Industry perceptions of South African Extended Producer Responsibility (EPR) Regulations: Challenges and opportunities for the paper and packaging industry

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Dissertation accepted in fulfilment of the requirements for the degree *Master of Environmental Management with Waste Management* at the North-West University

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Graduation May 2024

23581204

PREFACE AND ACKNOWLEDGMENTS

I would like to acknowledge and give my profound appreciation and thanks to my supervisor Dr RC Alberts who made the completion of this research possible. His guidance and advice carried me through all the stages of this research.

I am also grateful to my husband and my son for their patience, understanding and support they gave me while I devoted family time towards completing this research.

Finally, I thank God for giving me strength and power to complete this research.

ABSTRACT

The waste management environment in South Africa is undoubtedly characterised by collection and landfilling with a limited amount of recycling. Landfills have several detrimental environmental effects, including air pollution from burning waste and methane gas release, soil and water pollution from seepage from the landfill cells, leachate collection systems, uncontrolled spillages and discharges, and more. In addition, most of the landfills in South Africa particularly those located in urban areas have or are nearing the end of their lifespan. On the other hand, there is a shortage of suitable land to establish new landfills. To combat the littering and landfilling issues, there is an urgent need for better waste management through promotion of recycling and reuse of End-of-Life (EOL) products.

South Africa recently introduced the Extended Producer Responsibility (EPR) Regulations to address the problems of waste management in the country. The EPR has now emerged and is now recognised worldwide as an effective and efficient waste management principle that promotes reuse and recycling of EOL products. The EPR is also regarded as a catalyst or pathway to attaining a Circular Economy (CE). The EPR is conceptualised from the polluter pays principle (PPP) whose basic feature is that producers are responsible for managing the waste generated by the products they put on the market.

The “cheapest cost-avoider” (the producer) is the main actor within the value chain who is in the best position to provide a solution or the “best briber” (producer) who is best suited to transmit the stimulus of the EPR policy to the most suitable stages. The successful implementation of EPR therefore largely depends on the practices and actions of producers. The aim of the research is to assess the paper and packaging industry’s perceptions of the opportunities and challenges associated with the EPR Regulations in South Africa. The EPR is a new concept in South Africa and there is very little research on the subject in this country. This research is therefore exploratory and qualitative. The research lays a foundation for future research. Data was principally obtained through semi-structured interviews with producers and Producer Responsibility Organizations (PROs) in the paper and packaging industry.

The results showed that in principle, there is widespread support of EPR by the packaging industry in South Africa. However, the industry has certain reservations about the EPR regulations. From the research, the following challenges were identified: disproportionate allocation of responsibility to the producers, the costs of rolling out accessible EPR collection points, weak or absence of monitoring and enforcement by Government and concomitantly the problem of free riders. Although EPR presents immense benefits to the environment, the research

established that there are no or very little financial benefits of EPR to the producers at least in the short term. Recommendations are made to alleviate these challenges. This research will contribute towards future research that looks to undertake an empirical investigation of the economic and financial benefits of EPR to producers. Further research can be conducted in several areas pertaining to EPR such as exploring South African companies' readiness to implement EPR.

Keywords: Producers, EPR Regulations, EPR, Paper and Packaging Industry, Design for Environment, EOL, CE, Waste Management and PROs.

ABBREVIATIONS AND ACRONYMS

Abbreviations	Full Meaning
3 R's	Reduce, Re-Use and Recycle
CE	Circular Economy
C&C	Command & Control
CPR	Collective Producer Responsibility
CPRO	Collective Producer Responsibility Organizations
CSR	Corporate Social Responsibility
COGTA	Cooperative Governance and Traditional Affairs
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs & Tourism
DFE	Design for Environment
DFFE	Department of Forestry, Fisheries and the Environment (South Africa)
DRS	Deposit Refund Scheme
DWS	Department of Water and Sanitation
EC	European Commission
EPA	Environmental Protection Agency
EMF	Ellen MacArthur Foundation
EPR	Extended Producer Responsibility
EOL	End Of Life
ESG	Environment, Social & Governance

FNASREC	North -West University, Faculty of Natural and Agricultural Sciences Ethics Committee
GNR	Government Notice Regulation
GRI	Global Reporting initiatives
GPP	Green Public Procurement
IPR	Individual Producer Responsibility
ISWA	International Solid Waste Association
IWMSA	Institute of Waste Management of Southern Africa
IP&WM	Integrated Pollution and Waste Management
LE	Linear Economy
MBIs	Market Based Instruments
MOU	Memorandum of Understanding
MSW	Municipal Solid Waste
NWMS	National Waste Management Strategy
NEMA	National Environmental Management Act of 1998 (Act No 107 of 1998)
NEMWA	National Environmental Management Waste Act (Act No 59 of 2008)
OECD	Organisation for Economic Cooperation and Development
PAYT	Pay As You Throw
PET	Polyethylene Terephthalate
PLC	Product Life Cycle
P&C	Production & Consumption
PPP	Polluter Pays Principle

PRO	Producer Responsibility Organisation
SAPRO	South African Plastics Recycling Organisation
SAWIS	South African Waste Information System
SAWIC	South African Waste Information Centre
SDG	Sustainable Development Goal
SoWR	State of Waste Report
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNCED	United Nations Conference on Environment and Development
WMH	Waste Management Hierarchy
ZWCE	Zero Waste Circular Economy

KEY DEFINITIONS

TERM	DEFINITION
Circular Economy Model	Is a production and consumption model that aims to reduce disposal through the reduce, reuse, reject, rethink, redistribute, repair, restore, reuse, recycle, and recover of materials and minimizing incineration and disposal (Bag *et al*., 2020).
Design For Environment	Is a design strategy that considers all aspects of a product's life cycle to minimize the overall impact on human health and the environment.
Environmental Effectiveness	Is the extent to which the instrument could be used to reduce or change environmental impacts in relation to the policy targets set (OECD, 2001).
Extended Producer Responsibility	Organisation for Economic Cooperation and Development (OECD) defines EPR as an environmental policy framework that extends a producer's liability for a product to the post-consumer stage of a product's life cycle, including ultimate disposal.
Green Economy	Is defined as low carbon emissions, resource efficient and socially inclusive. In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that permit lower carbon emissions and pollution, improved energy and resource efficiency, biodiversity conservation and ecosystem services (UNEP, 2021).
Linear Economy Model	Is described as "take-make-waste" or "take, produce, consume, and waste" (van Buren *et al.*, 2016; Masi *et al.,* 2018).
Producer Responsibility Organisations	Are consortia that manage the collection and processing of the EOL products and packaging on behalf of member companies (Lifset and Lindhqvist, 2008).
Producer	Constitutes any individual or group of individuals, including brand owners, involved in the commercial manufacture, conversion,

	refurbishment (if applicable), or import of new or used products that have been identified by the Minister through a notice published in the Government Gazette under section 18(1) of the Act. A producer also includes, as applicable, the same as defined in the specific section 18 notice for each of the identified products that the Minister has gazetted under sections 18(1) and (2) of the Act (DFFE, 2020).
Packaging	Means any material, container or wrapping or corrugated cases, used for the containment, transport, handling, protection, promotion, marketing or sale of any product or substance, which may be primary packaging, containing the actual product or secondary packaging or tertiary packaging, typically containing products already packaged in primary packaging.
End-Of -Life	EOL in the context of manufacturing and product life cycle, is the final stages of a product's existence.
Free Riding	Is when producers benefit from the EPR system but do not contribute anything to the operations of the PRO (OECD, 2016).

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CHAPTER 1 INTRODUCTION

1.1. Background

The increase in mismanagement of waste is made visible by frequent visibility of littered plastic, multiple packaging materials, and bottle pollution among others, as reported globally (Gibbs *et al.,* 2007). Jambeck *et al*. (2015) associated the global increasing population, per capita consumption and economic growth with increase in waste production. The United Nations (UN, 2020) projects that the world's population will increase to approximately 9.7 billion by 2050 and could peak at 11 billion by 2100, thus exponentially increasing the amount of waste generation.

The definition of waste management services according to the World Bank (2016), include removal, transportation and disposal. The above scope of waste management services, as defined in the World Bank (2016) is known to absorb approximately 50% of the total municipal budgets. The UN-HABITAT (2010) estimates that around 50% to 80% of middle-income countries have access to waste collection services. Comparatively, Department of Environmental Affairs (2018) records that in South Africa, approximately 30% of urban households' dispose of their own waste, while Rodseth *et al*. (2020), reported that 90% of the country's rural population have no access to refuse removal service. A detailed breakdown of refuse removal and broad solid waste management in South African is presented below (Figure 1-1).

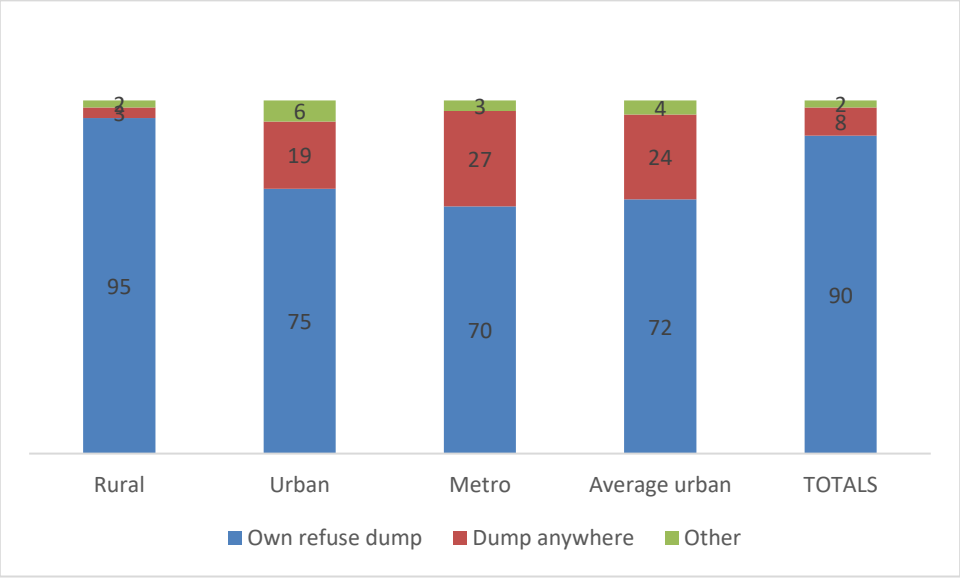

Figure 1-1. Rate of South African households without access to waste collection.

Source: Adopted from DEAT (2018).

Uncollected or improperly disposed-off waste is known to pose negative environmental and public health impacts, particularly for serving as suitable breeding environment for disease vectors (Amoako, Frimpong & Boamah, 2015). In cities, uncollected or improperly disposed-off waste impairs sanitation infrastructure, blocks drains and exacerbates floods as witnessed by Dhiman *et al*. (2019) in Durban during the 2019 floods. During an interview with City Press, 17 November 2019 (City Press, 2019), the Kwa-Zulu Natal's Cooperative Governance and Traditional Affairs (COGTA) Member of the Executive Committee (Hon Sipho Hlomuka) summed up the problem as a "rampant littering and illegal dumping blocked drainage systems and this is a phenomenon across the province".

Metz *et al*. (2007) adds that waste disposal is also a contributory factor to global climate change. It is estimated that inappropriate waste disposal contributes to approximately 3% of greenhouse emissions (Metz *et al*., 2007). According to EPA (2015), landfills produce up to 12% of global methane emissions. The later reports reflect an accelerated and worsening state of environment concerns associated with the deteriorating quality of the global natural environment. According to UNEP (1989) and Oyesola (1995), the global natural environmental concerns were first raised during the United Nations Conference on the Human Environment in 1972 in Stockholm. Efforts to address these concerns continued in the 1980s during the World Commission on Environment and Development (Brundtland Commission, 1987), through to the 1990s during the Earth Summit Conference (Rio Conference), resulting in the Agenda 21 report of 1992. South Africa, like many countries endorsed and domesticated these international conventions into national environmental law.

According to Kaza *et al.* (2018), waste is a global problem associated with activities of companies such as extraction of raw materials, manufacturing, producing, selling of goods to satisfy societal needs ultimately produces waste. Every year, the world generates approximately 2.01 billion tonnes of domestic waste, of which more than 33% is improperly managed (World Bank, 2018). Only 30% of the 2.01 billion tonnes of waste produced worldwide each year is diverted from landfills by means of recycling, reusing, composting, or incineration (Kaza *et al*., 2018). Despite accounting for only 16% of the world's population, high-income countries generate approximately 34% (83 million tonnes) of the world's waste. Globally, per capita waste generation per day averages 0.74 kg (World Bank, 2018). Figure 1-2 depicts the trajectory of waste generation measured in millions of tonnes per year by region.

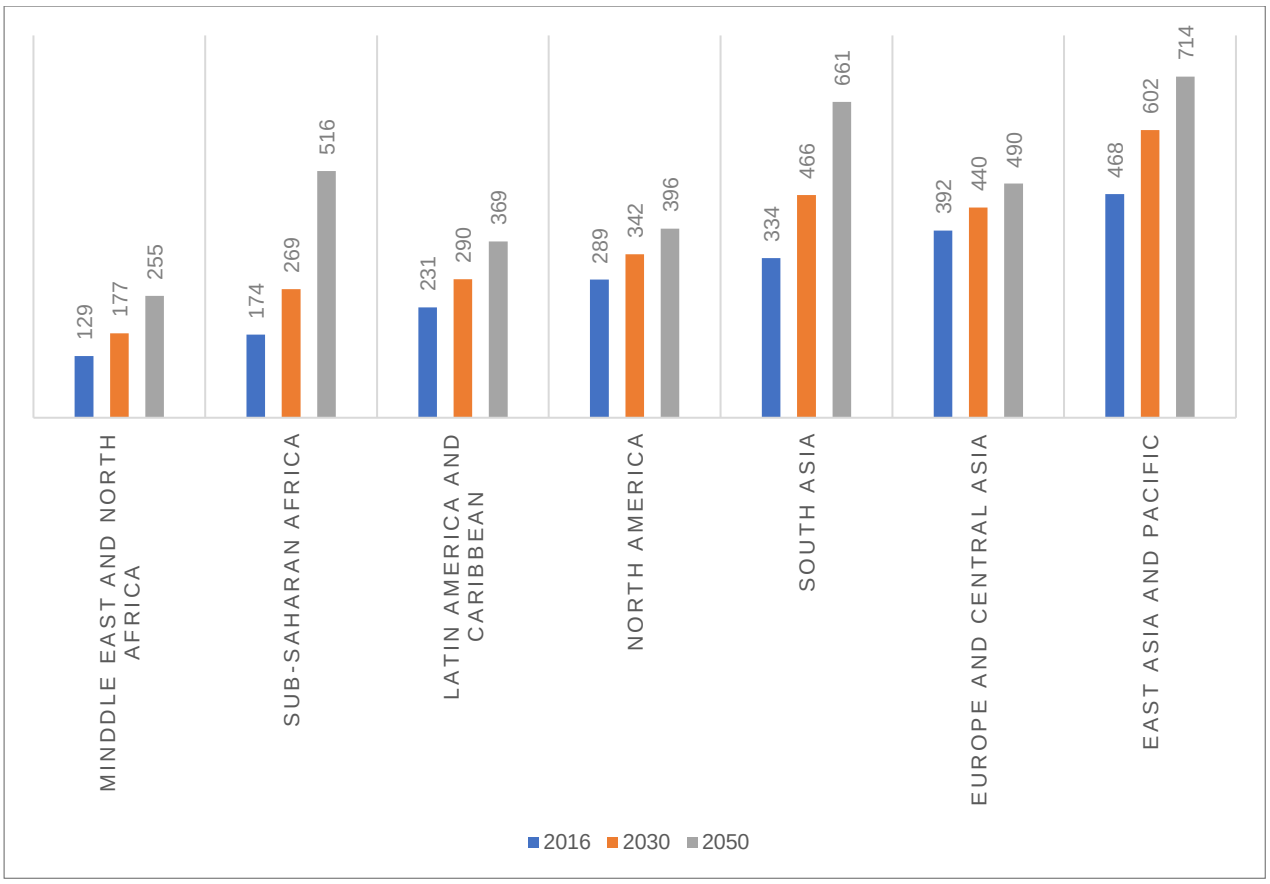

Figure 1-2. Projected waste generation according to regions

Source: World Bank (2018).

The amount of waste generated in the world is anticipated to increase by 70% by 2050 (World Bank, 2018). The total amount of waste generated in low-income countries is expected to more than triple by 2050 (World Bank, 2018). The East Asia and Pacific region account for 23% of global waste generation, while the Middle East and North Africa region accounts for 6% in absolute terms. However, Sub-Saharan Africa, South Asia, and the Middle East and North Africa are the fastest growing regions, with total waste generation expected to more than triple, double, and double by 2050, respectively. More than half of the waste which is generated in these regions is currently dumped openly, and waste growth trends will have far-reaching negative consequences for the environment (World Bank, 2018).

The composition of waste worldwide varies and is complex, and improper disposal harms the environment (Tchnobauoglous *et al*.,1993; Ikechukwu, 2015). Paper, plastics, textiles, metals, and glass comprise most the world's waste streams. The United States, for example, generates over 250 million tonnes of municipal waste per year, with paper, plastics, metals, and glass accounting for 31% of this waste (U.S. EPA, 2009).

Africa produced 125 million tonnes of municipal solid waste (MSW) in 2012. This amount is anticipated to double by 2025. Waste collection services in most African countries are poor. The average collection rate is estimated at 55%. More than 90% of waste is disposed at undesignated dumpsites invariably associated with open burning. Approximately 70-80% of MSW that is generated in Africa is recyclable and only 4% of the waste is recycled (UNEP, 2020).

Although there is generally lack of accurate data on waste generation rates in South Africa (DEA, 2018), there is no doubt that the amount of waste generated in the country is unsustainable. The State of Waste Report (DEA, 2018) reported that South Africa generated about 55 million tonnes of general waste in 2017. Organic waste at 56.3% accounted for most waste generated. Chris Wiid (Chris, 2020) estimates that South Africa generated more than 125 million tons of general and hazardous waste annually and asserts that most of it about 90% goes to landfills. It is further estimated that large amounts of waste are illegally dumped (Rodseth *et al*., 2020).

Littering and illegal dumping particularly in informal settlements, townships and villages has reached pandemic proportions. Litter is a common sight on city and town streets. South Africa has a serious litter problem (DEA, 2018). Littering is recognised as a method of incorrectly disposing of waste (Garg & Mashilwane, 2015). Littering and illegal dumping are now widely acknowledged as a serious problem in South Africa (DEA, 2018). The most littered items include fast food packaging, plastic and paper bags, cider, beer, soft drinks bottles, cans, advertising flyers, cigarette butts and lately disposable nappies. Uncontrolled disposal (littering, illegal dumps) of waste disfigures the waste management hierarchy (WMH) as shown in Figure 1-3.

