

A Study on EPR Practices in E-waste Management in Haryana

RAHUL DHULL

Research Scholar, Haryana School of Business, Guru Jambheshwar University of Science & Technology, Hisar, Haryana, India

Abstract

E-Waste has constantly been growing because of changing lifestyle of people. The zest to stay updated with technology has been the driving force behind the rapid purchase of electronic gadgets in the society. Extended Producer Responsibility (EPR) has been seen as one of the solution to this ever increasing problem of E-Waste which focuses on making the manufacturer accountable to manage their E-Waste. This paper focuses on how effective EPR is in the context of E-Waste management.

Key Words: E-Waste, EPR, manufacturer, retailer

Introduction

In 20th century, the revolution of info and communication has also brought a number of changes in the whole way people organise their lives, their industries, their economies, institutions, etc. Also, they lead to bigger and manifold issues which include the issue of a massive quantity of hazardous waste as well as other wastes being generated from the electric products. It comprises of a major challenge to modern societies and need coordinated effort for addressing it in order to achieve sustainable development (**Özdemir-Akyıldırım, 2015**).

The rapid growth in technology, upgradation of technological innovations and high extent of obsolescence in electronics domain have caused the fastest developing waste streams across the globe that comprise of end of the life electronic and electrical equipment products like washing machines, refrigerators, televisions, printers, computers, mobiles, etc. A lot of these contain toxic material. It comprises of ferrous and nonferrous metal, plastic, wood, glass, etc.

In India there are ten states which contribute to about 70% of total E-waste that is generated. Around 65 cities are known to generate 60% of total E-waste of the country. Amongst top 10 cities which generate E-waste, Mumbai is at the first rank. The next cities are Delhi, Bangalore, Chennai Calcutta, Ahmedabad, Hyderabad, Pune, Surat and Nagpur. The primary source for electronic wastage in the country are public, private and the government sectors. About 70% of the contribution comes from the individual households and 15% comes from the manufacturers.

These predictions highlight an urgent need of addressing the issue of electronic waste in the developing nations where collection as well as management of electronic waste and process of recycling needs to be regulated properly. It might even cause excessive damage to the environment and cause health issues of electronic wastage recycling when left to vagaries of an informal sector.

The low cost of manufacturing, raw material, skilled labour, availability of engineering skills and opportunities for meeting the demand in populous market in India have contributed prominently (**Luyi, 2020**).

A lot of substances are carcinogenic and toxic. These materials are complex and they are seen to be difficult to be recycled in the environmentally sustainable way causing health hazards. The impact maybe worse in the developing nations such as India where people engage in recycling the electronic wastage who mostly engage in an unorganised sector, residing in a close proximity to the landfills and dumps of the untreated electronic wastage and working and that too without any safeguard or protection.

EPR or the Extended Producers Responsibility is responsibility of each producer of the electronic and electrical equipment (EEE) for the channelization of electronic wastage to authorised recycler and dismantler for ensuring a sound management of this kind of waste which does not cause any harm to the environment. The authorisation of EPR is compulsory and needs to be attained by all producers including E-retailers, importers, E-bar, online sellers, etc. of the EEE covered in the electronic wastage rules of 2016. The producers might implement its Extended Producer Responsibility either through the taking back system or through setup of the system collection centres. Producers are also required to maintain the arrangements with the authorised recyclers and dismantlers either collectively or individually or with the help of PRO (Producer Responsibility Organisation) or E-waste exchanging system as it has been spelt in the EPR plan that's approved or authorised by the CPCB (Central Pollution Control Board). Placing or selling EEE at the market by producers without the EPR authorisation need to be considered as a violation of rules and leading to damages to environment that shall allure the provisions under the EPR Act of 1986 (**Giuffrida and Mangiaracina, 2020**).

An EPR plan is the implementation plan meant for the producers where they give the overall plan for fulfilling its EPR or Extended Producers Responsibility in order to achieve the details and the targets of the mechanism to collect and channelize the E-waste which is generated by producers. EPR plan demands estimation of amount of electronic waste which is generated from end of the life products, outlining the scheme for channelization and collection of the end of the life products with similar code of EEE to the authorised recyclers and dismantlers, estimated budget meant for implementation of EPR, outlining the scheme to create awareness, declaration on the compliance of regulations and also submission of the documents regarding this. Each producer needs to make the application which seeks EPR authorisation through Form one of E-wastage rules. The Form-1 needs to comprise of relevant

information which pertains to channelization and collection of the end of the life products as mentioned in the section 2.1.1- 2.1.7. Producers have got the freedom of revising their plan of EPR regularly with the information to the CPCB. In this case, the authorisation of EPR demands amendments.

