

STRATEGIES FOR ENHANCING EXTENDED PRODUCER RESPONSIBILITY ENFORCEMENT: A REVIEW

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Packaging Wastes (PWs) management is a global environmental challenge especially in cities of developing economies. Globally, it is a growing and critical waste stream. In order to achieve sustainable recovery rates in this waste stream, strategies such as source separation schemes should be adopted with the consideration of other techniques. In developed economies, a number of strategies to sustainably manage PWs have been successfully implemented. One of the strategies is the implementation and enforcement of Extended Producer Responsibility (EPR) on the manufacturers and distributors of packaging products. The purpose of this study was to assess the EPR schemes enforced in developed economies for proposal to developing economies. The study focused on developed economies in order to identify the key strategies that have enhanced the application of EPR schemes on the manufacturers and distributors. A total of twenty (20) studies that have focused on the subject were reviewed. The study reveals some key strategies that enhance EPR schemes enforcement and these include; systems approach; information and awareness; monitoring systems and definition of the roles of the stakeholders. The study has highlighted a number of factors and strategies that can impact the enforcement of EPR schemes in developing economies. These factors and strategies are key to policy makers, manufacturers and waste managers in the different packaging industries globally.

Keywords: extended producer responsibility, packaging wastes, policy, recovery, sustainability

INTRODUCTION

Provision of optimal waste collection services while ensuring effective and efficient enforcement of legislations and laws continues to be one of the major challenges in developing economies. The local authorities are responsible for solid waste management (SWM) in developing economies and these are faced with insufficient funds to provide optimal services. In most cases, 20-50% of the municipalities budget is spent on SWM which only covers less than 50% of the population (Memon, 2010; Henry et al 2006). Hoornweg and Bhada-Tata (2012) note that, less than 41% of waste is collected for disposal in lower income countries. As a result of the inefficiencies in the provision of SWM services to the communities in developing economies, inclusion of the private sector was thought to be one of

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the key solutions (Massoud and El-Fadel, 2002). To this regard, several public-private partnerships (PPP) have emerged (Abdrabo, 2008). Despite the new partnerships, the regulatory aspects of SWM remains a critical challenge to achieving sustainability especially in the management of packaging wastes (PWs). To this regard, this requires ensuring optimal recovery of PWs from the different points of generation with the engagement of the government, manufacturers and distributors. Engagement of the manufacturers and distributors of packaging products is accomplishable through enforcement of policies such as EPR. In developed economies, effective enforcement of EPR by the government continues to contribute to sustainable management of PWs (Xevgenos et al., (2015; Zhang and Wen, 2014).

This study focuses on filling the gap by analyzing the factors that have contributed to successful implementation of EPR in developed economies while pointing out strategies on how sustainable enforcement of EPR can be improved in the management of PWs in developing economies. The operation of EPR schemes on the recovery of PWs is also discussed from the developed economies' perspective. In order to highlight the strategies for enhancing EPR enforcement to developing economies, the following research questions are addressed;

1. What is EPR?
2. What are the operations of EPR on the recovery of PWs in developed economies?
3. What strategies have enhanced the enforcement of EPR in developed economies?

LITERATURE REVIEW

Extended Producer Responsibility

Hickle (2014) notes that, EPR is a policy for internalization of environmental costs of products in order to ensure greener products and smaller environmental footprint. Producer fees are used as implementation schemes and recovery and recycling responsibility is reflected on the industries and their related distributors (Hickle, 2014). In most case, fees are country specific and are bound to be material-specific or weight-based.

EPR schemes differ contextually depending on the spectrum of the packaging waste. It can involve commercial or household wastes or both (Cahill et al, 2010). In this study, the emphasis is on packaging wastes.

EPR has been enforced in a number of European nations and the Producer Responsibility schemes are in place. Two broad categories are used in the operation of the responsibility of producer responsibility scheme. These are financial responsibility and physical responsibility (Fernie and Hart, 2001). The physical responsibility lies with the local authority while the financial responsibility lies with the industries. In form of license fees paid on an annual basis, the members contribute to join and stay in the scheme to the Producer Responsibility Organization and thus contributing financially from the financial responsibility aspect.