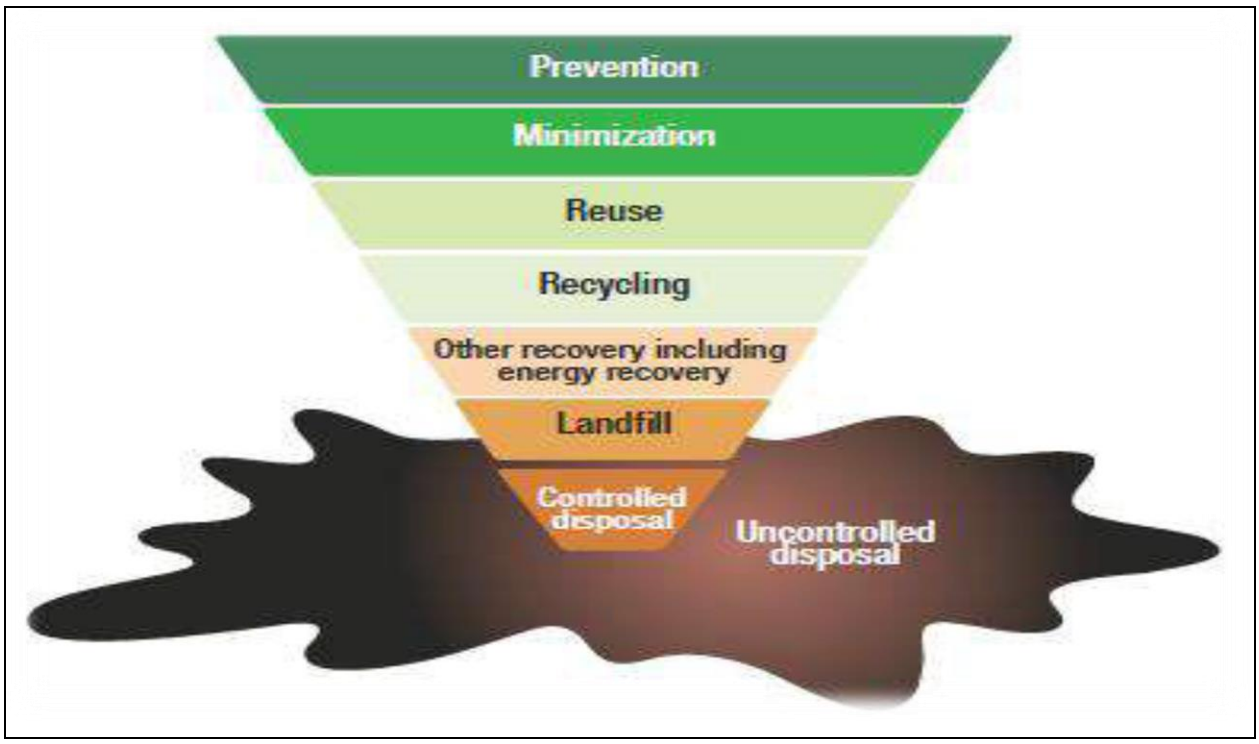

Figure 1-3. Disfigured Waste Management Hierarchy due to littering and illegal dumping

Source: UNEP (2015).

The waste management problem in South Africa has its roots in the prevailing LE model currently prevailing globally and, in the country (Wickman & Rockström ,2012). To address the problems engendered by the LE model of P&C, South Africa has signalled an intention to transition to a CE. This is evident by among other interventions the adoption of National Waste Management Strategy 2020 (NWMS) and the introduction of the EPR Regulations 18.

1.2. Problem statement

The waste management environment in South Africa is undoubtedly characterised by collection and landfilling with a limited amount of recycling (Rodseth *et at.,* 2020). South Africa consumed approximately 3.4 million tonnes of all types of packaging (glass, paper, metal & plastic) in 2021 of which a total of approximately 54% was collected for recycling and other purposes (Packaging SA, 2021). South African landfills are under pressure (Bonolo, 2016). Large cities such as Johannesburg, Durban, Pretoria, and Cape Town will reach rubbish “day zero” by 2030 (Grobbler, 2022). The Newcastle Municipality for instance has already effectively run out of landfill airspace with its existing landfill meant to have been closed in 2009 (DEA, 2018).

Command and control (C&C) measures became the most widely used mechanism to enforce national environmental laws which mainly addressed end-of-pipe waste management problems

(Bailey, 2002; Darby & Obara, 2005). The failure or inadequacy of C&C measures to address contemporary national waste management problems subsequently led to the emergence of alternative instruments. These market-based instruments (MBI) of which the EPR emerged as the most widely used instrument. The concept of EPR was first formally identified in the early 1990s in Sweden (Lindhqvist & Lidgren 1990). In 1991, Germany introduced the first operational EPR-based legislation known as the Avoidance of Waste Packaging Ordinance (Short, 2004), to solve the problem of shortage of landfill space. Many countries followed to embrace EPR and presently EPR is now recognised worldwide as an efficient and powerful tool for promoting effective waste management solutions.

Nearly 30 years after its invention as a waste management tool, EPR was first implemented in South Africa in 2021 (DFFE, 2021). The EPR is therefore in its nascent development in South Africa. The fundamental principle of EPR is that product manufacturers or producers are responsible for the EOL collection, recycling and disposal of their products (Lifset, 1993). In this way, the EPR concept is premised on the PPP. The EPR is a MBI, as producers are forced to internalise the costs of environmental externalises. The EPR is considered as a “next generation” environmental policy that is dependent on market incentives rather than traditional C&C obligations (Turner & Pearce, 1993).

The EPR is also widely acknowledged as a policy and practice to promote the CE (Lifset, 1993; Turner & Pearce, 1993; OECD, 2001; Tojo, 2004). The NWMS (DFFE, 2020) also recognises EPR as an important catalyst to facilitate the transition from a LE model to a CE model. The CE is a P&C model. The model aims to redirect waste from landfills through the reduce, reuse, reject, rethink, redistribute, repair, restore, reuse, recycle, recover of materials, and incineration (Bag *et al*., 2021).

Since EPR presents South Africa with a huge and real possibility to address the country’s waste management problems, it is paramount that the Country lays a proper and solid foundation for success through proper planning. Germany, Japan and other countries particularly European countries have to varying degrees succeeded to address waste management problems through EPR. It is pertinent to note that although South Africa can learn from the experiences of other countries, it is not possible to transpose those experiences to the South African situation. To be successful, foreign policy principles and experiences must be tailored to a country’s unique circumstances (Milanez & Buhra, 2009). It is therefore necessary to understand the unique circumstances of the Country and to develop a suitable model which is peculiar to the circumstances of South Africa.

Business is principally responsible for the production of waste. The solution to the waste problems in South Africa and the successful implementation of EPR primarily lies in interrogating and understanding how business as the main protagonist in the production of waste can solve or help solve the problem of waste management. To that end, it is important to investigate and understand the perception of opportunities and challenges through the lens of business in the implementation of EPR. Understanding and pointing out opportunities will help to incentivise business to implement EPR and understanding and pointing out challenges will help to remove challenges so that business will have a clear pathway to implement EPR. The EPR-based concepts are complex (Quinn, 2011) and if poorly designed and implemented they can fail (Watkins & Gionfra, 2020).

1.3. Rationale for the study

Several studies have shown that EPR and pay-as-you-throw (PAYT) taxes have shown to reduce waste generation (Dahlén & Lagerkvist, 2010; OECD, 2016). The EPR, for example, has helped to raise the recycling rate of packaging waste in France from 18% in 1993 to 68% in 2016 (Eco-Emballages, 2015). If properly implemented, EPR can be a powerful tool for guiding the transition to a CE. The EPR regulations assign the sole and exclusive responsibility to business for the implementation of EPR. The success of EPR therefore substantially depends on the willingness and ability of business to implement the regulations. It is therefore crucial to interrogate and understand the drivers and obstacles facing business in its endeavour to implement the regulations. Industry perception of EPR is one of the important drivers of EPR implementation. The significance of the study lies in analysing this important driver of success and dissecting the opportunities and difficulties encountered by business in the process of implementing the regulations.

The findings will assist business and Government to make the necessary interventions to improve the efficacy of the EPR regulations in South Africa. Paper, plastic beverage cans, and bottle packaging are the primary and significant source of litter pollution in the country (Naham, 2010). Therefore, the scope of this research will be limited to analysing industry perceptions, opportunities, and challenges faced by producers of these products regarding implementation of the regulations.

1.4. Research aim

The aim of this research is to assess the paper and packaging industry's perceptions of the opportunities and challenges associated with the EPR Regulations in South Africa.

1.5. Scope of the research

The focus of this research is on the paper, packaging and single use plastic industry. These waste streams covered by these sectors contribute approximately 30% of the waste produced in the country, second behind organic waste (DEA, 2018). In addition, glass, paper, bottles and cans constitute the bulk of the waste which is discarded as litter.

1.6. Structure and outline of the dissertation

Chapter 1: Covers the introduction with specific sections for background, problem statement and rationale for the research study, research aim, scope of the research and dissertation structure.

Chapter 2: This chapter presents a comprehensive literature review of EPR and related subjects. The concept of EPR is discussed at length in this chapter.

Chapter 3: This chapter describes the research methodology used to achieve the aim of this study. The chapter outlines the data collection, data analysis, assumptions, limitations, and ethical considerations for this study.

Chapter 4: The chapter presents the discussion and results of the study.

Chapter 5: This chapter presents the research conclusions and recommendations.

CHAPTER 2 LITERATURE REVIEW

2.1. Introduction

A literature review serves to enable the researcher to gain a considerable knowledge of important aspects of the research area. This allows the researcher to ground their research in existing academic literature (Wee & Banister, 2016). The topic that will be examined in this literature review is EPR. The interest of this research lies in examining how business perceive EPR regulations and the opportunities and challenges encountered by business in implementing EPR.

The examination of the literature will answer the following questions: What is EPR? What are the critical aspects of EPR which can enhance its impact and efficiency? What type of policy instruments which are used to implement EPR? What are the benefits of EPR? What is the role of different stakeholders who are involved in the implementation of EPR? What are the opportunities and challenges to the implementation of an effective and efficient EPR system? what is the general perception of EPR by business? and lastly, what is the nature of legal framework that supports EPR?

2.2. What is Extended Producer Responsibility

Organisation for Economic Cooperation and Development (OECD) defines EPR as an environmental policy framework that extends a producer's liability for a product to the post-consumer stage of a product's life cycle (PLC), including ultimate disposal (OECD, 2001; Widmer *et al.,* 2005; Walls, 2006). The rationale of EPR is that the producer is regarded as liable for the EOL product because they are the actors who are in the best position to make the requisite interventions to reduce the environmental impact of their products. The EPR represent a classic policy approach, the essence of which is an attempt to correct flaws resulting from violations of the most basic rules of waste management laws, which prohibit improper waste disposal or abandonment, dumping, or uncontrolled waste management e.g., National Environmental Management: Waste Act (Act No 59 of 2008) (NENWA).

The economic justification behind EPR concept is to encourage producers to internalise disposal costs so that producers can have an incentive to manufacture durable products that can be easily remanufactured, recycled, and reused post-consumer phase. This extension of the producers' responsibility incentivises them to consider environmental considerations when manufacturing or producing their products and, in the process, allowing a basis for dealing with EOL products according to sound environmental standards (EU, 2014) including strengthening waste prevention (Watkins, 2017).

The C&C legislation have historically been used to address most environmental issues, with an emphasis on end-of-pipe pollution issues (Bailey, 2002; Darby & Obara, 2005). Policies based on EPRs have altered this strategy. From resource extraction to recycling, reuse, and disposal, the focus of environmental concerns has moved from processes to products and their full life cycle (Ferro, 2002; Nnorom & Osibanjo, 2008). Figure 2-1 depicts the upstream and downstream stages of PLC.

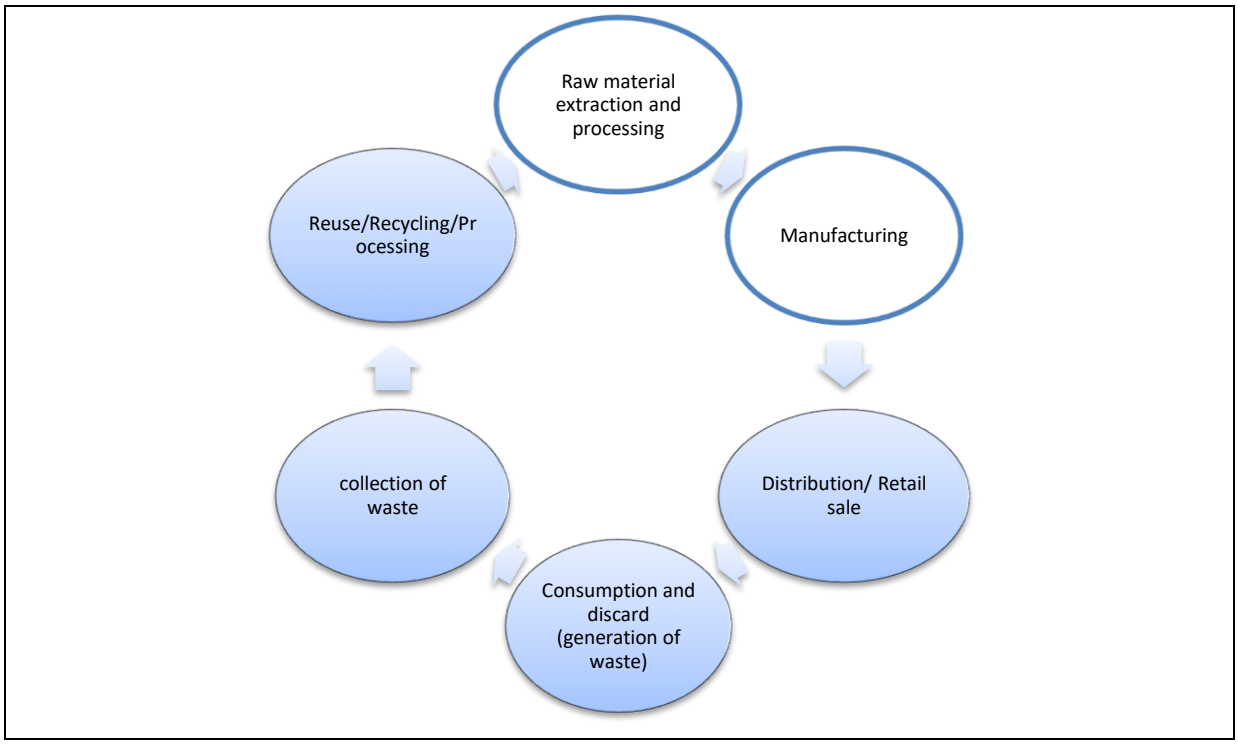

Figure 2-1. Upstream and downstream stages of a product life cycle

Source: Mckerlie et al. (2006).

Furthermore, EPR is a way to implement the PPP. Due to the implementation of EPR policy within the PPP framework, producers are now accountable for the environmental effects of their products from the time of production to the time of EOL (Zero Waste Europe, 2015). Therefore, producers will work to minimize the true costs of the environmental impact of their products if they are required by law to accept back, recycle or remanufacture their products. The PPP serves as a liability principle in the context of EPR (EU Directive, 2004), according to which the selection of the polluter and the assignment of liability does not depend on fault but conveniently and briefly on the pursuit of the "cheapest cost-avoider." Specifically, the participant in the entire supply chain who is in the best position to offer a solution or the "best briber" who is best suited to deliver the policy's stimulus to the most appropriate stages (Massarutto,2014). Therefore, the producers are the most appropriate economic actors who can be important in preventing and managing the

negative effects of their products. The waste is generated by both the producers and the consumers. Furthermore, the incentives provided by this system promote change in consumer's behaviour (McKerlie *et al*., 2006; Nahman, 2010).

The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, June 1992, acknowledged the crucial role that MBIs play in the internalization of environmental costs in sustainable development. Principle 16 of the Rio Declaration states: "National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution with due regard to public interest and without distorting international trade and investment (UN 1992)."

2.2.1. Different ways of defining Extended Producer Responsibility

The EPR is not in itself a legal instrument or mechanism. It is rather a policy principle which must be implemented through a toolbox of economic, administrative, regulations, performance standards and informative mechanisms as shown in Figure 2-2 (OECD, 2014).

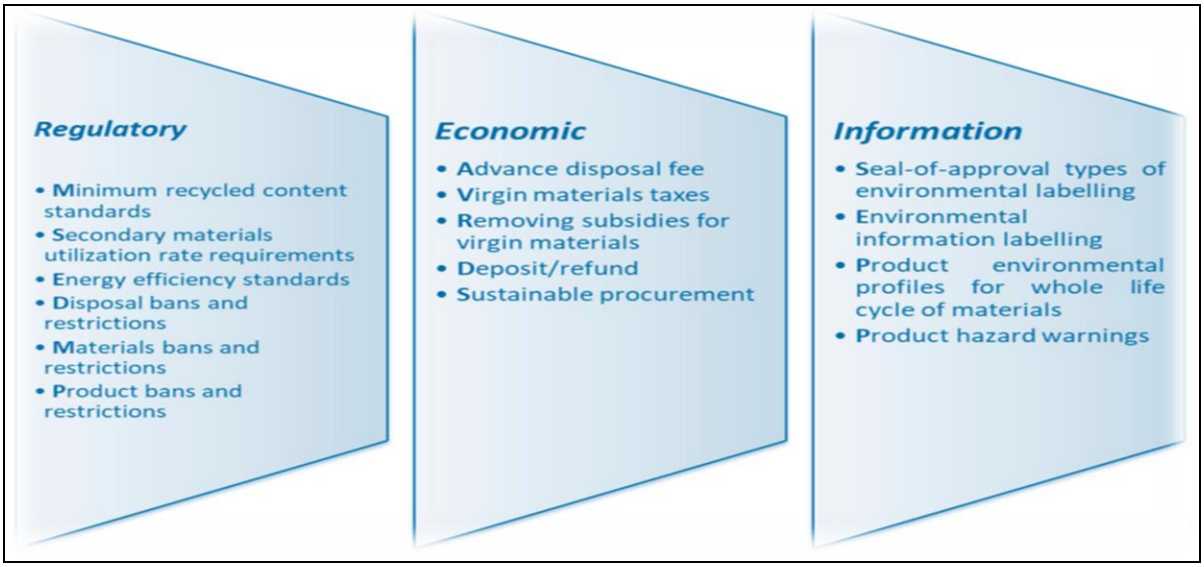

Figure 2-2. The three policy instruments that facilitate the implementation of EPR

Source: Acree Guggemos & Horvath (2003).

The EPR concept is described and used in different ways in literature. The distinction is as follows; EPR as a policy principle, EPR schemes and EPR Instruments (Vink, 2020). Figure 2-3 depicts how this triad (EPR policy, EPR schemes and EPR instruments) is connected. The EPR as a

principle is applied by establishing EPR schemes. These schemes consist of one or a combination of policy instruments.