Still India doesn't have the official estimates of quantity of electronic waste which the country might generate. A lot of estimates are there. One recent estimate suggests that India might have generated about 1.5 million ton electronic waste in the year 2015. Since it is a fast growing market of electronic equipment like cell phones, e-wastage quantities might grow further rapidly. A very important attribute of electronic wastage management just like the other developing nations is that above 90% of electronic waste processing happens within the informal domain (**Ghalekhondabi and Ardjomand, 2019**).

The rules of electronic waste were first bunch of rules and regulations which have been implemented by the country for addressing the issue of electronic waste. The system of take back of 2011 rules demand the producers for setting up the collection centres, which could be collectively or individually be used for channelling the electronic waste in order to recycle and have a safe disposal. The dismantlers, producers, recyclers, etc. are mandated to be registers with regulators of the state that is State Pollution Controlling Board or the SPCBs and get authorisation for operations. Primary evaluation of effect of rules of 2011 recommend that response from the producers have been insufficient even though total number of the registered electronic wastage processing units have significantly risen since introduction of rules.

The Government of India also amended rules of 2011 in a pursuit to make them more efficient and new rules have also become impactful since 2016. The latest Rules along with compulsory taking back requirements, specify targets of collection as the percentage of sale of the electronic equipment along with targets getting stringent over time. Apart from the targets, Rule also need producers to register deposit refunding system for the electronic equipment. Regarding this, the new instruments of policy were also introduced into the EPR framework of India. Several papers have been done for reviewing the empirical and theoretical literature on the instruments of policy within the EPR and drawing the implications for prospective efficiency of instruments which have been introduced in the management regulation of electronic wastage in India (**Krishnamoorthy et.al. 2018**).

The greater part of the hypothetical models in the natural financial matters which evaluate the instruments of EPR utilize the structure wherein the makers, in the serious business sectors, help in amplifying the benefits by choosing material contributions towards creation and level of yield. The customers choose the amount they need to burn-through, arrange and reuse while augmenting utilities, subject to spending limitations. Then, at that point the models likewise assess financial efficiencies and cost proficiency of various instruments. A portion of the models join the recyclers, aside from the customers and the makers.

The regulations design places a lot of burden on already ill equipped agencies. Regulators need to assess the plan of EPR which is submitted by producers, give authorisation and also enforce provisions of this plan of EPR. The regulations should also be specified and elaborate the processes and standards for the other entities including the dismantlers, collectors, bulk consumers and recyclers. They demand the agencies for enforcing compliance with such standards (**Radulovic, 2018**).

Literature review

E-waste is the waste which arises from the end of the life electronic products like mobile phones and computers. It is considered to be one of the rapidly growing streams of waste across the world these days. The annual production of electronic waste across the world is expected to grow by approximately more than 50 million ton by end of 2021. India ranks amongst the top 5 e-waste producing nations across the globe with an estimate annual production of about 2 million ton. Actually like other agricultural countries, e-wastage the board the nation over is ruled chiefly by casual area having appraisals of 90% in addition to squander which is prepared in the area. The e-squander includes various valuable metals, ferrous, non-ferrous metals, uncommon gritty metals, wood, glass and plastic. The informal practices in preparing of the electronic waste are identified with various wellbeing and natural externalities. In a reaction to such concerns, a ton of creating and created countries have, in the recent many years, presented different guidelines. EPR or Extended Producer Responsibility and electronic waste EPR, is a broadly utilized technique which helps in controlling the e-squander across the globe, places liability of end of the existence the executives of the items on makers and the makers. Adroitly, Extended Producer Responsibility is intended for causing the makers and the makers to disguise outside cost related with end of the existence removal of the items (**Adhana, 2020**).