Operations of EPR on Packaging Waste recovery

The amount of PWs going to the landfill sites continues to pose environmental challenges. Plastic Solid Wastes (PSWs) have a major environmental problem as a result of their non-degradability properties. Appropriately 50 million tons of PSWs is generated annually in Japan, Europe and USA (Hoornweg and Bhada-Tata, 2012). The increase in PSWs generation rates has not excluded developing economies. Hoornweg and Bhada-Tata (2012) indicate that, the amount of PSWs generation will increase from 8 to 13% by 2050. With these observations in the expected increase in PSWs generation in developing economies, strategies for sustainable management should be addressed. As for developed economies, a number of strategies, policies and regulations have been successfully implemented. For example, in 1996 the government of the United Kingdom (UK) introduced a landfill tax to encourage sustainable waste recycling and management (Fernie and Hart, 2001). In 1997, the Producer Responsibility Regulations (PRR) was enforced and focused on ensuring companies accept responsibility for recycling and recovering their PWs introduced on the market (Fernie and Hart, 2001). In Europe, the PWs Directive introduced in 1994 focused on "prevention of packaging waste." The essence of the directive was to administer a legislative framework for encouraging member countries to reuse, recycle and recover packaging wastes. To support the directive, member states were instructed to set packaging recycling targets in the range of 25 percent to 45 percent with a minimum waste type recycling target of 15 percent (Fernie and Hart, 2001).

In the study conducted by Xevgenos et al (2015) a number of success stories on the implementation of EPR are highlighted. In Austria, a total of 114 million pounds was raised in 2012 from more than 15000 licensees (packers, retailers, producers, importers and fillers). The EPR system in Austria is regarded as one of the most effective systems in Europe and the physical and financial responsibility lies with the producers while the local authorities can be involved and reimbursed for collecting packaging wastes (Xevgenos et al., 2015).

In terms of recycling rates, Germany is considered one of the EU nations with the most effective applied scheme and its Duales System-Deutschland (DSD) is responsible for coordinating the recovery and collection of packaging wastes. DSD has 15000 licensed members and covers household packaging wastes. In terms of financial and physical responsibilities of EPR, industry bears all the costs while the municipalities are reimbursed for contractual collection activities (Xevgenos et al., 2015).

A recycling rate of approximately 96% was achieved in Belgium (Xevagenos et al, 2015) as a result of the recycling system. Belgium utilizes the Green Dot system which is performed by a private non-profit organization. A total of 5233 companies are registered with it and covers household packaging waste. The financial responsibility is covered by the private and the local authority are reimbursed for performing collection activities hence covering the physical responsibility.

A Green Dot company operates in Ireland and focuses on household and industrial waste streams. It contracts local authorities and private companies. In terms of cost responsibility, the industry is responsible for commercial wastes while for

household packaging wastes, the local authorities and industry share the responsibilities (Xevgenos et al., 2015).

Italy has implemented a producer fee scheme which is a sole national compliance scheme and is based on the "first transfer." Approximately 1.5 million members are registered from both producers and users of packaging products. The physical responsibility is covered by the municipalities while the industry covers the financial responsibility (Xevgenos et al., 2015).

Japan has a well-defined EPR scheme in which the responsibilities and, roles of the industry and the local authorities are well outlined in the Packaging Recycling Act. The EPR scheme is managed by the Japan Container and Packaging Recycling Association (JCPRA) (Zhang and Wen, 2014). It is a sole national compliance scheme in which the costs are split between the industry (45%) and the local authorities (55%). Municipalities are reimbursed on recycling costs relative to the quality achieved. One aspect that has contributed to the quality of the product recycled is that, some municipalities demand source segregation of waste.