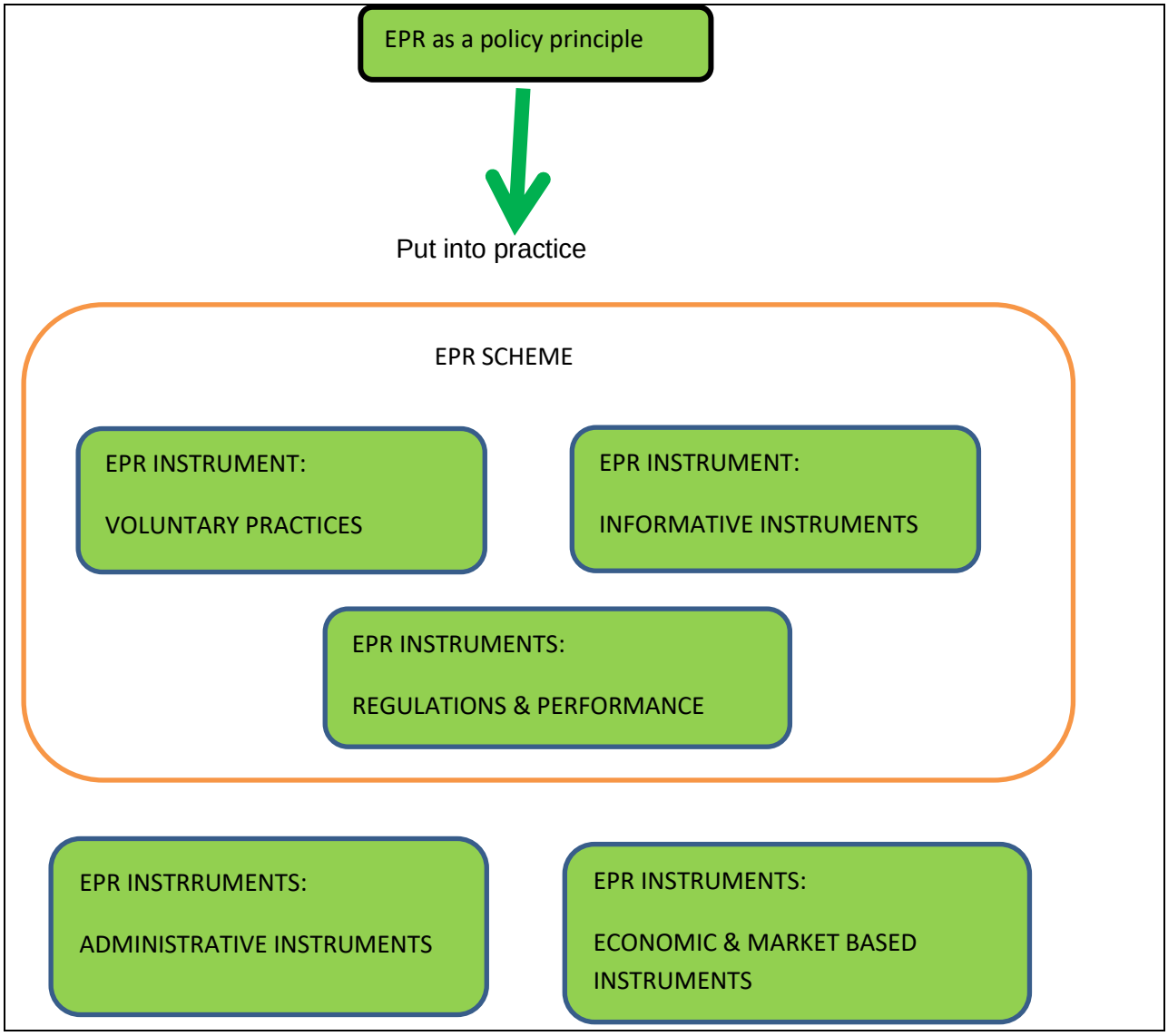

Figure 2-3. The Triad of EPR, EPR policy principle, EPR scheme & EPR Instruments

Source: Vink (2020).

Thomas Lindhqvist (2020), the doyen of EPR defines EPR as a "policy principle to promote total life cycle environmental improvements of product systems by extending the responsibilities of the manufacturer of the product to various parts of the entire life cycle of the product, and especially to the take-back, recycling and final disposal of the product" (Lindhqvist, 2020). Referring to EPR as a principle implies that it is not a tool or strategy, rather it is an overarching concept or guiding principle consistent with the PPP (Lindhqvist, 2020). The EPR should be viewed as guidance for policy making rather than a ready package of policies (van Nispen tot Pannerden, 2011). Referring EPR as a scheme refers to systems which are established to bring EPR as a policy

principle into practice. In addition, EPR as an instrument refers to the means of government intervention in markets or, in a broader perspective society to accomplish goals or to solve problems (van Nispen tot Pannerden, 2011). Take-back obligation is the most widely used EPR instrument as shown in figure 2-4 below.

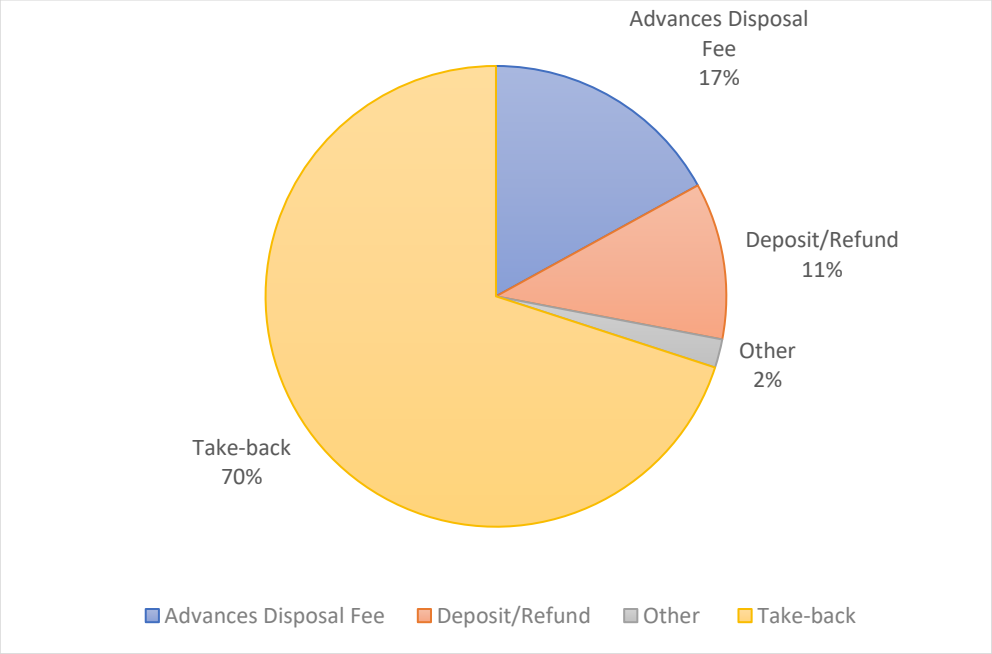

Figure 2-4. Distribution of different EPR Instruments

Source: OECD (2013).

2.2.2. Process for the development of Extended Producer Responsibility

The process to implement EPR basically involves three stages. Firstly, it involves the development of an appropriate policy instrument and a legislative framework that embodies the EPR principles. Secondly, the legislation is then translated to EPR programs. This involves designing specific mechanisms through EPR schemes. The final stage is the execution of the EPR program into a working system in practice. (Atasu & Van Wassenhove, 2012; Luyi Gui *et al*., 2013). Execution of EPR involves the participation of several stakeholders with clearly defined roles and responsibilities.

2.3. Roles and Responsibilities of the main actors in the implementation of Extended Producer Responsibility

This section outlines the roles and responsibilities of the main actors in the implementation of EPR. These actors are producers or manufacturers, consumers, National Government and local municipalities.

2.3.1. Responsibilities of the Producer or Manufacturer

The purpose of EPR includes the prevention of waste generation, the development of more durable, reusable and recyclable products and the increase of reusable, recycling and compositing rates (Manomaivibool *et al*., 2007). In terms of EPR, the manufacturer is responsible for the fate of a product across the full PLC of their products from the design, manufacture, recycling and final disposal (OECD, 2016). The issue of responsibility of the EOL product is complex because most products change hands in the supply chain from the manufacturer of the product itself (brand owner), the manufacturer of the packaging material, distributor to the retailer until it reaches the consumer. It is therefore important for EPR regulations to assign responsibility fairly and appropriately for the EOL product (OECD, 2016). If responsibility is inappropriately assigned, aggrieved actors may feel disinclined to comply with the regulations.

The Responsible Producer's responsibilities are shown in Figure 2-5. According to Lindhqvist (2000), liability is a fundamental aspect of ownership, and posits that in most situations, the producer can be viewed as one actor with legal liability. According to Lindhqvist, if a producer retains ownership of their product throughout its lifecycle, they must accept responsibility for environmental harm caused by their product, as well as informational, economic, and physical liability (Lindhqvist 2000).

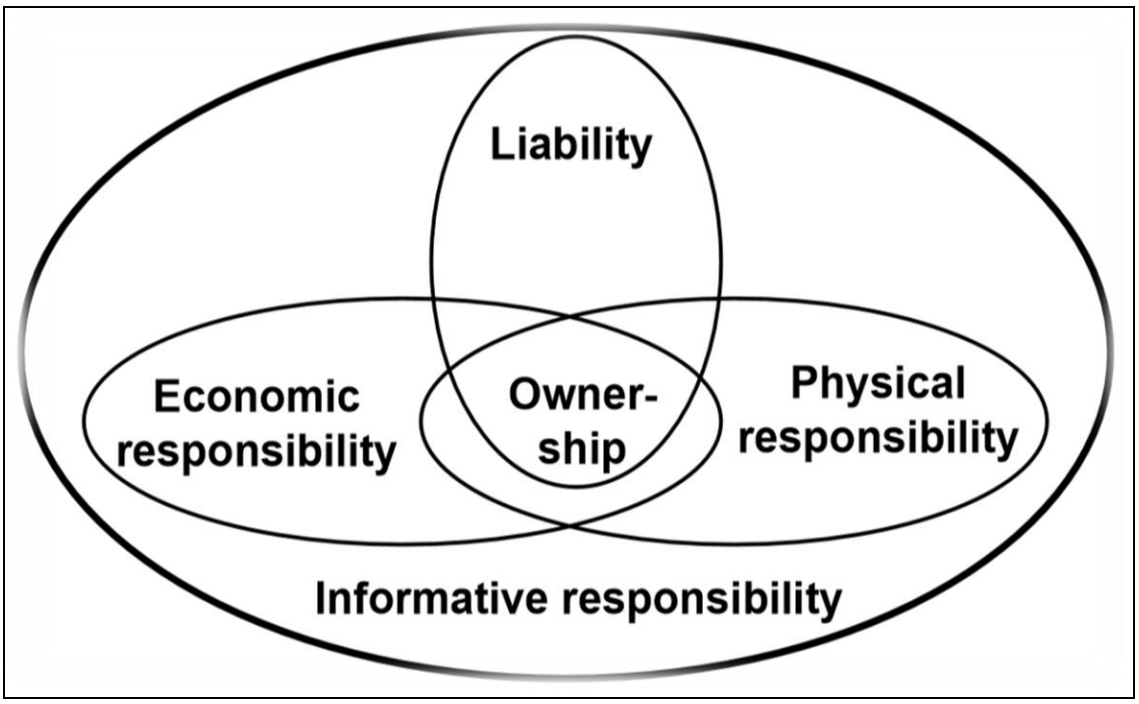

Figure 2-5. Responsible Producer's responsibilities throughout product lifecycle

Source: Lindhqvist (2000).

The Producer's responsibilities are further expatiated below:

a) **Liability** –The Producer is responsible for the environmental damage or impact caused by the product post-consumer use stage.
b) **Financial responsibility** –The Producer is responsible for the costs of the products, which include collection, reuse or recycling and final disposal of the products manufactured.
c) **Physical responsibility** – The Producer has responsibility towards ownership of the products throughout its life cycle. This involves physical management and effects of the products that could cause environmental issues.
d) **Informative responsibility** – extends the responsibility for the products by requiring the Producer to supply information on environmental properties of products being manufactured (Lindhqvist, 2000). The net effect of the producer responsibility is that the costs of waste management is shifted from local authorities and municipalities to producers and in the process environmental costs are internalized and borne by the producers giving effect to the polluter pays principle.

2.3.2. Responsibilities of the Consumers

Numerous studies have shown that implementation of policies on environmental issues can only be efficient and relevant when they involve all stakeholders particularly citizenry (Rio Declaration, 1992; Yasmin *et al*., 2017). Consumers are important stakeholders in the EPR framework. The way they purchase, use and dispose EOL products has a direct bearing on the effectiveness and success of EPR implementation. The role of consumers in an EPR system therefore needs to be better understood and articulated.

2.3.3. Responsibilities of the National Governments

The National Government is responsible for establishing the policy and legal framework, which includes identifying the producers and products in question, defining the producers' actual responsibilities (such as quantified targets for waste take-back, collection, and recycling), identifying the roles of other actors (such as local municipalities), and, lastly, accrediting, approving, and overseeing EPR schemes to ensure compliance. The Government generally assumes the role of regulators overseeing EPR policies and holding responsible parties accountable for their product EOL responsibilities. If the EPR program is not effectively monitored and enforced, free riding (this is when producers benefit from the EPR system but do not contribute anything to the operations of the PRO) will occur and this phenomenon can reduce the environmental benefits of EPR (OECD, 2016).

2.3.4. Responsibilities of Local Municipalities

Numerous studies have shown that it is important for the success of EPR to have wide geographical coverage of collection points. Easily accessible collection points make it easy for consumers to return used goods and in the process collection rates are maximised. The Municipalities are responsible for waste collection from households and businesses, including providing readily accessible infrastructure for meeting responsibility and targets set by government (Atasu & Van Wassenhove, 2012; Luyi Gui *et al*., 2013; OECD, 2016).

These four actors, Government, business, municipalities and consumers although each one of them hold a different capacity to influence the success of EPR, the success of EPR is a collective responsibility of all actors (Bass, 2017). EPR success and its opportunities can only be realised if all the actors play their full role in its implementation.

2.4. Opportunities associated with the implementation of Extended Producer Responsibility

The following segment discusses the opportunities of implementing EPR.

2.4.1. Environmental opportunities of Extended Producer Responsibility

The environmental opportunities of EPR include facilitating separation at source practices, increasing reuse and recycling rates. The opportunities of EPR can only be realised or achieved if the EPR programme is well-designed. Conversely a poorly designed and poorly implemented EPR is prescription for failure (Watkins *et al.,* 2020). However, if the EPR model is poorly designed and implemented problems like lack or inadequate waste management infrastructures to support its function, the failure by producers to pay fees or to pay adequate fees to fully cover the costs of waste management and lack of effective monitoring by authorities will weaken its effectiveness to achieve efficacious results. Figure 2-6 depicts the overview of the environmental opportunities of EPR based policy.

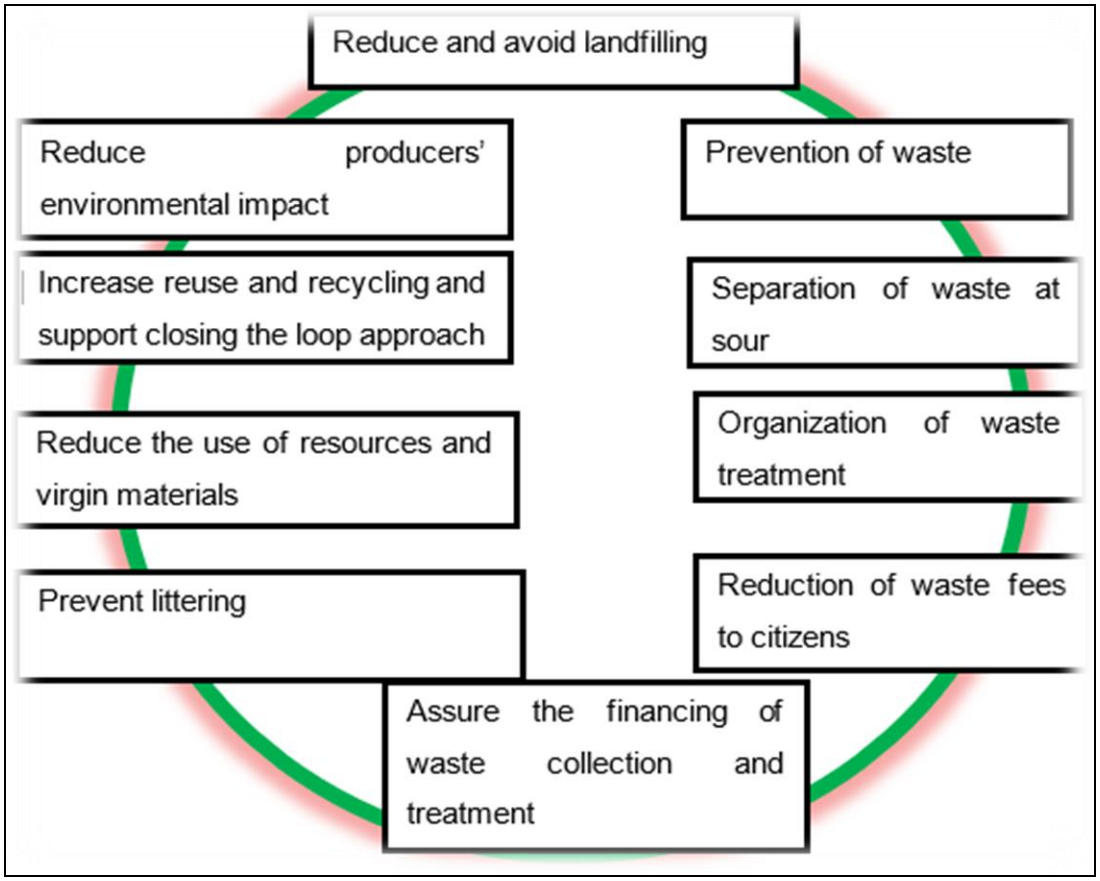

Figure 2-6. **An overview of environmental opportunities of EPR**

Source: Landbell (2021)

2.4.2. Extended Producer Responsibility and Circular Economy Opportunities

Extended Producer Responsibility is widely acknowledged as a policy and practice to promote the CE (Lifset, 1993; Turner & Pearce, 1993; OECD, 2001; Tojo, 2004). The NWMS (DFFE, 2020) also recognises EPR as an important catalyst to facilitate the transition from a LE to a CE paradigm. The conventional LE model of "take, make and throw away" has proved to be unsustainable (Frosch & Gallopoulos,1989; Ness, 2008). The CE proposes a paradigm shift from the LE model to a resource-efficient and regenerative CE (European Commission, 2012).

The CE model has recently surfaced as a promising strategy for sustainable development (Schroeder *et al*., 2019). The CE has gained significant traction in academic circles (Easac, 2016; ,Cullen, 2017; Pauliuk, 2018), governments such as those of the European Union and in other countries such as China (Geng *et al*., 2012) which has adopted CE as a developmental strategy and some corporates (H&M Group, 2016) who view CE as an instrument that can provide solutions with which to tackle the environmental challenges caused by the LE model of production. There is therefore consensus among scientists, industrialists, and politicians worldwide on the need to adopt CE (Virtanen *et al*., 2019). Numerous definitions and interpretations of this concept often very diverse and at times inconsistent have emerged over the years.

The Ellen MacArthur Foundation (EMF, 2012) defined CE as a "system that is restorative or regenerative by intention and design, that can be achieved by eliminating waste through the superior design of materials, products, systems and, within this, business models". Milios (2018) and Korhonen *et al*. (2018) point out that this definition of CE is rather vague and argues that words and terms such as restorative or highest utility linked to CE can be difficult to translate to the language of policies and therefore put in practice.

The European Union defines CE as "an economy, where the value of products, materials and resources is maintained for as long as possible, and the generation of waste minimized" (EU, 2015). The minimisation of the generation of waste can be achieved by long-lasting design, maintenance, repair, and reuse, remanufacturing, refurbishing, and recycling of products (Camilleri, 2018). The minimisation of the generation of waste forms the cornerstone of CE by 9Rs of Lankester illustrated in Figure 2-7 below.