Association of monetary turn of events and participation or OECD have determined 2 fundamental goals of the methodology of EPR. The first is that EPR moves some piece of weight of the e-squander the executives from neighborhood government to the upstream makers. Furthermore, by constraining disguise of outside costs for removal, EPR is likewise expected to offer motivating forces for the makers for taking natural contemplations for plan of the item. For example, makers have the impetus of planning their items with the assistance of material which is not so much harmful but rather more recyclable in the event that EPR causes makers to disguise social expenses for removal after valuable life. Under EPR approach, makers could likewise be made mindful in 4 particular manners. The monetary onus makes makers and the producers pay, an expense regularly towards cost of electronic waste preparing model, reusing, assortment and removal. The actual obligation incorporates commanding for example, reclaiming of items from shoppers post the valuable existence of the item. The items reclaim necessities may even uphold assortment of the rate targets. The data obligation could likewise order offering data about qualities of items that is recyclability and poisonousness including these prerequisites, for example, naming of the item. At last, the responsibility rules could determine the monetary liabilities for the natural harms and tidy them up (**Arya and Kumar, 2020**).

The regulations of EPR might comprise of any one or mix of the 4 types of responsibilities of the producers. The very first regulations of electronic waste in India called E-waste including the handling and management rules of 2011 employed the approach of EPR

and demanded the producers manufacturing electronic products for setting up the collection centres that is the physical responsibilities of the manufacturers. They also need to inform their consumers that comes under the information responsibility regarding the right ways of returning the used products to these designated collection centres. Essential assessment of such guidelines portray that they may have fostered an interest for the new and formal reusing and destroying focuses, rules have been for the most part wasteful in improving the current practices. Somewhat as a reaction to shortcoming of these underlying principles and guidelines. The public authority of India has made changes in the standards multiple times, whenever it was done in 2016 and next in 2018. The revisions in these guidelines have likewise presented the objectives of reclaiming for the makers, whereby the makers are relied upon to gather some level of the items which are sold in past monetary year. The reclaiming targets rose from simple 10% during the time of 2017 to 2018 to about 70% from the year 2023 onwards. Part of the way, due to such guidelines, in the beyond 8 years, the electronic waste area in India has been encountering various changes which are more serious endeavours on piece of makers, extension of a proper area of waste administration, a rise of the PROs (Producer Responsibility Organizations) just as endeavours for creating native advancements for handling and recuperating various parts identified with electronic waste. Notwithstanding, regardless of such turns of events, main part of the electronic waste is as yet being dealt with by casual area. The primary goal of the colloquium is assessing present status of the biological system of electronic waste administration by ID of various difficulties which the area witnesses and the likely way for upgrades. This colloquium likewise brings along 9 articles from the worldwide and public sectoral specialists on different parts of electronic waste with respect to back, innovation, guidelines, arrangements, casual and formal area, PROs and business. Specialists come from various work backgrounds like the global advancement associations, government, the scholarly community, industry, common cultural associations, and so forth Thought about together, articles in colloquium consider various difficulties like lacking assets for observing and implementing the guidelines, deficient mindfulness among customers in regards to nature of the electronic waste and related guidelines and narrowing down the attention on consistence from the makers. The primary subject what slices through all articles, is significance of the casual area. A grounded and a solid organization of faculty work in the area chiefly in assortment of electronic waste. Yet, even in the reusing and recuperation measure (**Bhaskar and Kumar, 2019**).

This area produces business openings for a huge piece of populace, generally which has a place with underestimated segments in the general public. Various practices utilized by them, but are dangerous just as informal, and represent a ton of dangers to their wellbeing. They possibly force wellbeing and ecological expenses on bigger society. Generally the articles in colloquium wrestle with the issue about methods of bringing the solid organization of faculty into vigorous electronic waste administration frameworks that may save their business while relieving outer expense identified with electronic garbage removal and preparing (**Bhaskar and Turaga, 2018**).

Some studies explore the regulatory and policy perspectives about management of electronic waste. They discuss about the experiences of the policy that is followed in the other nations for management of electronic waste. It draws valuable suggestions from previous 8 years of the policy landscape of India. These studies delve into relationships found between the formal sector and informal sector for management of electronic waste in the country and recommend the suitable mechanisms for relationships between these 2 sectors.