Strategies to effective EPR enforcement

Effective enforcement and implementation of EPR on the manufacturers and distributors can never work in isolation of the product consumers and waste generators. In many nations, post-consumer products' recycling is implemented to reduce the amount of waste that goes to the landfills and also conserve resources. To support EPR schemes, recycling programs and targets have been set in developed economies and this is usually not in isolation of the consumers. Buelow et al (2010) notes that, majority of the recycling programs are dependent on consumers segregating their wastes and participating in the programs. Involvement of the consumers in recycling programs is a strategy that has not fully been implemented in developing economies. Mwanza (2018) designed an African reverse logistics model for PSWs and the study highlighted a number of factors that prevent households from participating in recycling and recovery programs for PSWs. Lack of information and enforcement of EPR were highlighted.

A number of EPR schemes focus attention on the reduction of packaging waste from the industry and households' perspective. However, despite this being the responsibility of the producers and distributors, policy makers should understand that, the EPR schemes do not work in isolation of the waste generators and managers. Further, a number of strategies are required to facilitate successful implementation of the policies and schemes. It is also important for the manufacturers and distributors to understand the framework of the policy in order for them to positively respond to the existing and new challenges. In most cases, the pressure imposed by the policy obligates most manufacturers and distributors to understand the environmental issues for their success and survival.

In order to understand the strategies that have contributed to the success stories on the implementation of EPR schemes in developed economies, Table 1 below highlights the strategies that contribute to effective implementation of EPR. Further, the table outlines the strategies, the context in which the study was conducted, the methodology and the nature of the industry.

Table 1: Strategies that contribute to effective enforcement of Extended Producer Responsibility

| Author Names | Methods Used | Context | Industry | Strategies to Support EPR |
|---------------------------------|--|-------------|---|--|
| Fernie and Hart (2001) | Interviews and Case study | UK | Food Industry (Packaging Waste) | Design of legislative frameworks Systems to support recovery; Databases to monitor the amount recovered, recycled and reused Set recycling and recovery targets Design drop-off centers at supermarkets and encourage the consumers to participate |
| Corbett and Cutler, (2000) | A Case-Study of 7 companies | New Zealand | Plastic Industry (Packaging Waste) | Characteristics of NZ plastic industry Regulatory Control Public Perception Preventive approach and raw material and waste management practices Customer and suppliers Culture and leadership People Practice |
| Mandaraka and Kormentza, (2000) | Empirical Study, Questionnaires | Greece | Plastic, Paper, Aluminum, Glass (Packaging Industry) | Information and sensitization of consumers Formulation of outlines and other necessary terms Information and training of manufacturers, suppliers, transporters and users Open and public dialogue for the harmonization of the Greek legislation to the EU regulation Continuous study and evaluation of management systems and recycling programs. |
| Zutshi and Soha (2003) | Case-study of nine companies | Australia | Manufacturing and Service Industries | Methods of identification of improvement areas Need and usage of audit findings Monitoring progress Role of communication Role of senior management Role of employees Role of suppliers Role of consumers |
| Jecton and Waema (2013) | Collecting data using interviews, direct observation and literature review | Kenya | Electronic Industry | A clearly defined e-waste collection system; Universities, NGOs and investors; Clearly defined transport logistics; Producers and manufacturers of electrical and electronic equipment; The informal sectors Collaboration Monitoring of illegal imports and dumping. |
| Xie and Breen (2014) | Literature review and in-depth interviews | UK | literature review with empirical work, benchmarking method, survey and interviews | Recapturing product value processing approaches System cooperation and enforcement Drivers and motivations System design and facilitation. |

MATERIALS AND METHODS

An extensive review of articles focusing on EPR and waste management was conducted. Using the research engine, articles were downloaded from the following online publishers; Elsevier, Emerald, ScienceDirect and Wiley. A total of 40 articles were downloaded using the search themes of; "extended producer responsibility AND waste management," or "extended producer responsibility AND packaging wastes." A total of 20 articles were selected to form the sample size because the studies focused attention on the aforementioned themes. Further, the studies were conducted in developed economies and hence met the criteria of selection.