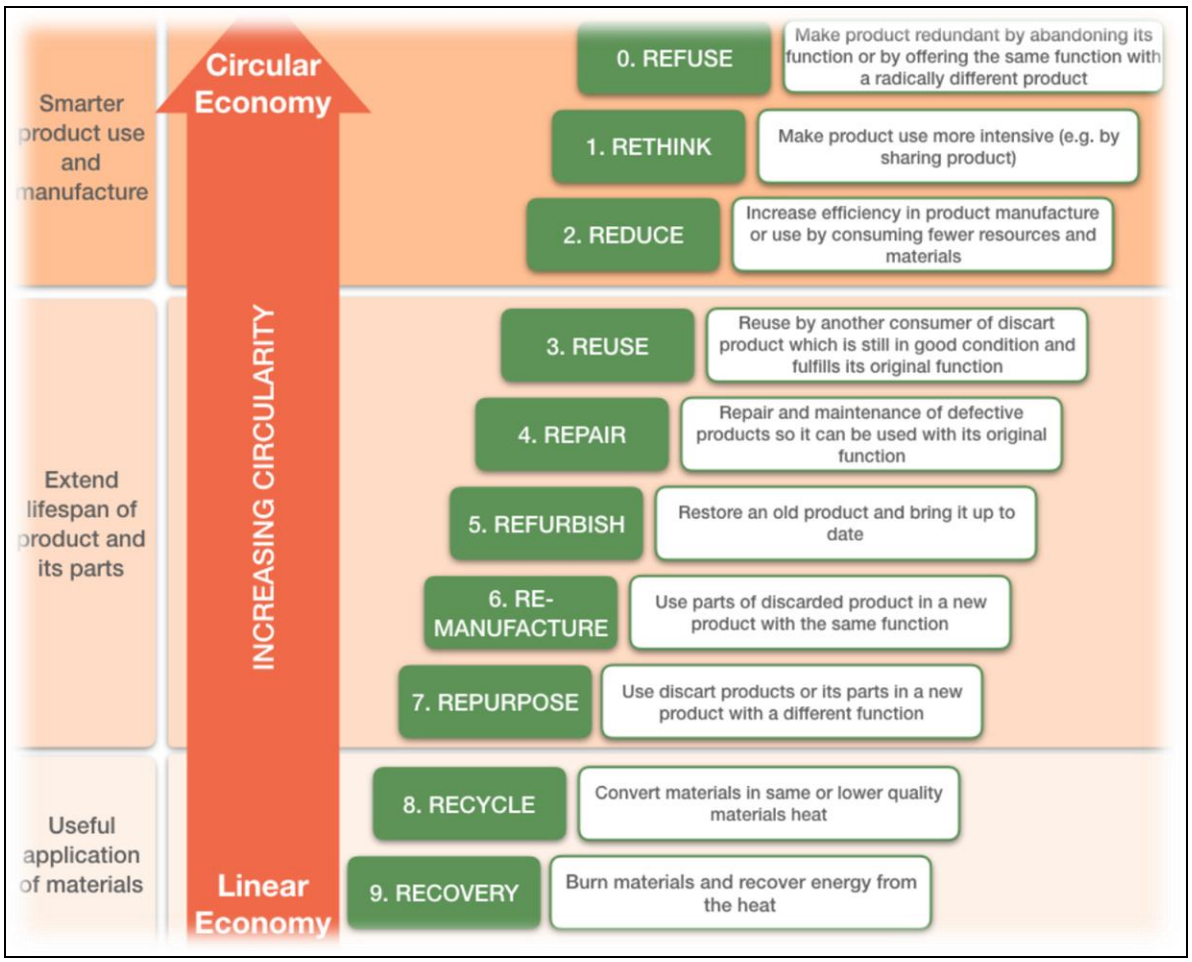

Figure 2-7. The 9Rs of waste minimisation model for circular economy

Source: Lankester (2018).

The European Union emphasise the theme of minimisation of generation of waste in their definition of CE. The CE is a regenerative system in which resource input, waste, emission, and energy leakage are minimised by slowing, closing and narrowing energy and material loops. This can be achieved through durable design, maintenance, repair, reuse, re-manufacturing, refurbishing, recycling and upcycling (EMF,2012). Strasser (1999) and O'Brien (2008) express that the basic ideas of CE have been around since the 19th century in households and cottage industries. Viewed in this light, CE is not a radical or for that matter a "really new" idea (Garcia & Calantone 2002).

The cornerstone of a CE is prolonging the lifetime of products. The Delft University of Technology (TU Delft, 2017) explains how extending the lifetime is achieved in a circular scenario. The technical cycle involves prolonging the products lifetimes through maintenance, recovering, restoring, remanufacturing, or recycling. Stahel (2016) elaborates on this when he says that it is necessary to replace production with sufficiency; reuse what you can, recycle what cannot be reused, repair what is broken, remanufacture what cannot be repaired. The CE goes beyond the

model of the 3Rs and proposes a much more comprehensive transformation of our production and consumption patterns to achieve high resource efficiency and move towards zero waste and zero emissions. The EPR when implemented via RDS and Take Back Systems (TBS) can be a panacea to the problem of littering. The EPR thorough financial incentives discourages consumers to discard EOL products such as plastic, bottles, beverage cans etc. Figure 2-8 shows the benefits of EPR through the lens of CE.

Figure 2-8. Benefits of EPR through the lens of CE

Source: Manomaivibool et al. (2007).

2.4.3. Economic opportunities

Financial benefits of EPR for companies may vary based on the nature of the product and industry. As a result, producers have tended to respond to EPR policies in different ways. For instance, some producers in the United State of America have intensified to lobby against EPR (Jackson, 2007). Companies oppose EPR mainly because it raises expenses for them, as they must pay fees to PROs, cover the cost of collecting EOL products, pay for recycling, and fund the infrastructure needed for collection. While in South Africa producers in the paper and bottle industries have chosen to embrace EPR voluntarily (Nahman 2010).

Those who oppose EPR claim that the policies impose the cost burden on the wrong parties and EPR offers inadequate incentives for consumers and producers to reduce waste (Nash & Bosso 2013). In certain instances, industry resistance has posed a formidable barrier to EPR implementation (Kobold, 2017).

Extended Producer Responsibility instruments such as the RDS for bottles, collection and recycling of beverage cans promotes reuse of packaging and concurrently translates into reduced manufacturing costs for companies (Jackson, 2007; Nash & Bosso, 2013). Subsidies and government incentives such as the plastic credit where companies are given tax breaks for the amount of plastics, they collect from the environment also has the potential to offer financial gains for companies (Plastics Consumer Benefits, 2020).

Company commitment to sustainable business practices can provide reputational benefits Investors world-wide are interested in investing in sustainable companies and companies that embrace sustainability in the context of EPR. Many investors now consider sustainability as an important deciding factor in approving loans.

2.4.4. Social opportunities

Extended Producer Responsibility promotes waste valorisation through reuse and recycling. Recycling creates new materials which can be processed into raw materials and in the process supporting the development of markets for secondary industries thereby creating new jobs (Pouikl, 2020). Recycling creates more jobs than landfilling and incineration (Richter *et al*., 2016).

It is clear that the EPR offers enormous opportunities to the environment, consumers, and producers equally; however, there are also numerous challenges that could prevent the EPR from being implemented successfully. The challenges associated with the implementation of EPR are covered in detail in the section that follows.

2.5. Challenges associated with the implementation of Extended Producer Responsibility

This section discusses the challenges faced by business or producer during EPR implementation.

2.5.1. Financial challenges

It is crucial for the sustenance of the system for member companies to make proportionate and fair financial contribution to the PRO to cover full operational costs of the scheme (Kaffine & O'Reilly,2015).

The full cost approach includes costs for collecting, transporting, sorting, recycling, operational costs relating to managing the Producer Responsibility Organisation (PRO), costs of awareness campaigns and waste and litter prevention programmes (European Commission, 2014; Kaffine & O'Reilly, 2015; OECD, 2016; Watkins *et al*., 2017; Watkins & Gionfra, 2019; Pouikli, 2020).

2.5.2. Legal framework challenges

The EPR based concepts are complex (Quinn, 2011). Policy makers have therefore to fully understand the complexity of system to lay the policy framework for successful implementation. Academics caution that developing countries must not transplant best practices of EPR from developed countries to address their unique challenges because these countries have a tradition of policy cooperation, robust monitoring systems, and easy access to technological innovation and highly developed institutional capacity (Milanez & Bührs, 2009; Nahman 2010; Quinn, 2011; Manomaivibool & Vassanadumrongdee, 2011). To be successful, foreign policy principles must be tailored to a country's unique circumstances (Milanez & Bührs 2009). Unrealistic targets and monitoring failures all contributed to the difficulties and failures in the EPR policy process (Quinn, 2011).

The EPR related regulations play an important role in EPR implementation by companies (Véronique Monier, 2014). Properly framed regulations enhance the chances of implementation success. According to the report by the WWF (1986), an ideal regulation should contain precise and comprehensive set of material-specific quantitative goals for reduction, reuse, and recycling. They should be designed with precisely defined roles and responsibilities and complemented by a monitoring system supervised by the government.

2.5.3. Compliance, enforcement and free riding

Compliance and enforcement measures must be effectively applied to ensure that responsibilities fall on the appropriate actors. The Government generally assumes the role of regulators overseeing EPR policies and holding responsible parties accountable for their product EOL responsibilities. If the EPR program is not effectively monitored and enforced, free riding will occur, and this phenomenon can reduce the environmental benefits of EPR (OECD, 2016). According to the OECD (2016), one of the biggest challenges to the success of EPR policies nowadays is the absence of competition and transparency. Fees, fines, criminal and civil prosecution, loss of accreditation, and public disclosure are some of the possible outcomes of non-compliance (OECD, 2016).

The European Union (EU,2004) addressed the problem of unnecessary packaging by manufacturers by enacting The Packaging and Packaging Waste Directive (94/62/EC).

As a result of this policy, Sweden for instance has the lowest levels of packaging waste in Europe and 99% of the household waste generated in Sweden is recycled. It is a tragedy and a travesty of environmental justice that South Africa has excellent and robust waste management laws, regulations and standards yet still suffers from the problems of littering, illegal dumping, marine pollution, and unregistered and overwhelmed landfills. In South Africa implementation and enforcement is weak and lacking efficacy (DEA, 2018).

2.5.4. Environmental challenges

The problem of orphaned products can also arise within the context of implementation of EPR. Such products arise from businesses that go bankrupt before they had the opportunity to collect their product at their EOL (Lindhqvist & Lifset 2003).

2.5.5. Social challenges

Numerous studies have shown that there is dearth of knowledge in developing countries about environmental issues in general (Gilleo, 2001; Lindhqvist & Lifset 2003; OECD, 2016). Conradie (2003), a South African academic made the following succinct observation; “For many South Africans environmental concerns remain remote and distant. Environmental concerns seem all too long term, almost imperceptible and unrelated to our daily lives and aspirations”. It is widely acknowledged that environmental knowledge is high in developed countries (Abelson, 2010; Castiglione *et al.,* 2014). Majority of citizens are unaware of the environmental and health impacts associated with inappropriate disposal of waste and the benefits of recycling EOL products to the environment and as a result they are not willing to return goods for recycling or to pay for waste disposal services.

2.5.6. Infrastructure development challenges

There is generally a dearth of accessible and efficient infrastructure for recycling, and adequate capacity, skills and technology to promote recycling; wide geographical coverage of collection points is important to guarantee a simple return system of used goods for consumers so that collection rates are maximised (Gilleo, 2001; OECD, 2016). The salutary lesson which emerges from countries which have successfully implemented EPR is that there must be an effective waste management infrastructure which includes collection points and properly financed Collective CPROs. This is the case for Sweden, Spain and France where the recycling rate for tyres is 100% ((Akenji *et al.,* 2011; Plastics Europe, 2016; Sebola *et al*., 2018). In SA, REDISA and other waste initiatives failed primarily on account of a poorly waste management infrastructure. REDISA is a South African Non-Profit Company that works with the government to implement CE initiatives.

2.5.7. Information system challenges

There is lack of accurate data for designing efficient waste management, recycling strategies and for making informed investment decisions (Widmer *et al*., 2005; Nnorom & Osibanjo 2008).

The literature makes it clear that there are a number of challenges that may hinder the successful implementation of the EPR. If these challenges are not addressed, it could have an effect on the industry's willingness to comply with the EPR.

2.6. Industry Perceptions on Extended Producer Responsibility Regulations

This research is about industry perception of the opportunities and challenges of implementing EPR. This section discusses what is perception and its significance in the implementation of EPR. Perception is defined as how people view or interprets things, and the angle from which they view things (Wayne, 2007). Perception includes knowledge gained from the experiences of life.

The EPR globally and more particularly in South Africa is a recent phenomenon. Very little studies have been conducted worldwide on industry perception of EPR and to the best of the researcher's knowledge no studies have been conducted on industry perception of EPR in South Africa. As a result, there is little or no literature on the subject. A review of industry perception on environmental issues in general is apposite as this will assist the researcher to gain some insight on industry perception of EPR.

Historically, companies viewed environmental issues and concerns as a constraint to business and as an unnecessary irritant. This perception seems to subsist to the present times. A survey of 200 South African companies (including the top 150 companies as ranked by asset value) found that the main drivers of corporate environmental responsibility were "government policy/legislation" (82%), "public opinion" (64%), "custom demands" (62%) and "international trade" (51%) (KPMG-IEF, 2004). The survey suggests that in the absence of such pressure there remains little incentive to improve environmental performance.

The prevailing social, political and economic system of South Africa can aptly be described as capitalism, a largely secular culture, liberal democracy, individualism, rationalism and humanism (Cahoone, 1996). This society was readily embraced by many companies whose corporate strategies seem to be based on the same principles. This corporate culture believes that natural resources exist to be exploited and that environmental problems associated with such exploitation of the resources are not the concern or business of the company.

Extant literature suggests that many companies do not adopt environmental responsible practices because it is intrinsically good to do so. Companies introduce environmental compliance measures to comply with regulations (Dechant *et al*., 1994; Porter van Linde, 1995; Shrivastava, 1995; Hart & Ahuja, 1996), and to improve stakeholder relations (Berman *et al*., 1999; Cormeir & Magnan, 1999). Other considerations include the perceived environmental visibility of the company (Bowen,2000), a sense that such improvement will result in competitive advantage (Hart, 1995; Shrivastava, 1995; Bonsal & Ruth, 2000), and a sense of social responsibility and a desire to adhere to societal norms (Bonsal & Ruth, 2000; Cordano & Frieze,2000; Flannery & May,2000), and to avoid penalties for non-compliance (King & Lennox, 2002).

The radical green critics (deep ecology and other biocentric views) accordingly see any greening of business as essentially a public relations exercise or disinformation that attempts to portray an image of corporate responsiveness to environmental concern when in fact companies continue to degrade the environment (Green & Bruno, 1996). Other critics charge that the dominant approach to the greening of business amounts to business as usual and is centred on eco-efficiency which simply adds an environmental dimension to the mainstream development path and reinforces the growth paradigm and consumption patterns that constitute the root cause of the environmental crisis (Welford, 1997).

Some critics have adopted a perspective which sees increasing corporate responsiveness to environmental and social concerns as a reality but one which is fundamentally political in nature (Levy, 1997; Murphy & Bendell, 1997). Levy suggests that capitalism is resilient and adaptive, and companies can accommodate environmental challenges through compromise and co-option (Levy, 1997). O'Neill (1999) suggests that factors associated with globalisation such as transnational activism and networking. Furthermore, the rise of consumer politics will bring big business in the spotlight and will force them to reform their policies and practices in both North and South.

Financial benefits of EPR for companies may vary based on the nature of the product and industry. As a result, producers have tended to respond to EPR policies in different ways. For instance, some producers in the U.S.A. have intensified to lobby against EPR (Jackson, 2007). While in South Africa producers in the paper, packaging and single use plastic industries have chosen to embrace EPR voluntarily (Nahman 2010). Those who oppose EPR claim that the policies impose the cost burden on the wrong parties and EPR offers inadequate incentives for consumers and producers to reduce waste (Nash & Bosso 2013). In certain instances, industry resistance has posed a formidable barrier to EPR implementation (Kobold, 2017).

Perception impacts on how people are willing or unwilling to comply with laws. This may be through ignorance or a feeling that the law is onerous or unfair therefore it should be ignored or complied with under pain of punishment. Perception is therefore important in terms of the willingness or otherwise of companies to comply with the EPR regulations. With specifics to South Africa, what is the legal framework that the industry must comply with?

2.7. Legal Framework of Extended Producer Responsibility in South Africa

This section discusses the legal framework which underpins EPR regulations in South Africa.

2.7.1. The Constitution of the Republic of South Africa of 1996 (Act 108 of 1996)

The Constitution of South Africa (the Constitution) establishes the foundation for all environmental laws, regulations, and policies in the country. Section 24 of the Constitution establishes the constitutional right for citizens to live in a safe environment. This Bill of Rights contained in section 24 underpins environmental policy and law in South Africa. This section further directs the State to legislate laws which promote the objectives and spirit of this environmental right.

2.7.2. National Environmental Management Act of 1998 (Act 107 of 1998)

Pursuant to the legal obligation stated in section 24 of the Constitution, the State introduced the National Environmental Management Act of 1998 (Act 107 of 1998) (NEMA) which provides a specific overarching framework for environmental legislation in South Africa. Section 2 of NEMA makes provision for 19 fundamental principles of sustainable development that must be followed by all organs of state in fulfilment of their obligation to protect the environment.

Sustainable development concept places humans at the centre of environmental management. It also stresses the importance of socially, ecologically, and economically sustainable development. This anthropocentric approach to the environment is without its critics. Some claim that the concept itself is an oxymoron arguing that one cannot have sustainability and development at the same time. The writer holds the view that though imperfect, sustainable development goes a long way to allowing development to proceed whilst preserving natural resources and the ecosystem from degradation or total collapse thereby compromising the ability of humans to continue enjoying the benefits of nature.

2.7.3. White Paper on Integrated Pollution and Waste Management

The objective of the White Paper was to stimulate focus on pollution prevention and waste minimisation. The WMH was introduced into the waste management landscape in 2000 through the adoption of Integrated Pollution and Waste Management (IP&WM) as an official strategy. The

WMH in 2008 which defined as a priority order in waste management legislation and policies, prevention, reduce, re-use, recycling (3Rs) and finally disposal as the least preferred option.

2.7.4. National Environmental Management: Waste Act of 2008 (Act 59 of 2008)

The White Paper alluded to the necessity for the introduction of a comprehensive waste management legal framework in South Africa. This was achieved through the promulgation of National Environmental Management: Waste Act of 2008 (Act 59 of 2008), hereafter referred to as “the Act”. The Act was informed and influenced by the key fundamentals of the waste management hierarchy. The Waste Act creates a general duty for waste generators to avoid waste and, if not, to reduce the amount and toxicity of the generated waste (DEA, 2011). Thereafter, they are required to recycle, re-use or recover waste.

According to Section 18(1) of the Act, the Minister may designate a product or class of products for which EPR applies or may specify EPR measures that must be taken with respect to a given product or class of products after consulting with the Minister of Trade and Industry and publishing notice in the Gazette. The individual or group of individuals responsible for carrying out EPR measures may be named by the Minister. The requirements for putting into place and running an EPR program, including waste reduction, reuse, recycling, recovery, and treatment, are outlined in Section 18(2).

The provisions of Section 18(2) of the Act also cover the institutional arrangements for the administration of a waste minimization program, the financial arrangements for the program, the percentage of products that must be recovered, the labelling requirements for waste, and the producer of a product or class of products identified to carry out a life cycle assessment regarding the product. Regarding the design, composition, and production of a product or packaging, the section outlines the acceptable practices, standards, and procedures that may be mandated, as well as the requirements that must be met.