Studies have been done which focus their attention on a need of indigenous technological development in order to access and recycle technology in informal sector. The financing of electronic waste systems within EPR approach is important and they offer a particular roadmap as well as milestones. They give a global viewpoint by bringing the insights about the importance of voluntary standards of the industry in the context of USA. PRO is one of the emerging institutions in the domain of electronic waste ecosystem. It is expected out of businesses to play an important role in developing a robust market of electronic waste and these studies bring this particular aspect of electronic waste. Finally the producers are centrally regulated entities in the current regulations of EPR and these studies call out for rethinking about the importance of the producers in the framework of EPR, arguing for better shared responsibility stratagem for managing the electronic waste (**Borthakur and Govind, 2019**).

There are certain issues and challenges also regarding electronic waste. The biggest issue is misinformation about generation rate of electronic waste. The regulations of 2012 acknowledged a lack of inventories of waste as the biggest limitation and assigned the responsibility for developing e-waste inventories across the state on respective SPCBs (State Pollution Control Boards). After 7 years of inception of such regulations, none of the SPCBs has released any inventory yet. The data of sales of electronic products, that's a significant input for estimation of the E-waste quantity, is available often at nationwide aggregation which makes it quite challenging for producing the inventories at state level (**Garlapati, 2016**).

Apart from the domestic generation, electronic waste is even imported from the developed nations, mostly illegally. There's less understanding of amount and nature of electronic waste which is imported into our country. The designing systems for efficient collection, processing and transportation demands reasonably accurate information about electronic waste generation, flows and composition. The environmentally unsustainable practices of the informal sector are also considered here. In spite of growth in formal dismantling as well as recycling sector regarding total number of these kind of facilities, the real waste which is processed in a formal sector is still quite low. The anecdotal evidences indicate that most of the formal facilities operate below the approved capacities due to their inability of sourcing sufficient amount of electronic waste. Insufficient awareness about electronic waste and the cost for returning end of the life equipment to formal centres of collection reduce willingness of the institutional and household consumers for returning their electronic waste to the formal sector. Something most important here is that informal segment, through convenience of the collection from households and the monetary incentives make it even more alluring for the consumers to easily return their electronic waste. The formal sector is yet to make investments in the robust systems for processing and collection (**de Albuquerque, Mello and de Freitas Gomes, 2021**).

The informal sector of electronic waste offers livelihoods to a lot of people who belong to the marginalised community. On the contrary, the waste management practices of the sector pose severe health and environmental hazards to workers themselves and larger public. It presents the prospective moral dilemma regarding the public policy and sustain success of electronic waste system of management which hinges on our capability of resolving the dilemma. Frictions in the markets are there for end of the life products. An inability to the reliable source quantities of electronic waste which create economy of scale also restrict the entry of the private players in the market like the PROs for setting up the electronic waste management system in formal sector. For instance, using efficient techniques of recycling for electronic waste might require a good upfront capital expenditure that might not be justifiable for the private players in absence of the certainties around sourcing of sufficient quantity of electronic waste **Patil and Ramakrishna, 2020**.

Also, such markets also suffer from the information hurdles. Firstly, given that the electronic waste recycling is new business relatively, a potentially insufficient information about the cost efficient recycling techniques might be the biggest market barrier. Secondly, less awareness, partly due to lack of the reliable information about electronic waste management amongst the consumers, affect functioning of the markets. The public policy might have an important role to play for enabling a better market for the electronic waste. In the regulations of 2012, the compulsory taking back system for the producers without any collection targets does not provide any incentives for taking the responsibility and therefore induce less improvements in the practices of electronic waste management **(Borthakur and Singh, 2020)**.

Objective of the Study

To study the effectiveness of Extended Producer Responsibility in E-Waste management in Haryana.

Research Design

A questionnaire was designed for stakeholders with specific reference to manufacturers and retailers of electronic products to know how they perform their EPR activities. The questionnaire had 5 questions in all. For the first question comprising of 9 statements a 5 point Likert scale ranging from strongly disagree (1) to strongly agree (5) was used. Rest 4 questions were left open ended to encourage respondents to express their views in a flexible manner. Demographic information was also collected to see the difference in their approaches towards EPR if it existed. The researcher carried out a series of in-depth face to face discussions with the stakeholders to get authentic data. A total of 174 stakeholders were taken from the four administrative zones of Haryana out of which 30 agreed to fill the questionnaire. Retailers were also contacted to know their views about EPR and the difficulties they face as stakeholders. The preliminary questionnaire related to studying the effectiveness of EPR also included demographic information of the respondents.