The study reviewed the articles and focused attention on the methods that were used to conduct the study, the context that the study was conducted in and the strategies that have contributed to the successful implementation of EPR. The methods used to conduct the study are relevant to highlight as they present to the developing economies, the research designs that can be used as well as the gap in the methodology. For the context, it was necessary to present the context to show where most of the studies have been conducted and also highlight that, the strategies outlined in these contexts should not be applied directly in developing economies but to indicate that, studies of the same nature should be conducted in order to appreciate the differences.

Based on the nature of the research questions presented in the introduction section, a systematic analysis of literature was conducted to address the questions. Further, the strategies identified in the reviewed literature were analyzed using the thematic approach and this formed the basis on which the discussion section was presented. The study is therefore an analytic type of study, as it reviews the different articles with the aim of identifying and highlighting the strategies that have contributed to EPR success in developed economies. According to Ghosh (2013), analytic methods focuses on breaking down a phenomenon into its constituent elements and it is conducted in order to understand the effect of a complex phenomenon. It determines the elements that are relevant and irrelevant to the phenomenon. The study also highlights the industries in which the study was conducted in order to identify the gap as well as show the industries in which EPR has been successful.

Based on the above criteria, the packaging industry was used as a result of the environmental profile. In addition, the results from the study are important for most developing economies' manufacturing and recycling industries. According to Sarkis et al (2010) recovery and recycling of PWs is still at its infancy in most developing economies despite the introduction of legislations and laws. Analysis of the strategies behind the successful implementation of EPR schemes is thus relevant to developing economies.

RESULTS AND DISCUSSIONS

Based on the research questions presented in the introduction section, the lessons learnt from the reviewed studies are discussed. Further, using thematic analysis, the strategies for enhancing EPR are presented and discussed.

Lessons from EPR enforcement

EPR is a key policy for economies to achieve a circular economy and sustainable management of wastes. In the studies reviewed above, a number of EU nations if not all, have enforced EPR through the PPW legislation. It is also clear that, the EPR is categorized into two broad concepts, the financial responsibility and the physical responsibility. The categorization of EPR has clearly defined the stakeholder's responsibility. For example, in Austria, Germany and Belgium, the municipalities are reimbursed by the industry for the physical responsibilities performed.

It is also interesting to note that, a compliance scheme exists in Belgium, Italy, Germany and Austria, and the industry is mandated to register and obtain licenses in order to practice EPR. For example, in Italy almost 1.5 million members are registered from both producers and users of packaging wastes. Xevgenos et al (2015) indicates that, approximately 114 million pounds was raised in Austria from the license fees. This aspect is a success story for developing economies, to understand that, producers and users of PWs should be involved. For example, users of packaging wastes should pay for collection services but it should not end there. In Japan, households are required to segregate their wastes and this has increased the quality of the wastes recovered. A total of 96% recycling rates was achieved in Belgium as a result of clearly structured EPR.

Fernie and Hart (2001) have alluded that, the purpose of the PRR legislation is for companies to be responsible for the recovery and recycling of PWs. To facilitate the implementation of PRR, the EPR scheme guides the industry through the producer fees. These fees differ contextually and for this reason, countries should conduct feasibility studies and involve the relevant stakeholders. Further, setting of recycling rates for the industries has contributed to successful implementation of EPR schemes, for example, 25% to 45% recycling rates were set in the EU nations (Fernie and Hart, 2001).

Hoornweg and Bhada-Tata (2012) indicate that, the amount of PSWs will increase from 8 % to 13% by 2050 in developing economies. It is also clear that, developing economies have waste management challenges. To this regard, the success story of Japan's enforcement of the EPR scheme is relevant to developing economies. For example, the costs for managing PWs are split between the industry (45%) and local authorities (55%). Further, the municipalities are reimbursed for any recycling costs and this is subject to quality.

Strategies to enhance EPR enforcement

A number of studies reviewed have highlighted strategies that enhance effective enforcement of EPR schemes. From different contexts, research methods and different industries, a number of commonalities in the strategies are noted.