2.7.5. National Waste Management Strategy 2020

The failure of the Polokwane Declaration to meet its stated objectives prompted the DEAT to come out with revised targets 20 years later with the introduction of the NWMS (DEA,2001). This strategy is significant in that it introduced for the first time the concept of CE as a strategic policy to reduce waste to landfills by 40% within 5 years that is by 2026, 55% within 10 years that is by 2031 and 70% within 15 years that is by 2036. As a sequel to the NWMS 2020, the CE motif was further given impetus by the introduction of more regulations and initiatives directed at achieving a Zero Waste Circular Economy (ZWCE).

The first was the plastic bag levy in 2003, and the second was the ban of all forms of liquid waste, recyclable waste oils and tyres from being disposed at any landfill in August 2019. The third was the introduction of the EPR regulations which came into force on the 5th of May 2021.

2.7.6. Extended Producer Responsibility Regulations

The EPR regulations may recognise the establishment of voluntary or mandatory schemes. Whether a policy is implemented as a mandatory program, or a voluntary program has strong implications as to the function and organization of EPR (Quinn, 2011). An EPR system or scheme can be described as any system which is established by one or several producers to implement the EPR concept. It can be an individual system when a producer organises its own system (Individual Producer Responsibility—IPR), or a collective system (Collective Producer Responsibility—CPR) when several producers decide to join hands and therefore transfer their responsibility to a specific organisation, a PRO (OECD, 2016). A PROs are consortia that manage the collection and processing of the EOL products and packaging on behalf of member companies (Lifset & Lindhqvist, 2008). They work to achieve collection and recycling targets on behalf of groups of producers or entire industry sectors (Lifset & Lindhqvist, 2008).

The IPR is the form of producer responsibility and is championed by many academic researchers owing to its positive impact on DFE (OECD, 2004; Dempsey *et al*., 2010). The IPR has the potential to promote remanufacturing and dismantling for re-use of components, because EOL products can return to the original producer (Atasu & Subramanian, 2012). Despite the potential environmental advantages, few IPR schemes exist (Lindhqvist & Lifset, 2003; Sachs, 2006; Mayers & Butler, 2013). In most countries, producers set up collective industry wide EPR schemes because these are perceived to be cost efficient since they are characterised by economies of scale (Khetriwal *et al*.,2009).

A joint collection scheme generates administrative ease for several actors. Consumers are unwilling to bring EOL goods to different dedicated locations (Hickle, 2013). In addition, municipal collection points and multi-brand retailers that accept EOL goods, find it very inconveniencing and costly to sort the waste stream into individual brands (Hotta *et al*., 2014). Accordingly, rather than setting up an individual collection scheme companies typically prefer the convenience of CPR. In addition, governments prefer CPR to IPR because the latter is best suited to deal with the problem of orphaned products. This is because CPR includes all products regardless of brand and once a firm is insolvent or bankrupt, the CPR will be able to finance the take back operations from the combined financial pool. Governments therefore consider CPR as a suitable insurance for future waste management costs (OECD, 2004; Van den Abele, 2006; Séguin, 2014; Grgulovà, 2014). However, CPR by their disparate composition of producers does not provide incentives for

producers to redesign products (Zeynalova, 2017). Many academic researchers hold the view that EPR incentives for DFE are very weak (Lindhqvist & Lifset, 2003; Sachs, 2006; Gottberg *et al*., 2006; Roine & Lee, 2006; Walls, 2006; Rotter, 2011; Gui *et al*., 2013; Tong & Yan, 2013) and conclude that the contrast between policy expectations and realisations is more aspirational than real (Deutz, 2009).

In South Africa, voluntary EPR programs and policies have been more successful in achieving the goals of EPR than mandatory programs (Nahman 2010). Nnorom and Osibanjo (2008) contend that voluntary schemes are relatively ineffective compared to mandatory ones. On the other hand, including academics such as Fridge (2001) and Brink (2007) suggest that there is no need for government intervention in the management of an industry's post-consumer liability if the industry itself is prepared to take the initiative and can do a better job and therefore posits government intervention should only be restricted to providing subsidies, contends that voluntary schemes are inspired to forestall more stringent regulations from the government than the desire to fulfil their obligation to protect the environment (OECD, 2016). Without government intervention the author argues that producers usually fail to follow through on their obligations. South Africa's voluntary EPR system was replaced by a mandatory EPR system by regulations which came into effect in 2020 (DFFE, 2020c).

2.8. Analysis of Extended Producer Responsibility Regulations of South Africa

The main and overarching regulations which regulate the EPR system in South Africa is Regulations No 718 promulgated in terms of section 18 of the Waste Act. The Regulations (Regulations 18) makes it mandatory for all importers, distributors and producers of the following identified goods and products to be responsible and accountable for the post-consumer stage of the product, that means that at the EOL of the product, producers bear the responsibility to make sure that the products are collected or returned and the reused, recycled or properly dealt with in an environmentally sound manner.

2.8.1. Specifics of Regulations 18

The regulations:

a) provides for a framework for the development, implementation, monitoring and evaluation of EPR schemes by producers, importers, and brand owners and to promote the implementation of CE initiatives (s2).
b) obliges producers or a class of producers of an identified product must establish or belong to an EPR scheme. The regulations further direct that producers should incorporate DFE policies

in their manufacturing and production processes s5. The DFE policies and practices stated objectives includes reduction in the consumption of natural resources; design of more environmentally friendly products; waste prevention; reduction of the volume of the resulting post-consumer waste stream; and reduction of toxicity of the resulting post-consumer waste stream;

c) mandate the producers to appoint third parties to collect, recycle and recover waste;
d) directs the producers to utilise old infrastructure and to establish new infrastructure to promote the effective implementation of EPR scheme;
e) enjoins the producers to develop and set up secondary markets for recyclable items;
f) further directs the producers to implement mandatory take back of all EOL products and lastly the producers are mandated to implement environmental labels and declaration for identified products in accordance to established standards.
g) in the new EPR regulations, producers include importers, brand owners, licensee agents and retailers (s.2 of 400 National Environmental Management: Waste Act (59/2008): Amendments to the Regulations and Notices Regarding Extended Producer Responsibility, 2020. GN 400. No. 44539).

2.8.2. Registration of Producer Responsibility Organisations

Prior to the advent of The Regulations, the following voluntary PROs dominated the recycling industry namely, PETCO for PET, Polyco for polyolefins (PP, HDPE, LDPE/LLDPE and Multi-layer), the Polystyrene Association for polystyrene, Southern African Vinyls Association for PVC. Section 10 of the Regulations abolished the voluntary PROs in favour of mandatory schemes. The new regime under the Regulations requires the mandatory PROs to:

(a) be an independent body established by producers as incorporators, shareholders; or directors by a due process;

(b) be a registered non-profit company;

(c) have representatives from the entire value chain of their products; and

(d) be managed by a Board of Directors (s.11).

The obligations of PROs are outlined in section 12. The PRO is mandated among other duties to tender and appoint third parties to collect, recycle and recover waste; establish new and utilise existing infrastructure to promote the effective implementation of the EPR scheme and manage the data collection, collation and submission to the South African Waste Information System as required in terms of Regulation 8 of these Regulations.

2.8.3. Objectives of Producer Responsibility Organisations

In terms of section 6 of the regulations, all PROs are required to promote DFE waste minimisation and reduction, waste recycling and waste recovery initiatives and programs among producers. The PROs are further required to implement and report on minimum recycled content standards, secondary materials utilization rate requirements, energy-efficiency standards, disposal, and materials bans and restrictions and environmentally preferable products procurement procedures.

2.8.4. Financial arrangements for Extended Producer Responsibility scheme

In terms of section 7 of the regulations, the primary obligation to fund the operations of a PRO rests wholly with the producers. The executive committee of a PRO in consultation with the Minister of Finance and Minister of Trade, Industry and Competition is mandated to determine the fee which must be paid by the producers fund the operation of the EPR scheme. The fee is calculated on a differentiated rate per item category, dependent on weight and recyclability of each item. There are two methodologies of setting fees, namely basic and advanced fee modulation. The basic criteria are largely based on unit, weight and/or material, representing the cost associated with managing EOL product. Advanced fee modulation is any fee modulation based on more detailed criteria such as design for recyclability, reparability, or the use of secondary materials (Laubinger *et al*., 2021).

2.8.5. Monitoring, Reporting and Evaluation

In terms of section 8, the Department is responsible for controlling and monitoring the performance of PROs by obliging producers to submit bi-annual performance reports reporting on how far agreed targets were met. PROs are also required to submit annual performance reports to the South African Waste Information System (SAWIS) on an annual basis on the quantities of waste resulting from the identified products that are generated, collected, diverted from landfills through recycling, reusing, recovery and refurbished and waste exported and disposed to landfills. According to the regulations, the Department has a discretion not an obligation to conduct verification audits on the obligations of the producers (s8). Section 9 of the Regulations obliges the Department to conduct a review of the performance of the EPR after every 5 years.

The following are subsidiary regulations which specify the specific industries and products which must be managed in terms of the EPR system, namely: GN No1185. National Environmental Management: Waste Act of 2008 (Act No 59 of 2008): Extended producer responsibility scheme for the electrical & electronic equipment sector. Gazette No 43880, GN No.1186 National Environmental Management: Waste Act (59/2008): Extended producer responsibility scheme for

the lighting sector. Gazette No. 43881, GN No 1187 National Environmental Management: Waste Act (59/2008): Extended producer responsibility scheme for paper, packaging and some single use products. Gazette No 43882. The focus of this research is on GN 43882.

CHAPTER 3 METHODOLOGY

3.1. Introduction

The aim of this research was to assess the paper and packaging industry's perception of the opportunities and challenges associated with EPR Regulations. The Chapter outline the scope of the research, data collection, data analysis, ethical considerations and the assumptions and limitations of the methodology.

This research is qualitative as opposed to quantitative. Qualitative research uses research methods which result in a narrative, descriptive account of a given topic and it involves collecting and analysing non-numerical data to understand concepts and to gather in-depth insights into a problem or generate new ideas for research (Parkinson *et al.*, 2011). Usually, a qualitative research method uses aims to develop new theories while a quantitative method is used when the goal is to verify and test existing theories (Bryman & Bell, 2007). In addition, qualitative data normally takes form of words as opposed to numbers and in the case of qualitative research, the researcher is able to preserve chronological flow, see precisely which events led to which consequences, and derive fruitful explanations (Miles & Huberman, 1994).

In conducting a qualitative research strategy, this research aims to capture data through semi structured interviews (Miles & Huberman, 1994). The chosen strategy provides a deeper understanding of the subject and research area, which is required to answer the research question. This research concerns EPR regulations in the context of solid waste management issues. It is inherently narrative, and the research findings are non-numerical. The EPR is a new concept in South Africa and there is very little research on the subject in this country. This research is therefore exploratory and qualitative.

3.1.1. Scope of the research

Setting the boundaries of the case to be studied is an important step in the research design (Yin, 2018). The EPR is a paradigm with environmental, economic, and social implications (triad aspect of sustainability) which includes higher rates of waste reuse and recycling, improved waste collection, ensuring higher quality of secondary raw materials, employment creation, and reduced risks from improperly disposed waste (Murray *et al*., 2017).

Baxter (2008) cautions about the dangers of answering a research topic that is very broad or a topic that has too many objectives in one study. To navigate or circumvent this pitfall, Stake (1995)

and Yin (2003) suggest that a researcher should place boundaries on the research project to prevent this problem from eventuating. Miles and Huberman (1994) suggest that a case can be bound by definition and context to ensure that the study remains reasonable in scope. These boundaries also indicate the breadth and depth of the study. Taking this advice, the research confined its parameters to the paper and packaging industry.

South Africa has a litter problem (DEA, 2018). The major categories of litter ubiquitous in South Africa include plastic bags, Take-away food containers, beverage and beer cans and paper packaging materials (Marais *et al*., 2000). If the relevant actors were to effectively manage these waste streams in terms of the purpose of the Regulations, the problem of litter in South Africa can effectively be addressed. The paper, packaging and single use plastics industry has been identified as priority waste streams and are largely responsible for litter pollution in South Africa. Confining the research to this industry is necessary to make the research project manageable and more focused.

3.2. Data collection

Qualitative research is research which uses research methods which result in a narrative, descriptive account of a given topic and it involves collecting and analysing non-numerical data to understand concepts and to gather in-depth insights into a problem or generate new ideas for research (Parkinson *et al.*, 2011). By conducting qualitative research strategy, the aim was to capture data through interviews, observation and from reports and documents (Miles & Huberman, 1994). The subject of the research requires the study and interpretation of perceptions of managers and other personnel working in companies which produce goods and generate waste, which is why a qualitative research approach was appropriate. This strategy provides the researcher with an insightful understanding of the subject which was necessary to address the research question. This research followed a semi structured interview.

The literature for this research was obtained from multiple sources which included peer reviewed articles, grey literature and official documents and reports on EPR from South Africa and other countries. The desktop study was conducted following the systematic research method. According to The Cochrane Collaboration (2005), a systematic research method employs explicit techniques to locate, evaluate, and critically assess pertinent research from previously published studies that are relevant to the inquiry at hand.

A systematic search begins with the identification of keywords and search terms, which is built from the scoping study and literature review (Cresswell *et al*., 2010). The researcher then decides

on the search strings that are most appropriate for the study. Table 3-1 shows the search strings used and the scope of the review is about EPR Regulations, systems and practices and perception of industry about EPR and opportunities and challenges which these companies face in implementing EPR.

Table 3-1. Keywords and search strings for the Systematic Research Method.

Search Strings	Keywords
Extended Producer Responsibility Circular Economy and EPR	Laws, Regulations, Acts and Schemes, EPR challenges and opportunities. Extended Producer Responsibility Model, Reports, Directives. South Africa, Germany, Netherlands. France.
Criteria	**Included**
Search Engine	Google Scholar, Scopus, and Semantic Scholar, with the assistance of open-source programs like Citation Gecko and Mendeley that provide recommendations for relevant articles.
Source	Publications from peer-reviewed journals; non-peer-reviewed reports were also included because they offer insights into the relationship between academic research and practical application.
Search parameters: Keywords	Industry or business perception of EPR Industry or business perception of environmental laws Corporate environmental responsibility EPR challenges and opportunities Circular economy and DFE
Relevance	Literature focusing on EPR
Period	2000 to present

3.2.1. Semi structured interviews

In order to assess the paper and packaging industry perceptions of the opportunities and challenges associated with the EPR Regulations semi structured interviews was used. The structure of the interview questionnaire was designed to give structure to the conversation and to ensure that the information regarding participant's experiences relating to the perceptions, opportunities, challenges, and practices relating to EPR are expressed during the conversation. The interview was conducted through Microsoft teams. Teams is a software program used to hold

online meetings with individuals or groups using computers, laptops, or mobile devices. Microsoft teams offered the option for sessions to be recorded for replay while also allowing participants to see and hear each other through the video and audio systems on the devices being used. Teams is a cost-effective fast and effective method of communication. It also provided a secure platform for one-on-one interaction (Archibald *et al*., 2019).

3.2.2. Interview questionnaires design

When conducting a semi structured interview, researchers recommend using an essential checklist to help cover all relevant areas. The benefit of such a checklist is that it allows for in-depth probing while also allowing the interviewer to keep the interview within the parameters defined by the study's aim (Van Eygen *et al*., 2017). The design of the interview questionnaires for this research was informed and guided by the following suggestions by Fink (1995) and Oppenheim (1996):

a) The questionnaire should be concise, succinct but should cover crucial grounds to enable the elicitation and collection of all necessary data.

b) The language should be as simple as possible and easy to comprehend. This means that verbosity and jargon should be avoided. In addition, leading questions should also be avoided.

c) Questions must be unambiguous and not include multiple aspects at once.

The interview questionnaires were distributed to the interviewees through email prior interview. Following this, each person or company had a private Microsoft teams session to discuss the questionnaire, ask follow-up questions as part of the semi-structured approach, and clarify any questions as needed. Table 3-1 below depicts the interview questions asked during the interview.

Table 3-2: Interview questions

Category	Interview question
Research Questions	• What challenges does your company encounter when implementing EPR? • What opportunities does your company see in EPR? • What is needed to turn challenges into opportunities?

Fox (2009) forewarns that a poorly planned interview might contain leading questions or questions that the participants are unable to understand. The Researcher therefore ensured that the

questionnaire did not contain any leading questions and the questions were concise, succinct, unambiguous, and perspicuously clear. The structure of the questionnaire was designed to give structure to the conversation and to ensure that the information regarding participant's experiences relating to the opportunities, challenges and practices relating to EPR were expressed during the conversation. Semi-structured interviews work very well in projects dealing with high-level bureaucrats' people who are accustomed to efficient use of their time (Bernard, 2006). The participants who were interviewed fell in this category. Semi-structured interviews had two- fold advantages, namely, it showed that the interviewer was in control of what was expected from the interview and at the same time it showed that the interviewer was not trying to exercise unconscionable control over the participants (Bernard, 2006).

3.3. Population and sample

Eisenhart (1989) states that "the concept of population is crucial because the population defines the set of entities from which the research sample is drawn." The population relevant for this research was described as individuals or organisations that were operating or employed in plastic, paper manufacturing, producing, importing, or retailing industry in South Africa also the PROs in the paper and packaging industry.

3.3.1. Sample size section guideline

There is no general directions about the optimum numbers necessary in qualitative research (Guest *et al*., 2006: 60), established rules or methods guiding the researcher about how to obtain a properly sized sample (Lichtman, 2010; Kindsiko & Poltimäe, 2019). Patton (2002) suggests leaning towards a minimal size albeit based on a reasonable coverage of the studied occurrence. Most researchers use the concept of "saturation" to determine whether the sample size is appropriate or not (Sandelowski, 1995; Malterud *et al*., 2015). According to this principle, a sample has a suitable size if it is big enough to answer the research's questions and to achieve the study's purpose. Notwithstanding this, the usual sample size in qualitative research is between 15 and 50 participants (Guest, Bunce & Johnson, 2005; Baker & Edwards, 2012) opines with the proviso that 20 participants may be enough for one study and not enough, or too many, for another. The total population of subjects who are involved in EPR programs and initiatives was small, hardly surpassing by conservative standards of 200. This research therefore used a sample size of ten participants from the population sample were interviewed.

3.3.2 Sampling procedure

The purpose of this section is to draw a meaningful, reliable and valid conclusion for identifying a representative sample of the study population Furthermore, any research investigation must carefully consider the sampling strategy used because the features, makeup, and size of the sample typically lend credibility to the study's conclusions. As a result, different sampling strategies are used, based on the goals and research problem. In order to confidently answer the research question, the researcher must be able to choose and apply the most appropriate technique for gathering richly informed data, which requires an understanding of various sampling techniques. Probability and nonprobability sampling are the two main categories into which sampling techniques can be broadly divided (Welman *et al*., 2006; Campbell *et al.,* 2020) In probability sampling, a representative is selected at random by the sampler to be included in the sample, while in nonprobability sampling, the researcher selects the sample at random to be included in the sample. This research followed a purposive sampling procedure to select the ten participants as outlined in the previous section.

Purposive sampling is a nonprobability sampling technique in which the researcher makes judgments about which elements to include in the sample based on a range of criteria, such as the participants' willingness to participate in the study and their level of expertise on the research issue. Additionally, in qualitative research, purposive sampling has been used to find and choose data relevant to the study's goal (Creswell & Clark, 2017)

Through the use of purposive sampling, the researcher can choose participants based on predetermined standards, such as their willingness to participate in a study within a specific segment that aligns with the research question and their level of expertise. Due to the unique nature of this research, a specific set of participants had to be selected in order to collect detailed information that would enable the researcher to understand and discover how the industry views the opportunities and challenges brought about by the EPR Regulations. In this research Organisations were divided into 2 categories namely PROs and producers. Participants who were interviewed held managerial positions in the organisation. According to Baxter and Jack (2008) it is important to pay consideration to the unit of analysis to be used. The unit of analysis of this research was the experience of the participants as to the opportunities, barriers and practices of the organisation towards EPR issues relating to waste management and CE. Table 3-3 below lists the participants interviewed.