Non-Probability Convenient Sampling Technique was adopted to select samples in this study and Personal contacts on a random basis were used to approach the organizations and seek permission. A sample of respondents was taken from the universe in a manner that would foster both the quality and representativeness of data to facilitate better analysis and interpretation

Data Analysis

Extended Producer Responsibility (EPR) is a term most commonly associated with the manufacturers of electronic and electric items. It basically makes the manufacturer responsible to take care of E-Waste generated when their electronic item reaches its end of life stage. There are many activities that come under EPR and are must for all manufacturers to manage their E-Waste. Amendments in EPR related practices have been a useful feature of E-Waste Management and Handling Rules, 2018. It can practically improve the overall process of E-Waste management. One of the main objective of the study was to check the effectiveness of EPR and to achieve this objective various practices related to EPR have been studied. Various obligatory activities related to EPR have been noted and the study revolves around these activities to study the effectiveness of EPR. The focus has been on checking the applicability of such EPR activities which are mentioned in E-Waste Management and Handling Rules. The study focussed on finding the extent to which these practices have been followed by manufacturers and other related stakeholders.

Table 1: Obligatory Activities for Manufacturers under EPR as per E-Waste Management and Handling Rules, 2018

Sr. No.	Perspectives of EPR under E-Waste Management Rules, 2018
1	It ensures the take-back of the end-of-life products
2	Producer Responsibility Organization has been introduced to strengthen EPR
3	It has provisioned the targets for the producers which were missing in earlier version
4	Producer must ensure that his EEE do not contain pollutants like lead, mercury etc.
5	Producer shall provide detailed information on the constituents of the equipments along with a declaration of conformance to the RoHS (Restriction of Hazardous Substances) provisions in the producer user documentation
6	Imports or placement in the market for new EEE shall be permitted only for those which are compliant to provisions of [sub-rule (1) and sub-rule (4)] of Rule 16.
7	CPCB shall conduct random sampling of EEE to monitor and verify the compliance of RoHS provisions. The producer shall take corrective measures to bring the product in compliance, if it is not.

Source: E-Waste Management and Handling Rules, 2018

There are many examples of EPR activities performed by several companies such as Apple uses 100% recycled parts in adapters of iPhones which means EPR promotes use of recycled parts. Companies like LG have tie-ups with recycling companies to avoid practices like incineration and land filling. EPR also promotes practices like Exchange and Take back programs to channelize E-Waste. EPR also focuses on encouraging awareness campaigns to create awareness among people. Panasonic has done so under 'Harit Umang' program to encourage students of over 200 schools for a responsible disposal of E-Waste. EPR also specifies the targets for all manufacturers which get revised every year. Companies like Xiaomi have achieved its collection targets of 2019 in India. Under which it has been made mandatory to obtain EPR authorization and companies like Flipkart has already obtained such authorization in 2019 with several other companies and has achieved its collection targets of 2019 (Times of India, December13, 2019). EPR practices motivate manufacturers to set up E-care zones in its stores where customers can drop their E-Waste. EPR also encourages manufacturing companies to collaborate with other brands to give incentives to people who drop their E-Waste. Companies like Croma have adopted this practice to perform its EPR. Therefore it can be said that manufacturers are made more responsible for their electronic waste under EPR.

In order to check the agreeableness of manufacturers towards awareness of Extended Producer Responsibility (EPR), nine statements pertaining to EPR awareness have been asked. Out of 174 manufacturers, 30 responded. The response frequency of the respondents has been presented in table 1.

Table 2: Response Frequency of Manufacturers towards Awareness of Extended Producer Responsibility (EPR) in E-WasteManagement (N=30)