Systems approach

A systems approach to the management of PWs and other wastes is highlighted. Design of systems for the recovery of PWs (Fernie and Hart, 2001); characterization of the plastic industry (Corbett and Cutler, 2000); continuous study and evaluation of management systems and recycling programs (Mandaraka and Kormentza, 2000); and system design and facilitation (Xie and Breen, 2014). These studies indicate that, a systems approach to managing PWs enhance the enforcement of EPR schemes. These strategies are relevant for adoption in the legislation

frameworks for PWs. For example, Japan has implemented a framework that is clearly defined to the stakeholders (Xevgenos et al, 2015). A system approach to the enforcement of EPR is viable in the sense that, the stakeholders involved are aware of their roles and responsibilities as well as the chain of management.

Roles of the stakeholders

A number of stakeholders are involved in the waste management arena. To this regard, their roles should be clearly outlined to enable successful engagement and implementation of EPR schemes. Zutshi and Sohal (2003) indicates that, the roles of the senior management, consumers, suppliers and employees should be clear in the management of PWs. In the EPR schemes operations, the financial responsibility and physical responsibility are clearly categorized as well as the stakeholders' responsibility. It is thus clear that, outlining the roles of the consumers, senior management, suppliers and employees is relevant to enhancing EPR enforcement. People practice is noted by Corbett and Cutler (2000) and Jecton and Waema (2013) indicate that, producer, manufactures and informal sector engagement enhance EPR schemes enforcement.

Information and awareness

Provision of information on PWs management is key to the enhancement of EPR schemes. For example, the stakeholders are required to understand their roles and what is expected of them in the recovery and recycling programs. Zutshi and Sohal (2003) noted the role of communication to enhancing EPR schemes. The role of communication in the recovery and recycling programs is important. For example, communication on the targeted and expected recycling rates should be communicated to the stakeholders involved. Corbett and Cutler, (2000) indicated public perception on EPR schemes. To this regard, information on the subject matter should be communicated to the public in order to understand their perceptions. Mandaraka and Kormentza, (2000) alluded that, information and sensitization of consumers is key to enhancing EPR schemes enforcement.

Monitoring systems

Design of systems for recovering and recycling of PWs is never in isolation of the monitoring systems. Therefore, to enhance EPR schemes, the systems designed to monitor; the amount of money generated from the license fees, the industries registered, the amount of PWs recovered, the technologies used to convert the wastes etc. should be monitored. A number of authors have indicated the relevance of monitoring systems (Xie and Breen, 2014; Jecton and Waema, 2013; Zutshi and Sohal, 2003; Mandaraka and Kormentza, 2000; Fernie and Hart, 2000; Corbett and Cutler, 2000). For any system to work effectively, monitoring mechanisms should be in place. In developed economies such Germany, Japan, Australia, monitoring systems track the progress of the recycling targets as well as the industries registered to the EPR schemes.

CONCLUSION

Globally environmental concerns towards PWs are becoming clearer. Internationally, the implications have become imperative and thus the necessity to implement contextual environmental legislations. The studies reviewed have shown the strategies that have contributed to the enhancement of EPR schemes

contextually. Further, it is noted in the findings that, the PRR enforced in a number of the EU nations have been adjusted to suit the context of each nation.

A number of lessons can be drawn from this study. Firstly, EPR is categorized into physical and financial responsibilities. The stakeholder mandated to each responsibility performs the roles and this has enhanced EPR schemes enforcement. Other strategies that have contributed to EPR include and are not limited to the; systems approach, information and awareness; monitoring systems and definition of the roles of the stakeholders.

For developing economies and the stakeholders involved in the enforcement of EPR schemes, the study provides information that can contribute to the success stories noted in developed economies.

The study has highlighted a number of strategies that have contributed to successful implementation of EPR in developed economies. However, the study has some limitations in terms of the sample size of the studies that were reviewed. To this regard, consideration of a larger sample size would provide more strategies for consideration. Further, the study has not discussed the challenges that face developing economies in the implementation of EPR.

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