Table 3-3. List of participants interviewed

Participants	Industry	Company Name
Participant 1	Producer	Coca Cola
Participant 2	PRO	Metal Packaging Association of SA (Metpac-SA)
Participant 3	Producer	Shoprite
Participant 4	PRO	PETCO
Participant 5	Producer	SAPPI
Participant 6	Producer	SAB Breweries
Participant 7	Producer	Woolworths
Participant 8	PRO	Polystyrene Association of SA
Participant 9	PRO	POLYCO
Participant 10	Producer	Heneken SA

3.4. Data analysis

The significance of data analysis is emphasized by McNabb (2010:287), who claims that data collected using a variety of methods are meaningless if the researcher does not process, analyse, and interpret the data. In most cases, there is no one correct way to analyse qualitative data. The research usually starts with a large body of data that is then condensed to a few distinct, abstract themes (Leedy & Ormrod, 2005; McNabb (2010). The researcher followed the thematic analysis (TA) approach as recommended by Braun and Clarke (2006). The TA is the process of identifying patterns or themes within qualitative data. The goal of a TA is to identify themes or patterns in the data that are relevant and use these themes to address or answer the research question (Vaismoradi, Turunen & Bonda, 2013). In conducting the TA, the researcher followed the 5-phase guide recommended by Braun and Clarke (2006) which is articulated as follows: Step 1: Become familiar with the data, Step 2: Generate initial codes, Step 3: Search for themes, Step 4: Review and define themes, Step, Step 5: Write-up.

Step 1:

The first step involves a thorough reading of the interview transcripts.

Step 2

In this phase the Researcher arranged and organised the collected data in a meaningful and systematic way. Coding reduced voluminous data into small, relevant and meaningful data. The researcher used pre-set codes as identified during literature. As per the Table 3-4:

Table 3-4: Pre -set codes identified during literature review

Initial themes	Examples of key words
Legislative	Legislative Policies, legislation, treaties, conventions, acts, regulations, legal, licence, permit etc
Infrastructure	Separation at source structure, recycling plants
Financial	EPR fees, target fees, modulated fees Economy, market, finance, budget, cost, income, savings, business case, DRS, taxes, levy
Social	Jobs, education, awareness
Environmental	Diversion, waste separation, recycling, pollution, landfills, illegal dumping, littering

Step 3

A theme is a pattern that highlights something important or significant about the data and research question (Braun & Clarke, 2006). In this instance, the Researcher examined the codes and align them with the initial categories. At the conclusion of this step the Researcher organised the codes into broader themes that appear to address specific aspects of the research question below:

a) What challenges does your company encounter when implementing EPR?

b) What opportunities does your company see in EPR?

c) What is needed to turn challenges into opportunities?

Step 4

In this phase, the Researcher reviewed, modified and revised the themes to ensure that each theme has sufficient data to render it a full and distinctive theme. Finally, the Researcher began to formulate the themes into a narrative.

Step 5

In this phase, the Researcher concluded the process by writing a narrative to address the research questions.

3.5. Data Presentation

The results obtained from the interviews are discussed in Chapter 4. The research findings are summarized in a table. The key challenges, opportunities and measures to address the key challenges are clustered and discussed under the following initial categories as identified during literature review,

a) Legislative

b) Infrastructure development

c) Financial

d) Social,

e) Environment

3.6. Ethical considerations

The Faculty of Natural and Agricultural Sciences Ethics Committee (FNASREC) at Northwest University approved this study as having only minor ethical concerns with the additional requirements that best practices for interviews be followed, including appropriate negotiation of access to participants, representative sampling, documented informed consent that includes the necessary information, alignment of data collected with research questions, and anonymization of data collected. The ethics number for this study is NWU-01226-23-A9.

3.7. Methodological assumptions and limitations

Although 30 invitations and enquiries to participate in the interviews were made, only 10 responses were received; four from representatives from the PRO and only six from producers; nine producers declined to participate in the interview and the rest ignored or closed further communication with the researcher. Representatives from PROs participated in the interviews with alacrity and enthusiasm and the majority indicated that they looked forward to receiving the results of the research. On the other hand, producers' participation was lukewarm and most preferred to remain anonymous due to what they said was the "business sensitivity" of some of the information the research sought to elicit.

Interviews via teams were affected by the perennial problems of load shedding and poor network coverage. To navigate through this potential problem, the Researcher in conjunction with the

respective Participants mitigated the impact of these obstacles by scheduling the interviews when there was no load shedding according to ESKOM timetable.

Semi structured interview is susceptible to unintentional bias, to mitigate this limitation all participants were interviewed using standardised questions (Killion, Pietila, & Jonson,2016).

This research gives a qualitative and exploratory examination of industry perception of EPR, and opportunities and challenges faced by company in the process of implementing EPR in South Africa. Accordingly, the research results are not applicable on a wider level. Future investigations, for example might focus on quantitative assessments of EPR perception by companies in South Africa and implementation how efficient are they in implementing EPR? The results of this research therefore lay the basis for quantitative research on the subject.

3.8. Chapter summary

This chapter described the methodology used by the researcher so that the reader could understand how the data were collected, how they were to be interpreted, and how the researcher chose the approach to answer the research question. It also provided an explanation of the qualitative approach's goal. To determine the need for a research sample, a purposive sampling strategy was employed in order to collect thorough and detailed data to support this research. Furthermore, the selected sampling strategy supported assigning participants to a specific domain. The procedure for analyzing the dataset was outlined also how data was presented. It was underlined how important it is to get consent and permission, as well as the ethical issues surrounding the participants' identities. Finally, the limitations of the study were mentioned and briefly summarized.

CHAPTER 4 RESULTS AND DISCUSSION

4.1. Introduction

The aim of this research is to assess the paper and packaging industry's perceptions of the opportunities and challenges associated with the EPR Regulations. The requisite data was obtained through semi- structured interviews. The results and analysis of the findings are also presented in this chapter.

For convenience's sake, respondents will be referred to as Respondents 1-4 (PROs) and 5-10 (Producers). The general mood of producers to the interview was summed up by a response from one producer who responded to the invitation to participate in the interview by issuing the following statement "*We are affiliated with a PRO, and we pay them an EPR fee to handle waste management on our behalf."* It is apparent that most producers are content to passively pay the mandatory fees to PROs instead of accepting and acknowledging their responsibilities and obligations in terms of the EPR Regulations.

The general poor response from most producers was offset by positive response from PRO. They provided useful and helpful insight into the general perception of producers towards EPR. The sample just realised the anticipated sample target of 10. The validity and reliability of the data is enhanced by the fact that four of the responses were from PROs who represent more than 120 companies in the paper and packaging industry. Interviews ranged from 20 to 40 minutes. Interviewees were furnished with interview questions in advance, see annexure A for standard interview questions. The questions were used as a guide and then tailored to each interviewee. The interviewer used probing and follow-up questions to address identified issues and topics and to elucidate and clarify points which came out during the discussion.

The following themes emerged from the interview: Level of awareness of EPR by business, degree of embracement of EPR by companies, financial benefits of EPR to business, EPR fees, DFE, legal definition of producer, disproportionate burden on producers, absence of assigning responsibilities to municipalities and consumers, rolling out of EPR collections points, EPR infrastructure costs, recycling capacity, the problem of monitoring, enforcement and free riding. The results are fully elucidated in the following section and discussed for convenience's sake under the following main themes: challenges hindering successful implementation of EPR, opportunities of EPR to business and measures to address the challenges. Table 4-1 below summarises the challenges faced by PRO & producers during EPR implementation , opportunities of EPR and measures to address the challenges .

Table 4-1. Summary of the research findings

Challenges	Opportunities	Measures to address challenges
1. Legal framework challenges • EPR disproportionately burden producers to the exclusion of municipalities and consumers. • The definition of producer is wide and ambiguous and blurs responsibility for the EOL product. • Lack of monitoring & compliance enforcement by the government	1. Legislative opportunities • An opportunity for policy makers to amend the Regulations by assigning Municipalities with some roles in EPR implementation	1. Addressing legislative challenges • Regulations should assign some role to the municipalities and consumers. • the definition of a producer should be narrowed to include only brand owners and importers. • Department must establish a unit which should be dedicated to monitoring and enforcement of EPR.
2. Infrastructure development challenges • Unavailability of collection points	2.Instracture opportunities • opportunity for the importation of equipment to recycle plastic lined paper disposable coffee cups	2.Addressing infrastructure challenges • The EPR regulations should be amended to provide for the role of municipalities in EPR implementation. The role should include transportation of collected recyclables to recycling plants. In addition, large retail shops should be designated by the regulations to be collection points.

3.Social challenges • Great expectation that jobs will be created through EPR	3. Social opportunities • Extended Producer Responsibility has the potential to create jobs through the creation of new infrastructure for collection of used packaging products and through the creation of downstream industries	3.Addressing social challenges • National Government must incorporate GPP in procurement legislation
4.Environmnetal challenges • EPR does not encourage or incentives DFE	4. Environmental opportunities • Separation at source & circular economy	4.Addressing environmental challenges • authorities to introduce packaging standards for the products that are sold in the market.
5.Finacial challenges • EPR imposed additional financial & administrative costs to the business	5.Finacial opportunities • Financial benefits of recyclable or remanufactured products to brand owners	5.Addressing financial challenges • The Department should replace the basic fee modulation with the advanced fee modulation as suggested by majority of Respondents

4.2. Challenges hindering successful implementation of Extended Producer Responsibility

This section will discuss the challenges and problems faced or encountered by producers in paper and packaging industry in implementing EPR regulations. The challenges will be discussed seriatim as indicated in the preceding section.

4.2.1. Legal Framework challenges

The legal framework challenges will be discussed under the following themes: roles and responsibilities, definition of producer and compliance and enforcement.

4.2.1.1. Roles and Responsibilities

The major challenge from the perspective of both producers and PROs is the general view that EPR disproportionately burden producers to the exclusion of municipalities and consumers. Respondent 2 justified this argument by asserting that the Constitution, National Environmental Management Act and the Municipal Structures Act assign the duty to provide waste collection services to municipalities. By transferring all the waste collection services to producers under the EPR regime, EPR in effect contradicts all the three sets of legislation. The unanimous view of all Respondents is that the Regulations should assign some role to the municipalities. With regards to the role of consumers, the Respondents concur that it is not feasible to legislate the role of consumers. They however suggested that massive education particularly on the importance of returning products to collection points should be launched by all stakeholders i.e., business, local, and provincial and national governments.

The research reveals that both producers and PROs feel that EPR imposes egregious burden on them alone to the exclusion of other stakeholders who are involved in a PLC such as municipalities and consumers. The complaint by producers brings into focus the stated rationale of EPR. The EPR is an application of the PPP. The definition raises many questions. Who is the polluter? Is it the producer or the consumer? To avoid answering these intractable questions, policy makers have adroitly and conveniently found the “cheapest cost-avoider” (the producer) who is the actor within the value chain who is in the best position to provide a solution or the “best briber” (producer) who is best suited to transmit the stimulus of the policy to the most suitable stages (Massarutto, 2014). The fact that producers have been artificially and conveniently labelled the polluter should not exonerate the real polluters who are the consumers from responsibility. The burdens thrust upon the producers by EPR should not be forgotten or

underestimated. The burdens include liability for any environmental damages caused by the product which he/she sells to the consumer and (ironically) enjoyed by the consumer during the PLC, financial, physical and informative liability (Lindhqvist, 2000; European Commission, 2014; Kaffine & O'Reilly, 2015; OECD, 2016; Watkins *et al*., 2017; Watkins & Gionfra, 2019; Pouikli, 2020).

The producers assume many responsibilities under EPR and other stakeholders, are given no responsibilities at all. Therefore, there is some merit in the point raised by the Respondents. It is accordingly unfair to heap all these responsibilities to one actor. Consideration of the role played by each of these stakeholders is the only way to fairly distribute responsibility and costs associated with the fate of a product's EOL disposal. There is little justifiable rationale for excluding or absolving consumers and municipalities from responsibilities under EPR. It is fair to demand that the cost of waste generation and management should be distributed among all actors because each of these characters possesses different capacity to influence the fate of a product's EOL. It may be so that producers manufacture the offending products, but the story should not end there.

Producers do not direct consumers to act irresponsible and to improperly dispose of EOL products. Consumers once owned and enjoyed the services of the products during their lifespan and equally they have a responsibility to dispose of the same products properly at the end of the lifespan of such products. It is unfair to contend that producers should be solely responsible for the fate of EOL products. Consumers should also be encouraged (coerced) to change behaviour, perhaps by being incentivised to take back EOL products to collection points through MBIs such as DRS (McKerlie *et al.,* 2006; Nahman, 2010). It is proper to expect all stakeholders from Government, municipalities, producers and consumers should be responsible for EOL products albeit to different degrees.

The preceding discussion conveniently leads us to discuss the pernicious and harmful problem of littering. Producers and PROs also unanimously hold the view that the blasé attitude of the consumers to the litter problem contributes to leakage of waste into the environment. The consequence of this unsavoury behaviour is that it reduces the amount of waste which is collected for recycling. Numerous studies have shown that implementation of policies on environmental issues can only be efficient and relevant when they involve all stakeholders particularly citizenry (UN, 1992; Yasmin *et.al*., 2017). The solution to this problem partly lies in educating the public about their constitutionally obligation to keep the environment clean. If persuasion fails, then litter laws should be enforced. The role of consumers in the regulations needs therefore to be better articulated.

4.2.1.2. Definition of Producer

Respondents 3 and 4 raised the problem of definition of producer as defined in the Regulations arguing that the definition of producer is wide and ambiguous and blurs responsibility for the EOL product. According to these PROs, the suitable solution is to narrow the definition and define a producer as the last player in the value chain which ordinarily is the brand owner, importer or retailer. This point raises the issue of how EPR is distributed when different organizations are involved in the production of a product in circumstances where one actor develops, and another manufactures, processes, treats, sells a product. Alternatively, is it the manufacturer of packaging or is it the brand owner who is responsible for the EOL of the product? Consider the case of Coca Cola; is it the manufacturer of the bottle or Coca Cola as the brand owner and producer of the beverage who is responsible? It is correct that the definition of producer as per the Regulations is very wide. Producers are widely defined under the Regulations to include manufacturers, brand owners, retailers, etc. In most jurisdictions such as in Canada, Sweden and the Netherlands, a producer is narrowly defined as the actor whose activities produce waste i.e., the entity that sells the final product to the consumer (OECD, 2016). Garyn Rapson & Paulo-Ann (2021) summarises the problems that this wide definition can cause as follows:

a) This will encourage large brand owners to establish their own PROs to the financial disadvantage of smaller PROs.
b) This wide definition will lead to an influx of PROs, who will be motivated by different business agendas. In the circumstances individual compliant PROs may compete and it will also complicate the lines of responsibility.
c) This wide definition introduces possibilities of “double taxation”. If the brand owners are responsible for paying EPR fees, the upstream manufacturers will equally be obligated to pay fees.
d) In addition, extending the breadth of EPR to multiple actors creates reporting challenges of duplications of declared “sales” and “targets” across the supply chain that will be reported to the Department. Therefore, that will result in double counting which inevitably will result in inaccurate figures of collection and recycling rates.

4.2.1.3. Compliance and Enforcement

All Respondents lament the fact that there are free riders in the system and the Government has neither interest nor capacity to monitor and enforce the implementation of EPR. They cite the fact that thin plastic is still being openly sold illegally in the country. They also claim that there are a lot of manufactures of plastic packaging who are operating in the country but are not members of

any PRO. They suggested that the Department must establish a unit which should be dedicated to monitoring and enforcement of EPR.

Absence of monitoring and lack of enforcement will jeopardize the good functioning of EPR. Some of the problems which may thrive in the absence of enforcement mechanisms include free-riding, traceability of ownership of certain EOL products and unfair competition concerns (Tojo *et al*., 2001). The EPR also brings added financial and administrative costs to business. As producers carry these extra costs to accommodate EPR policies, they expose themselves to potential competitive disadvantage and vulnerability relative to those producers or manufacturers who do not comply with EPR policy. Compliant companies will be at a disadvantage if there is significant leakage that allows other producers to bend the rules or operate without complying with policy.

The EPR Regulations do not provide robust measures to monitor and enforce compliance by the Department. In the absence of strong monitoring and enforcement it is very doubtful that PROs will meet the producers' voluntarily self-imposed recycling targets. More so free riders will continue to operate at the expense of companies which comply with regulations. Apart from deliberate predilection for non-compliance by rogue producers, free riding can also be due to a lack of awareness. It flourishes where enforcement is weak or insufficient (Hilton *et al*., 2019). Effective monitoring and enforcement therefore is crucial for EPR to function optimally. Respondents 1 and 2 complained that some producers hop from one PRO to another in search of PROs that charge lesser fees. They contended that this shows that some producers merely join PROs as a formality to comply with the Regulations and do not care about achieving the objectives of the Regulations. Respondent 1 suggested that the Regulations should prohibit such behaviour and provide that a producer cannot change PROs within a certain period, and he suggested a period of two years.

Voluntary recycling has been going on in South Africa since the 70's which the author Godfrey terms the "Age of Recycling" (Linda Godfrey *et al.*, 2017). Voluntary recycling achieved very limited success because since the recycling age to the present, large volumes of plastic, cans and bottles have been leaking into the environment. The limited success of the recycling companies could be attributed to the fact that companies did not set recycling targets for themselves. It is also possible that recycling efforts could not have been influenced by altruistic concern for the environment but may have been motivated by just building a positive public perception of the companies as an element of corporate social responsibility. Whatever the reasons for the rather unsatisfactory recycling performance of the recycling companies, the salutary lesson that can be learnt from this "Age of Recycling" is that implementation of EPR cannot be left to the producers and PROs without government intervention through robust monitoring and enforcement.

4.2.2. Infrastructure development challenges

Lindhqvist (2000) posits that collection rates of used products are determined by factors namely: level of convenience or inconvenience in terms of how much effort must be made to dispose the used product (collection facilities), level of information and awareness among final consumers. Collection infrastructure therefore plays an important role in boasting collection rates of used packaging products for reuse or recycling.

One of the major challenges expressed by all Respondents is that EPR implementation is up to a slow start because of the difficulties of establishing accessible collection points covering all corners of the country. It is an enormous task to establish collection points in rural areas they added. Establishing such infrastructure is a massive and costly enterprise and they claim that producers alone cannot be able to undertake such costly enterprise without government involvement. The PROs raised the problem of recycling capacity. They contend that when EPR is fully operational, it will lead to an enormous increase in recyclable material and the present recycling companies will not be able to cope with the increased load. They added that it is a bit of a challenge because new facilities cannot be constructed in anticipation of the envisaged increased load.

The major challenge to EPR implementation is the huge up-front investment costs for establishing accessible collection facilities to receive used products. According to PROs, fees have to increase substantially in order to raise funds to fund the establishment of collection point's infrastructure. This they say is not feasible. Collection of used products requires the provision of an extensive and expansive network of easily accessible collection points which covers the length and breadth of the country. Producers claim that they cannot be able to fund establishment of collection infrastructure alone and they propose that Government and Municipalities should bear some of the costs of such development. The Regulations do not provide any model for raising the necessary funds to develop the required extensive network to collect the used products.