Statements	SD	D	N	A	SA
I am fully aware about E-Waste management issues in our country	00 (00)	00 (00)	03 (12)	17 (56)	10 (32)
I completely know about my role under EPR (Extended Producer Responsibility)	00 (00)	00 (00)	02 (6)	23 (78)	05 (15)
I am fully updated about E-WasteManagement Rules.	00 (00)	00 (00)	02 (6)	21 (69)	07 (24)
It is important to obtain essential certification from Government Agencies under EPR	00 (00)	01 (2)	06 (20)	09 (31)	14 (47)
I ensure regular inspection by SPCB/CPCB	00 (00)	01 (3)	06 (19)	08 (28)	15 (50)
It is our duty to manage E-Waste generated through our product.	00 (00)	00 (00)	01 (4)	20 (66)	09 (29)
According to me, providing label based information about E-Waste is sufficient	00 (00)	00 (00)	07 (25)	18 (59)	05 (16)
I ensure separate budget allocation for EPR related activities	00 (00)	00 (00)	05 (17)	08 (27)	17 (55)
I ensure maintenance of all documents of EPR related activities	00 (00)	00 (00)	06 (21)	09 (31)	15 (48)

Source: Primary Data

Table 2 shows the frequency and percentage regarding items of the Extended Producer Responsibility (EPR). Majority of the respondents (88%) are aware about E-Waste management issues in our country. Almost all the respondents (97%) also know about their role under EPR (Extended Producer Responsibility). More than (93%) respondents are found updated about E-Waste management rules. In case of obtaining certification, 78 % respondents understand the importance of getting essential certification from government agencies under EPR. Again 78% of the respondents make sure that the facility is inspected by SPCB/CPCB regularly. 95% of the respondents agreed to the fact that it is their duty to manage E-Waste generated through their products. According to 75% of the respondents, providing label based information about E-Waste is sufficient to manage E-Waste. When it

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Vol. 7 No. 1 (January, 2022)

comes to budget allocation, 82% of the respondents ensured separate budget allocation for EPR related activities. Documents of EPR related activities are maintained by 79% of the respondents. From the above discussion, it can be concluded that majority of the respondents fulfill their Extended Producer Responsibility activities. To understand further about awareness of EPR, descriptive statistics have been used for nine statements in table 3

Table 3: Descriptive Statistics indicating Awareness of EPR in E-Waste Management

Statement	N	Mean	Std. Deviation
I am fully aware about E-Waste management issues in our country	30	4.200	.635
I completely know about my role under EPR (Extended Producer Responsibility)	30	4.070	.497
I am fully updated about E-Waste Management Rules.	30	4.160	.563
It is important to obtain essential certification from Government Agencies under EPR	30	4.230	.839
I ensure regular inspection by SPCB/CPCB	30	4.250	.868
It is our duty to manage E-Waste generated through our product	30	4.230	.565
According to me, providing label based information about E-Waste is sufficient	30	3.910	.637
I ensure separate budget allocation for EPR related activities	30	4.360	.797
I ensure maintenance of all documents of EPR related activities	30	4.270	.789
Overall effectiveness regarding EPR	30	4.186	.249

Source: Primary Data

As per table 3, for the item, "I am fully aware about E-Waste management issues in our country", mean value came out to be 4.200 and SD= .635 which indicated that majority of the respondents agreed. For the item, "I completely know about my role under EPR (Extended Producer Responsibility)", mean value came out to be 4.070 and SD= .497 which suggested that majority of the respondents are towards agreement. For the item, "I am fully updated about E-Waste management rules." mean value came out to be 4.160 and SD= .563 which indicated that majority of the respondents agreed. For the item, "It is important to obtain essential certification from Government Agencies under EPR" mean value came out to be 4.23 and SD= .839 which indicated that majority of the respondents favour the item. For the item, "I ensure regular inspection by SPCB/CPCB", mean value came out to be 4.250 and SD= .868 which indicated that majority of the respondents are towards the agreement. For the item, "It is our duty to manage E-Waste generated through our product", mean value came out to be 4.230 and SD= .565 which indicated that majority of the respondents agreed. For the item, "According to me, providing label based information about E-Waste is sufficient", mean value came out to be 3.910 and SD= .637 which pointed out that majority of the respondents are towards agreement. For the item, "I ensure separate budget allocation for EPR related activities", mean value came out to be 4.360 and SD= .797 which revealed that majority of the respondents agreed. For the item, "I ensure maintenance of all documents of EPR related activities", mean value came out to be 4.270 and SD= .789 which denoted that majority of the respondents are found to be in favour of the item. In the case of overall effectiveness regarding EPR mean value is 4.186 and SD is .249 which shows that Extended Producer Responsibility is found high in most of the respondents.

