Responsibility) for products and acting as a PRO (Producer responsibility Organization) for them. Supporting the Customer for CSR Activities like Channelizing of E-waste, setting up Collection Point and Providing E-Bin
challenges	The major concern is DATA Protection; they offer On Site Data Sanitizing and Degaussing. They also provide physical Destruction of Disk and Media.

Source: <https://envirocareindia.co.in/>

To prepare the new future, it is expected that companies need to be more responsible for the waste generated by them the e waste management

companies have even a bigger role in managing this waste.

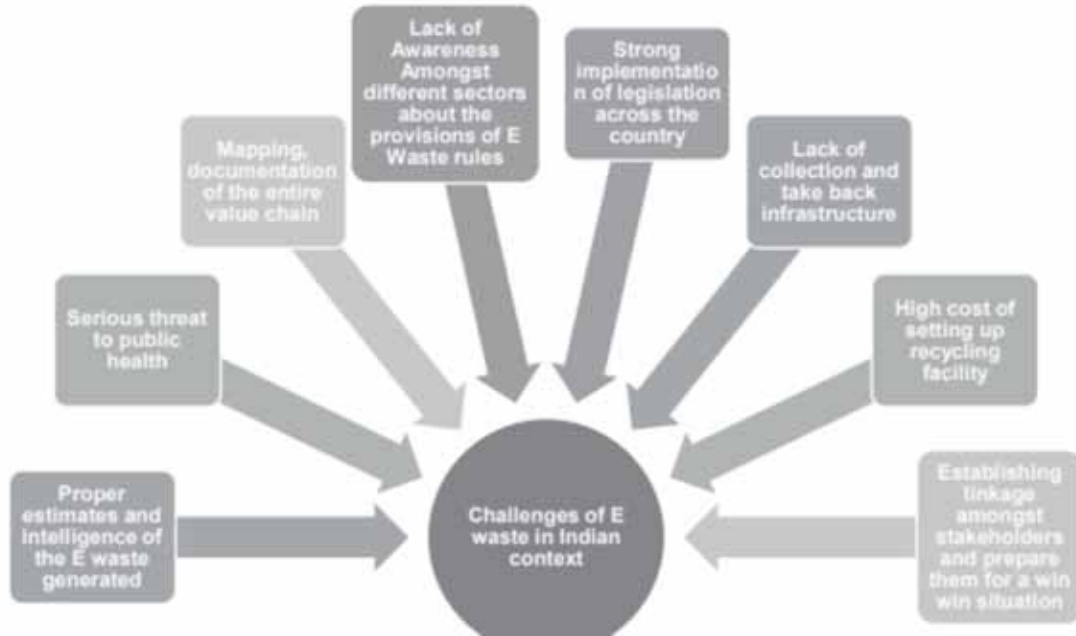


Fig. 2::Challenges of e-waste management in the Indian context

Source: NITI Aayog, 2019

IV CONCLUSION

Consumers are the only one that can provide effective management of e waste and they are being encouraged to correctly dispose-off their e waste .With the increment in the re usage and recycling rates there has been a link between the initiatives like Extended Producer Responsibility (ERP), Design for Environment (DfM); 3RS with the market so that the consumers also adapt sustainable consumption habits . The success of Extended Producer Responsibility (EPR) requires proper infrastructure, policies especially designed for e- waste, technology, and skilled labour along with the financial backing, which unfortunately India lacks in. Moreover,the e waste policy 2016 is not able to clearly define the responsibility and the role of various stake holders and organisations in the field of waste management. Although the promotion of Circular Economy cannot be solely done by the Government only but an approach involving the partnership of consumers, retailers and investors jointly is required. With the improvements in technologies and innovations like-Cloud, the electronic sector can easily dematerialize and creation of a sustained economy from millions of e-waste disposed of every year has create has a huge demand and potential.To prepare the new future, it is expected that companies need to be more responsible for the waste generated by them the e waste management companies have even a bigger role in managing this waste.

REFERENCES

- [1] Arora, N., Bhattacharjya, S., Goel, A., Gulati, P., Bhavnani, C., Sharma, A., & Shekhar, H. (2018). Circular economy: A business imperative for India. TERI Council for Business Sustainability (CBS) & YES BANK Ltd.
- [2] Blomsma, F., & Brennan, G. (2017). The emergence of circular economy: A new framing around prolonging resource productivity. *Journal of Industrial Ecology*, 21(3), 603-614.
- [3] Brundtland, G. H. (1987). Our common future— Call for action. *Environmental Conservation*, 14(4), 291-294.
- [4] EEA, 2016. Developments in indicators: Total Material Requirement (TMR).
- [5] Ellen MacArthur Foundation, 2017. Priority Research Agenda. Available at. https://www.ellenmacarthurfoundation.org/assets/downloads/higher-education/EMF_Priority-Research-Agenda-copy.pdf.
- [6] Geng, Y., &Doberstein, B. (2008). Developing the circular economy in China: Challenges and opportunities for achieving “leapfrog development.” In *International Journal of Sustainable Development and World Ecology*. <https://doi.org/10.3843/SusDev.15.3:6>