4.2.3. Social challenges

The Researcher put it to the Respondents that there is a great expectation that new jobs will be created through EPR. Most of the Respondents (80%) indicated that it is not possible and the other 20% were not certain but indicated that jobs may be created in the long term; perhaps in the foreseeable future when EPR is fully functional.

The Regulations mention job creation as one of the advantages of implementing EPR. However, from the literature, it is evident that EPR can create jobs if the following conditions exist (Lindhqvist 2000):

a) The PROs work efficiently,

b) Accessible collection points are available,

c) Consumers return used or EOL products to collection points (usually motivated by M.I.B instruments such as DRS),

d) Supply of quality and recyclable material increases exponentially,

e) Investment through establishing more recycling companies and recycling opportunities increases, and

f) Free riding is eliminated through robust and effective monitoring and enforcement by authorities.

Perhaps business is sceptical that EPR can create jobs in South Africa because most of the conditions of success do not exist at present in South Africa. It is therefore safe to conclude that EPR and jobs is still rhetoric at present. However, business will continue to carry this burden of "job creators" against high and unrealistic expectations from the authorities and policy makers. The danger is that at the end, it is the concept and business who will be blamed for the failure to create jobs instead of the blame going to those who failed to create conditions for the success of EPR. In theory EPR has an excellent potential to create new industries and new jobs. In practice in order for this to happen, an enabling environment should exist. This includes an efficient and effective PRO system, an extensive collection infrastructure resulting in increased quantities of collected used products and concomitantly an increased recycling capacity.

4.2.4. Environmental challenges

Environmental challenges will focus on DFE and environmental targets.

4.2.4.1. Design for Environment

When asked whether any producer has a research and development (R&D) policy aimed at advancing DFE in terms of the demands of EPR, none answered in the affirmative. When further asked whether any of them had improved or designed any new product with EPR in mind; none answered in the positive. However, they indicated that R&D cannot be achieved overnight. They added that in the medium to long term, it is possible to come up with new product designs in

pursuit of DFE. Producers (80%) indicated that even if alterations in product design decrease the cost of waste management, they would not improve their product designs if the resultant benefit is small.

None of the interviewed producers indicated that they have introduced new packaging designs in line with DFE requirements of EPR. They further indicated that they do not see any need to invest time and money in developing new or innovative products solely for the purposes of EPR. Designing products for reuse or recycle has not been widely adopted by most interviewed organisations. Companies are more concerned with practices that can generate economic returns in the short-term than those practices which can have a beneficial effect on the environment. In relation to the challenges for the implementation of 'eco-design' practices, they were found to be: 'lack of awareness and sense of urgency, also in businesses' (80%), 'major up-front investment cost' (70%), 'limited attention for EOL phase in current product designs' (80%), 'lack of clear performance measurement' (80%), and only 40% had adopted green packaging practices.

The findings are in line with findings of other researchers who found out that EPR particularly in the context of PROs does not encourage or incentivise DFE (Lindhqvist & Lifset, 2003; Sachs, 2006; Gottberg *et al*., 2006; Roine & Lee, 2006; Walls, 2006; Rotter, 2011; Gui *et al*., 2013; Tong & Yan, 2013). This is because the concept of PROs brings collective efforts to achieve waste management obligations and responsibilities. This results in the distribution of costs in such a manner that the incentive for individual manufacturers or producers to invest in DFE improvement is diluted (Lindhqvist & Lifset 2003).

The packaging industry is known for including unnecessary packaging designed to attract customers. There is therefore great scope for the industry to apply DFE to make packaging simple and discard superfluous material (Baker, 2009; Kim, 2012; Landbell BFS, 2021). The case of packaging bread is a quintessential example of unnecessary packaging which does not add any value to the product. Producers can simply tie the packaging instead of using plastic tag. Retailers, brand owners and consumers have significant influence and strong interest over packaging. Similarly, they demand minimal packaging from manufacturers because less packaging will result in less cost of product and the cost savings can then be passed on to consumers. This however does not apply in practice. This research has shown that producers have little appetite to pursue sensible DFE policies. Instead, they favour policies that put sales and profits first. Generally, consumers in South Africa have little knowledge and interest in environmental issues and therefore are not in a position to exert any pressure to producers in order to force them to adopt sustainable production practices. This leaves the problem to Government to fill the vacuum. The Government can do this by introducing legislation which stipulates packaging standards for products.

The bulk of litter endemic in streets, informal settlements, townships, and villages of South Africa comprises of cans and bottles. In instances where bottles attract a deposit like Coca Cola bottles and beer bottles, the deposit is so small that people horde bottles at home and are not bothered or incentivised to return empty bottles to retailers. Communities across South Africa are living in cesspools of such litter. Producers (100%) when asked why they do not raise the amount of deposit of a beverage bottle from the present R2 to R10 retort that this will likely decrease sales.

Producers (100%) who do not charge deposit for bottles and cans likewise cite fear of decreasing sales if they introduce a hefty deposit system for cans and bottles. It is posited that the problem of cans, and bottles litter can easily be solved by first legislating that every can and beverage bottle sold in South Africa should carry a deposit. In addition, the deposit should be set at a level that should incentivise the average consumer to value the empty bottle and consider such bottle as an asset that cannot simply be discarded into the environment. The issue of decreasing sales cannot and should not be allowed to stand in the place of a cleaner and healthy environment. Besides brand owners such as Coca Cola and SAB stand to reap the economic benefits of a deposit system.

Recycled or reused packaging is cheaper than packaging manufactured from virgin or raw materials. Granted, manufacturers of packaging will lose out in terms of reduced demand for their products. However, this must be accepted as the inevitable consequences of moving away from a purely LE mode of production to a sustainable and sensible mode of production. Fruitless production at the expense of the environment should belong to the "cowboy" era and should not have any place in this environmental conscious era. Various authors and researchers confirm that a DRS increases collection and re-use and recycling rates significantly (Panayotou,1998; Cahill *et al*.,2011; Sanborn & Kobold 2016).

Respondents 3 & 4 indicated that some materials are not recyclable such as materials for example wax-lined coffee cups and plastic trays. This is because at present, there is no equipment in the country to recycle these packages which contain two different materials. They suggested that until such time such suitable equipment exit in the country, the manufacture or importation of these non-recyclable packaging should be banned. Respondent 1 suggested that the Government should introduce legislation that governs packaging standards.

4.2.4.2. Environmental targets

The Regulations provides for producers to set their own recycling targets. Respondents 1-4 (PROs) indicated that internally imposed targets as opposed to externally imposed targets are

not effective in boasting the collection rates. However, respondents 5-10 (Producers) disagreed and they have indicated that they prefer internally imposed targets.

To access the effectiveness or performance of an EPR program, environmental effectiveness is a major criterion which should be applied. OECD (2001) defines environmental effectiveness as "the extent to which the instrument could be used to reduce or change environmental impacts in relation to the policy targets set". In the context of EPR, upstream changes in products design and composition and waste diversion could be two factors. The final goal of the policy is to reduce environmental impact. Therefore, a target aiming to promote environmental effectiveness should be explicitly set up. Tojo *et al.* (2001) posits that the establishment of mandatory targets by the Department can effectively contribute to high collection and recycling rates. The risk of internally imposed targets is that business can set low targets without considering their impact on the environment. The advantage of externally imposed targets is that they are set objectively and impartially. In addition, externally imposed targets should be set at realistic levels. A credible calculation methodology should be used to set the targets. For companies to take the targets seriously, the EPR regulations should provide penalties for failing to reach the set targets.

4.2.5. Financial challenges

Respondents unanimously indicated that the concept of EPR was a good thing. However, most producers (70%) had some reservations about EPR. Those with reservations indicated that EPR imposed additional financial and administrative costs to their business. It is not feasible to pass on those costs to the consumers they added. Producers mainly voiced concern that in the long term EPR had the potential to make their products uncompetitive or had the potential to subdue demand for their products. The findings are in line with previous studies reported in literature that have highlighted that companies implement environmental based models substantially because of financial reasons rather that environmental-conscious considerations (Liu *et al.,* 2009).

The primary objective of EPR as described in literature is that it seeks to shift the physical and financial burden of collecting, transporting and recycling waste to the producer and away from the municipalities and taxpayers. It can be argued therefore that EPR is about transferring "burden" not "profit" or "opportunities" to the producers. This, it is posited; explains the generally perception of producers that EPR is a threat to their bottom line. The question inevitably arises; can there be any business case for business in EPR? The answer depends on what does one refers to as benefits? Unbridled profits belong to the bygone years. In this modern era, companies cannot just focus on making profits at the expense of the environment. Companies just like all citizens have an obligation to protect the environment to the benefit of present and future generations.

Therefore, in pure financial or economic terms, companies may see little or no benefit of EPR. However, the success of a company is no longer judged or considered in purely monetary terms but in terms of the triple bottom line approach which assess the success of a company in terms of financial, environmental, and social bottom line. The bottom-line approach means that the motive for business is not only to make profits, but also to protect the environment and work towards the betterment of their workers and people in general. The triple bottom approach is now widely acknowledged as a measure or tool to evaluate business performance. Global Reporting Initiatives (GRI) Sustainability Reporting Standards is one such internationally accepted reporting standard.

The PRO Respondents raised the question of the flat rate per product which is currently being charged as per regulations. They argue that it is unfair and disadvantages other producers. One Respondent cited the case of Clover blue milk bottle. Clover's milk bottle was originally white, but they changed it to blue, which decreased the bottle's value by limiting the amount of recycling uses. Blue high-density polyethylene (HDPE) cannot be used to recycle materials of any color, white HDPE can. Yet Clover's EPR was unaffected by the choice to switch from white to blue. Relative to the bottle's color, Clover kept paying the same EPR levy. The majority of the Respondents (60%) proposed that the Government should apply an advanced fee modulation which considers recyclability and toxicity of a product as the basis of charging the fees.

4.2.5.1. Fee modulation types

Table 4-2 below shows the types of fees currently in use worldwide. Basic fee modulation applies simple averages per weight or product type based on measurable EOL cost differences whilst advanced fee modulation considers more detailed criteria such as recyclability and toxicity of product.

Table 4-2. Summary of Fee Modulation Types used worldwide (OECD, 2021).

Level of Modulation	Methodology	Life Cycle Stage	Modulations Type	Criteria Examples
Basic	**Granularity** (Allocation of approximated EoL costs)	**End of Life** (EoL is the focus)	**Basic**	Product Type, Weight, Source (post-consumer and post-industrial) used as a proxy for EoL costs.
	Granularity (Allocation of actual EoL costs, where possible)	**End of Life**	**Advanced EoL with Granularity**	Recyclability, Recycling Rate, Presence of Hazardous Substances, Consumer Awareness
Advanced	**Bonus/Malus** (Bonus/malus adjustments to basic fee)	**End of Life** **Lifecycle** (Aspects of all lifecycle stages, beyond EoL, can determine fee modulation)	**Advanced EoL with Bonus/Malus** **Advanced Lifecycle with Bonus/Malus**	Recyclability, Recycling Rate, Presence of Hazardous Substances, Consumer Awareness Recycled Content, Product Lifespan

The current basic fee modulation provided in the regulations amount to averaging waste management costs among producers. This reduces incentives for companies to make DFE investments. Modulating fees using a more diverse and advanced set of criteria provides for more targeted incentives for DFE. Fee modulations that give recognition or bonus based on criteria such as reusability, or recyclability reflects the EOL or environmental costs of products more appropriately (APPLIA *et al*., 2019). The main benefit of fee modulation premised on advanced criteria is a better and true granular cost distribution among companies that consequently provides manufacturers with additional incentives to invest in DFE (Hilton *et al*., 2019).

The DFE brings two benefits to society in that it lowers costs of EPR implementation in the long run. The resultant lower cost savings will be reflected in lower costs to companies and PROs either benefitting the companies themselves or lowering prices of consumer products. The other benefit is that it lowers environmental impacts of products beyond EOL costs i.e., if advanced fee modulation triggers design changes to for example if it increases recycled content in the product material mix.

An important benefit and a benefit South African policy makers and companies have yet to appreciate is the signalling function of advanced modulation. If announced or disclosed, a bonus allows procurement departments from Governments to identify environmentally preferable products. The benefits can be realised if the Government include Green Policies in their procurement criteria. The main reason why policymakers opted for a basic fee modulation instead of the advanced and more environmentally friendly modulation is that the basic fee modulation is simple to administer and the advanced is complex and difficult to administer. The other reason why Government opted for the basic fee modulation is the thinking that the advanced modulation offers bonuses to innovators and conversely imposes penalties to laggards. The thinking may create internal conflicts between front runners and laggards thereby jeopardizing the smooth operation of a PRO.

The PROs (100%) and the producers (60%) argue that PRO fees should not be set as per product but should be based on recyclability of a product. The proponents of this view give the example of Clover blue milk bottle. Clover's milk bottle was originally white, but they changed it to blue, which decreased the bottle's value by limiting the amount of recycling uses. Blue high-density polyethylene (HDPE) cannot be used to recycle materials of any color. White HDPE can. Yet Clover's EPR was unaffected by the choice to switch from white to blue. Relative to the bottle's color, Clover kept paying the same EPR levy.

4.2.5.2. Recycling rate

The EPR fees can be adjusted proportionately to the amount of waste that is recycled. Accordingly, waste categories with above-average recycling or collection rates may be eligible for bonuses, and those with below-average rates may be subject to penalties. However, because it needs precise measurement and disaggregated data to distinguish between the recycling rates of various product types and packaging, this approach comes with high implementation costs. Under perfect circumstances, this approach could effectively raise the nation's recycling rate.

4.2.5.3. Hazardous substances

The presence of hazardous substances can increase the costs of recycling and can cause environmental damage in instances where the material is improperly disposed. Fees should be modulated to incentivise the elimination of the production of hazardous substances. The advanced fee modulation though complicated to manage than the current basic fee modulation has more environmental benefits. The advanced fee modulation can encourage producers to

pursue DFE policies such as striving to produce products which are easily recyclable or products which contains less hazardous substances, or which do not contain hazardous substances.

4.3. Opportunities of implementing Extended Producer Responsibility

The following themes are covered: legislative, infrastructure, social, and environmental opportunities, when discussing the opportunities that businesses can take advantage of when implementing EPR.

4.3.1. Legal framework opportunities

Respondents have highlighted the weaknesses of the provisions of the current regulations. For instance, they have argued that by transferring waste collection services from municipalities to producers, the EPR regulations are inconsistent with the Constitution, the Municipal Structures Act and NEMA. This research has concluded that the criticisms are valid. This weakness in the current regulations present an opportunity for policy makers to amend the Regulations by assigning Municipalities with some roles in EPR implementation so that the Regulations can be in line with current waste management regulations.

4.3.2. Infrastructure opportunities

All Respondents have also pointed out that there is no equipment to recycle certain materials such as plastic lined paper disposable coffee cups in the country. This also presents an opportunity for the importation of such equipment into the country to fill the current undesirable gap in this regard. Government can offer tax breaks or subsidies to facilitate the importation of the equipment by companies.

4.3.3. Social opportunities

The EPR has the potential to create jobs through the creation of new infrastructure for collection of used packaging products and through the creation of downstream industries (White, 2002). If the EPR is fully functional jobs can be created. Increased collection of used products requires collection infrastructure which in turn requires personnel to operate and manage the collection facilities. The collected products need to be transported to recycling facilities and this will also require drivers and other personnel to transport the collected products to recycling facilities. Finally, new factories to process the increased quantities of collected products will have to be established and workers will be required to work in those factories. In theory, EPR has the potential to create new industries and jobs. However, for EPR to reach its full potential, the

conditions necessary for success such as collection infrastructure, increased collection of recyclable materials and increased recycling capacity should be in place.

4.3.4. Environmental opportunities

Waste is an unpleasant and natural by-product of industrial and manufacturing processes on one hand and human consumption on the other hand. It is a menace to both human health and the environment. It is not over exaggerating to say that South Africa is in a waste crisis that demands urgent attention and action. Most major cities and local municipalities across the country have run out of suitable landfill space and are generally operating in a crisis mode. Bottle, cans, plastic and paper packaging are improperly discarded in streets, veldt and open spaces across the country's towns and rural areas. In an ideal world, these waste streams should be regarded as "resources" for resource recovery which can be used to create economically viable businesses and, in the process, to create new jobs.

The country is in a self-destruct mode which requires Government to act decisively to stop this tsunami of waste to continue to cause harm to the environment and to human health. Consumers and business are both contributors to this waste tragedy. It is not enough to introduce new laws to address the waste problems. What is vital is to make sure that these laws are implemented effectively so that they can have efficacious results. All Respondents agree that EPR brings environmental benefits. The EPR if fully and effectively implemented will result in the attainment of many Governments' environmental policies.

4.3.4.1. Separation at source

The 2nd NWMS (DEA, 2020) set the goal that municipalities initiate separation at source programmes by 2021. Separation at source ensures the cleanliness, suitability and quality of the supplied recyclable material. There is no national formal sorting system in SA, and broadly speaking, there is no culture of separating waste at source in the country (Green Cape, 2018). The culture does not exist for several reasons. First there is very little infrastructure to facilitate segregation at source. It is expensive to set up an expansive and extensive separation at source infrastructure covering towns, cities, townships and villages of the country. This is because infrastructure of this nature requires at least four special different waste serration receptacles.

The system is also difficult to manage in this country for many reasons including susceptibility to vandalism. In the absence of such infrastructure, it is at present impossible to nurture a culture of separation at source. The efficiency in separation waste has been one of the strongest reasons why Sweden has a recycling rate of 99%. The country has to import trash from neighbouring

countries like Germany or the U.K. to generate energy (Zaikova, 2022). The EPR via the DRS is capable of achieving the goal of separation or segregation at source and in the process EPR is capable of putting the country firmly on the pathway to CE.

4.3.4.2. Circular Economy

According to Respondent 1, South Africa is a linear nation with few circular initiatives; however, the implementation of EPR regulations will help the nation transition from a linear to a more circular one. The story of CE in South Africa begins in 2001 in Polokwane, Limpopo. The Polokwane Declaration ushered CE lexicon into the waste management discourse in South Africa. The DEA, civil society and business committed to achieve the following goals for tackling waste management:

a) to stabilize waste generation and reduce the waste disposal to landfills by 50% by 2012;
b) to develop a plan for zero waste by 2022 and the following objectives to reducing waste generation and disposal by 50% and 25%, respectively by 2012 and develop a plan for zero waste by 2022.

Respondent 1 went on to say that the targets were unrealised, this prompted the Department to come out with revised targets 20 years later with the introduction of the NWMS 2020. This strategy is significant in that it reaffirmed the concept of CE as a strategic policy to reduce waste to landfills by 40% within 5 years that is by 2026, 55% within 10 years that is by 2031 and 70% within 15 years that is by 2036. As a sequel to the NWMS 2020, the CE motif was further given impetus by the introduction of few regulations and initiatives directed at achieving a CE society. When asked about the few circular initiatives Respondent 1 indicated that the first was the plastic bag levy in 2003, and the second was the ban of all forms of liquid waste, recyclable waste oils and tyres from being disposed at any landfill in August 2019. The third was the introduction of the EPR regulations which came into force on the 5th of May 2021.

Many countries in the world particularly those in the most developed and middle-income economies have recently started to shift from a LE model of P&C to a CE model of P& C. There is consensus among governments, policy makers and academics that the prevailing LE model operating globally and in South Africa which can be described as “take-make-waste” or “take, produce, consume, and waste” (van Buren *et al*., 2016; Masi *et.al*., 2018) is not sustainable and has now shown that it has reached its limits (William M.C. Donough & Michael Braungart, 2002).