Practices followed by Manufacturing Companies to fulfill EPR

Firstly, it was not an easy task to get the EPR related information from the manufacturing companies of electronic items. However 174 such companies from Haryana were contacted to see their EPR practices. Out of which, 30 agreed to share information with the researcher about EPR practices and rest of them denied to cooperate stating confidentiality issues. EPR has been implemented by the government so it is pertinent to study whether these companies work as per government norms. The industrial directions issued by the government mentioned in E-Waste Management and Handling Rules, 2018 have been used to identify the relevant respondents for the study. Relevant open ended questions were asked to get a better insight regarding EPR related practices and associated challenges. The manufacturers of electrical and electronic product based industries were identified and included as the respondents for the study. It has been observed that these companies follow the norms of government agencies for their operation and regular inspections were made from CPCB to monitor their EPR activities. Implementation of strict EPR practices has definitely

made the manufacturing companies more responsible. However lack of assistance has been found from government in terms of finance and training.

The practices adopted by companies towards their channel partners were also inspected. The EPR practices in relation to the channel partners include the introduction of buyback system for the retailers, it also include providing training to the channel partners like retailers and motivating them to increase awareness about E-Waste by supplying them awareness posters and initiating awareness campaigns through retailers and other channel partners. The manufacturing companies also have the responsibility to aware common man about E-Waste management and its effects under EPR. When asked about all these questions about EPR practices, most of the companies were found to abide by the EPR norms. These companies were found to be following the guidelines of MoEF. The companies do consider all these practices necessary but do not work on them to the required extent. It has been found that the companies also organize buyback setups and awareness campaigns but the frequency for the same is very low.

As far as channel partners are concerned, companies make effort to create awareness among them not only through awareness campaigns but also by marking symbols on them and also mentioning the proper and responsible way of disposal of obsolete electronic items. The manufacturing companies were also asked about if they also train their employees and the respondents revealed that the employees are provided training to manage electronic waste. The only issue with this was the intervals in which their training sessions are repeated. There was no concrete answer to this question and hence it can be assumed that training is not provided frequently to the employees working in these companies.

Findings and Suggestions

Since examining the effectiveness of EPR was one of the objectives of the study, therefore, several statements were given to the manufacturers to get input. Thirty manufacturing companies filled the questionnaire and the findings have been discussed below.

- Majority of the respondents are found aware about E-Waste management issues in our country. Almost all the respondents know about their role under EPR (Extended Producer Responsibility). So it can be concluded that majority of manufacturers are aware about their role under EPR.
- Almost all the respondents are found updated about E-Waste management rules and most of them understand the importance of obtaining essential certification from government agencies under EPR. Most of the respondents have essential certificates to operate their business.
- Majority of respondents revealed that their unit is inspected regularly by the agencies like CPCB and SPCB. The respondents were also found aware about their duty to manage E-Waste under EPR. This again reflects that the respondents are aware about their responsibilities under EPR.
- Majority of the respondents also feel that providing label based information is sufficient to manage E-Waste. However, it providing label based information can not address the problem completely but it could certainly help to some extent. But most of the respondents consider it as a good activity to make people aware about E-Waste.
- Majority of the respondents ensured separate budget allocation for EPR related activities. Since they are aware about their role under EPR, they make separate budget to carry out all these EPR related activities.
- Documents of EPR related activities are maintained by almost all the respondents. From above it can be concluded that majority of the respondents fulfill their Extended Producer Responsibility activities.
- Most of the respondents agreed that more awareness programs/campaign should be organised to enhance the awareness about electronic waste management. The government authorities should provide subsidies and other financial assistance to improve the process of electronic waste management in Haryana. Respondents also agreed that the companies should add the cost of EPR in product price to improve the E-Waste management and EPR related activities in Haryana.
- Manufacturers were found to understand their roles under EPR. They fulfill almost all their responsibilities under EPR. Some retailers were also contacted to see whether the EPR activities followed by the manufacturers also been communicated to them. Most of the retailers were found unaware about the EPR activities followed by the manufacturers which mean there exist a gap between what is claimed by the manufacturers and what exactly happens.
- Retailers don't get much assistance either from the government or the manufacturing companies except for small things like bins. This again shows that there is a gap in the practicability of EPR by the manufacturers.
- Retailers also revealed that the manufacturers do not motivate them to inform consumers about the proper disposal of useless electronic products or helping consumers to opt for take back options at authorized centers.

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