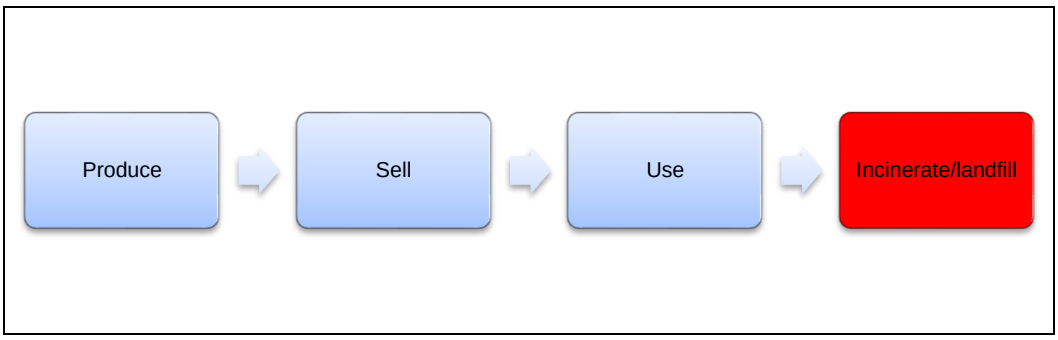

Figure 4-1. Linear Economy Model

Source: Adapted from van Buren et al. (2016) and Masi et al. (2018).

This LE model has resulted in increased production of waste (Ellen MacArthur Foundation, 2013) and rapid deterioration of the environment. This accelerated worsening of the environment around the world prompted the global community to introduce interventions in the form of protocols, reports and declarations such as the Brundtland Report (1987) Rio Declaration (1992) as well as the Kyoto protocol (1997) to transform the global economic paradigm. The notion of (CE)-Figure 4-2 below gained traction in 2010 as a result of the efforts of the Ellen MacArthur Foundation (EMF, 2013) and later the World Economic Forum (WEF, 2014).

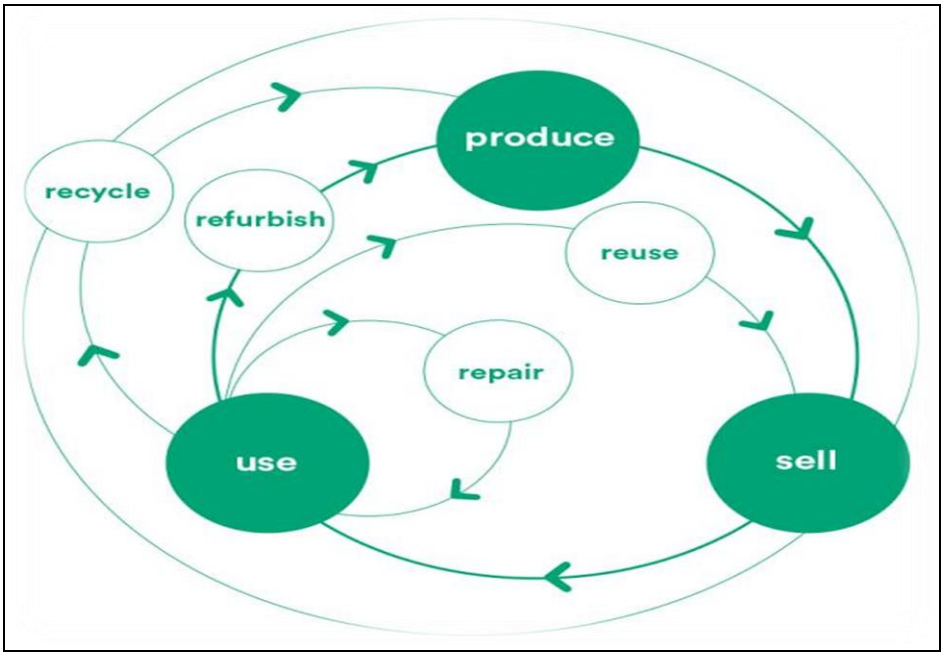

Figure 4-2. Circular Economy Model

Source: Cristina et al. (2019).

The CE model is the opposite concept to the traditional LE. It is based on the 9R approach which is about reduce, reuse, reject, rethink, redistribute, repair, restore, reuse, recycle, and recover) and minimizing incineration and disposal (Bag *et al*., 2021) . The LE model though pernicious to the environment is still entrenched. This inertia demands a comprehension of facilitative interventions that promote a pathway to a CE. The EPR offers such pathway. Several studies have shown that EPR has shown to reduce waste generation (Dahlén and Lagerkvist, 2010; OECD, 2016). For example, EPR has contributed to increasing the packaging waste recycling rate in France from 18% in 1993 to 68% in 2016 (Eco-Emballages; 2015). The EPR if properly implemented can be a potent tool to steer the transition to a CE. South Africa has signalled an intention to transition to a CE. The transition to a CE is well aligned with National Development Plan and SDG as articulated in the NEMA and the United Nations Agenda 2030 (2018).

4.3.5. Financial opportunities

The cost of recyclable bottle and can packaging is lower than that of packaging which uses virgin materials (Stromberg, 2004; Nahman & Godfrey, 2008). It is therefore less costly for companies which uses bottle and can packaging to purchase recycled bottles or cans. The findings of this research confirm the cost benefits of recyclable cans and bottles. Respondents 5 & 6 indicated that it is cheaper for them to purchase recyclable or remanufactured packaging than purchasing completely new packaging. On the other hand, Respondent 9 manufacturers of such packaging indicated that recyclable products are detrimental to their business because it has the effect of reducing demand for their products. There are therefore financial benefits of recyclable or remanufactured products to brand owners. Manufacturers must diversify their business and establish recycling departments or divisions for them to benefit from EPR.

4.4. Measures or actions identified to address the challenges

This section discusses the ways to address the challenges, and or issues identified around the implementation of EPR, followed by proposals to find solutions to the problems. The discussion can aid policymakers to improve EPR Regulations so that the Regulations can be well-perceived by key stakeholders and improve EPR implementation.

4.4.1. Addressing legislative challenges

The results of the research indicated that all Respondents are of the view that the Regulations impose a disproportionate burden on producers to the exclusion of other stakeholders particularly municipalities. The results further suggest that producers feel that the regulations place the cost

burden on the wrong parties or offer inadequate incentives for producers to reduce waste. The unanimous view of all Respondents is that the Regulations should assign some role to the municipalities and consumers.

4.4.1.1. Shared responsibility principle

Literature is replete with the observation that to be successful EPR should evenly distribute the burden of implementation among all stakeholders which are producers, retailers, municipalities, and consumers (Davis, 1992; Lifset ,1999; OECD, 2001; Tojo, Lindhqvist & Dalhammar, 2006). It is an aberration that the EPR regulations are silent on the role of municipalities and consumers in the implementation of EPR. The current model depicted in Figure 4-3 is inappropriate. South Africa should therefore follow the French and Japanese model depicted in Figure 4-4 which assigns some role to municipalities to implement EPR (Johnson & Adler, 2017).

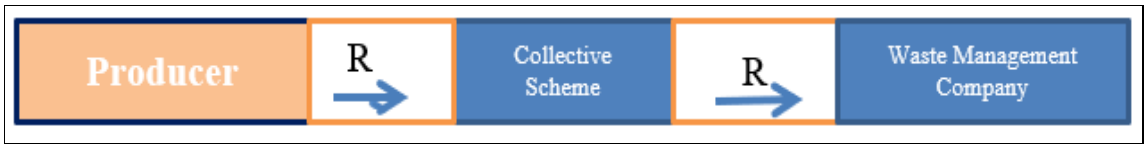

Figure 4-3. An example of the current model in South Africa that ignores the role of municipality

Source: Jonson and Adler (2017).

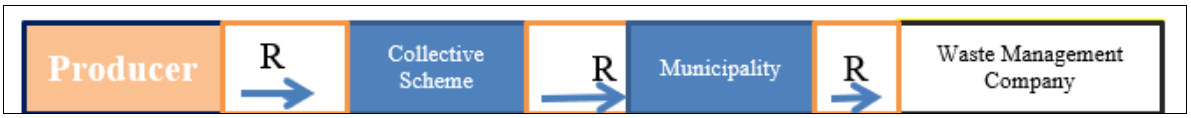

Figure 4-4. Example of the French and Japanese model that assigns some roles to the municipality

Source: Johnson and Adler (2017).

Japan used the shared-responsibility principle in their EPR policy implementation scheme. By invoking this principle, business, citizens, provincial and national governments are each assigned meaningful and clearly defined responsibilities (Ogushi & Kandlikar 2007).

4.4.1.2. Actors Involved in Extended Producer Responsibility Process

It is important to acknowledge that there are many actors involved in the implementation of EPR. There is no one entity responsible for implementing EPR. It should take a culmination of cooperation and interaction between different stakeholders before South Africa can hope to attain

the benefits of successful implementation of EPR. Municipalities and retailers should offer their facilities as collection points. Regulations should make it mandatory for retailers to act as collection points for products they sell. Consumers should take back used products to collection points. Each entity, from producer, to retailer to consumer, to municipality and to PROs fulfils an important role which cannot be filled by another entity. The EPR requires the collective responsibility and effort to succeed.

4.4.1.3. Definition of Producer

Respondents 3 and 4 argued that the Regulations cast a wide definition of what a producer is. They suggested that the definition of a producer should be narrowed to include only brand owners and importers. In theory this point raises difficult legal questions but in practise since the brand owners, retailers, producers and manufacturers are all legally obliged to belong to a PRO, this problem does not raise any serious operational problems. Granted problems such as double counting of “sales” and “targets” may arise, but these are offset by the advantages of the wide definition particularly the fact that it brings all companies into the net of contributing to the implementation of EPR through paying PRO fees. The solution to the potential problem of big companies forming exclusive PROs can be addressed through amendment of the Regulations to provide for criteria of PRO membership. In addition, the Regulations can be amended to direct that a company can only belong to one PRO at a time. Regulations can also be amended to prevent producers hoping from one PRO to another in search of PROs which charge lesser fees by prescribing a minimum period of for example 2 years before a producer changes a PRO as suggested by Respondent 1.

4.4.1.4. Monitoring and Enforcement

The problem of weak monitoring and enforcement came out strongly from the results of the research. Weak monitoring and enforcement create fertile grounds for free riding. Free riding occurs when some producers fail to completely comply with their obligations under the Regulations. This normally happens when some obligated producers deliberately understate the quantities of products put on the market. This will result in these offending producers paying lesser fees than they are supposed to pay. This scenario will threaten the financial viability of a PRO. In Germany for example, the PRO for the packaging industry called Duales System Deutschland (DSD) nearly collapsed in 1993 because only 55% of the producers provided accurate data resulting in underpayment of PRO fees by the offending 45% (OECD, 2014). If less revenue is collected this will impact negatively on the viability of the PRO resulting in the demise of a PRO. Free riding can also arise when some producers do not pay their fees at all. This issue is exacerbated in markets where it is hard to identify manufacturers particularly in circumstances

where counterfeiting, second-hand sectors and illegal importers are prevalent. This situation can threaten the effective functioning of the EPR system. All Respondents suggested that the Department must establish a unit which should be dedicated to monitoring and enforcement of EPR. Enforcement and monitoring should include robust audits or inspections to verify collection rates figures and enforcement should include bringing free riders to book. Consequences of non-compliance should include fees, civil penalties, criminal prosecution, public disclosure, and loss of accreditation (OECD, 2016).

4.4.2. Addressing infrastructure challenges

The results of the research reveal that there is no way that EPR can be successfully implemented without the establishment of easily accessible collection points by the public. Respondents 1-4 feel that it is impossible to roll out the establishment of these collection points from PRO fees. It is however possible and cheaper to establish collection points at every municipal office or sub offices. To enable this to happen, Respondents 1-4 indicated that the EPR regulations should be amended to provide for the role of municipalities in EPR implementation. The role should include transportation of collected recyclables to recycling plants. In addition, large retail shops should be designated by the regulations to be collection points.

The Constitution, Section 84 of the Municipal Structures Act and section 16 of NEMA all assign and allocate the provision of waste management services to municipalities. The EPR regulations are therefore inconsistent with extant laws. Respondents therefore have a valid point to demand that municipalities share some of the costs of infrastructure development. The importance of perspicuously defining responsibilities among different stakeholders to minimise policy failures and inefficiencies can hardly be over-emphasised (Monier *et al*., 2014; OECD, 2016). Kalimo *et al*. (2015) posits the establishment of collection points should be followed by massive educational awareness/ education to educate the public about the importance or need to take their EOL products to these collection points. It must be noted that once there is financial incentive in the form of a high refund through the DRS, the need for educating the public may diminish.

4.4.2.1. Private-Public Partnership

South Africa has 257 municipal offices and 420 Thusong centres covering every corner of the country. These centres can serve as collection points for EOL products. Public-Private Partnership agreements can be entered into between PROs and municipalities to regulate and manage the financial and management implications of receiving, storing and transportation of the collected products to recycling facilities. Many jobs can be created in such an arrangement. In

addition, the Regulations should make it mandatory for large retailers such as ShopRite, Spar and Pick N Pay to establish collection points for cans, bottles and paper packaging.

4.4.2.2. Unique challenges of rural areas

Recycling factories are based in major metropolitan cities such as Johannesburg, Pretoria, Durban and Cape Town. The cost of transporting recyclable waste to recycling facilities located in these major cities is very expensive. Waste management is a basic human right (UNEP, 2015). Therefore, costs alone cannot be a justification for neglecting rural areas and leave people to live with avoidable waste in their backyards. Rural citizens must enjoy this basic right of having EOL products collected and transported for recycling. It is inconceivable to expect business alone to finance the establishment of the collection and transportation infrastructure of recyclable material to factories located in major centres. The Government is obligated in terms of the Constitution and international law to give effect to the basic human right of waste collection. The government and Municipalities must join business and finance EPR in rural areas. If this is not done, people in rural areas will continue to live with waste within their neighbourhoods and this has adverse implication to the health of both human and the environment.

4.4.2.3. Recycling Capacity

The issue raised by PROs about lack of suitable recycling equipment for some products is an intractable problem. The other problem is that of the shortage of recycling facilities to cope with the anticipated increased volumes of recyclable material which will happen when EPR is fully operational. The third problem is that recycling facilities are very costly to establish, and the business is not always profitable. Infrastructure plays an important role in recycling. The only way to solve this myriad of problems is through Government intervention as suggested by Respondents 1-4. Government can provide cheap loans and subsidies to aspiring new entrepreneurs to enter into the industry. At present waste which cannot be recycled because suitable equipment does not exist in the country is disposed to landfills (Plastic SA, 2019). This is an undesirable practice because it defeats the whole purpose of EPR.

4.4.3. Addressing social challenges

Government is one of the largest buyers of goods and services in the country. The public sector spends approximately 45-65% of its budget on procurement. In view of this enormous purchasing power, the Government has significant leverage to steer or incentivise industry to adopt sustainable production and see the business case of implementing EPR. If the billions of Rands are spent on products that are environmentally friendly, huge progress can be achieved towards implementing EPR in South Africa which will in turn create an enabling environment to create new

industries and new jobs. From a social perspective, although it has not been definitively proved, EPR has the potential to create new job opportunities through the development of new recycling and remanufacturing industries (OECD, 2016).

Green Public Procurement is still in its infancy in South Africa, it is hoped that it will take root in the short term. The municipalities of eThekwini, Ekurhuleni, Cape Town, Tshwane to name a few committed in 2002 at the World Conference on Sustainable Development to adopt GPP in their procurement policies. To provide added impetus to business to embrace and implement EPR, this research holds the view that National Government incorporate GPP in procurement legislation namely, Preferential Procurement Policy Framework Act of 2000 (Act No 5 of 2000), The Municipal Finance Management Act OF 2003 (Act No 53 of 2003), Public Finance Management Act of 1999 (Act No 29 of 1999), Preferential Procurement Framework Regulations of 2000 (Act No 5 of 2001) and National Treasury Regulations (2005). If this is done, industry will view EPR favourably and see a clear case for fully adopting and implementing it to the latter.

4.4.4. Addressing environmental challenges

The environmental benefits of EPR are well documented which includes reducing quantity of waste to landfills through recycling and reuse and the promotion of a more efficient use of natural resources (OECD, 2001). What came out clearly from the research is that generally companies have no appetite or incentives to invest time and resources to implement DFE or eco-designs. Although there is limited space to implement DFE in the packaging industry, the industry is reluctant to use this limited space to implement DFE. For example, the industry is notorious for using glossy and unnecessary packaging whose sole objective is to attract consumers to purchase their products. Environmental considerations are often not considered when manufacturing the packaging products. Respondents suggested that is necessary for the authorities to introduce packaging standards for the products that are sold in the market. Penalties for unnecessary packaging in the form of fines can also be imposed to encourage the use of minimal packaging.

4.4.5. Addressing financial challenges

The advanced fee modulation is better policy option than the basic fee modulation. However, because the advanced fee modulation is complicated to initiate and manage, it should be meticulously designed to prevent additional compliance issues and free-rider risks. In addition, since the advanced fee modulation will add further complexity to compliance, the imperatives of monitoring and enforcement is in the circumstances non-negotiable. To facilitate and ease enforcement, modulation criteria should be easily comprehensible, auditable and verifiable. Easy

criteria allow for enforcement to be reliable, repeatable and cost efficient (APPLIA *et al.,* 2019). To achieve this, the Regulations should provide for standardised protocols for audits, compliance and verification (Hilton *et al*., 2019). The advanced fee modulation is better placed to promote sustainability; the Department should replace the basic fee modulation with the advanced fee modulation as suggested by majority of Respondents (60%).

4.5. Chapter summary

The major challenge to implementation of EPR is the perception by producers that EPR unfairly imposes a disproportionate burden to producers to the exclusion of municipalities. They would like municipalities to be assigned a role in EPR implementation. Producers also expressed the view that consumers should also play a role in the process of implementing EPR. Producers further indicate that EPR imposes additional financial and administrative costs on their businesses which have the potential to increase the costs of doing business. The research found out that negative perception disinclines producers to comply with the Regulations voluntarily. This means that compliance must be imposed through C&C mechanism. The question of absence of monitoring and enforcement also came to the foe. Producers view this as the cause of free riding. Producers suggest that an EPR monitoring and enforcement unit should be formed to enforce compliance with the Regulations.

All stakeholders hold the view that EPR implementation has started slowly because accessible and expansive collection infrastructure does not exist in the country. Since establishing the infrastructure is costly, PROs fees alone are not able to finance the establishment of the system. Accordingly, they suggest that municipalities and Government should play a role in this regard. Stakeholders also raised the question of recycling capacity expressing the view that once EPR is fully functional there is a need to construct more recycling facilities to meet or cope with the anticipated increase of collected recyclable products.

The consensus sentiment is that EPR has immense benefit to the environment particularly in tackling the perverse problem of litter and illegal dumping. The other environmental benefit of EPR is that it is a catalyst to achieve a CE in South Africa. The transition to a CE is well aligned with NDP and SDG as articulated in the NEMA and the United Nations Agenda 2030 (2018).

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

The purpose of this research was to evaluate how the paper and packaging industry perceive the opportunities and challenges presented by the EPR Regulations. Chapter 4 provided detailed information that served as sufficient support for the research's conclusion; this was made possible by semi-structured interviews with PROs and Producers in the paper and packaging industry. This chapter aims to provide the conclusions, recommendations of the research and areas of future research.

5.2. Conclusions

The research established that the industry unanimously (100%) hold the view that there are many challenges to the successful implementation of EPR in South Africa. The research also established that the majority of Respondents (60%) do not see any opportunities available in the implementation of EPR in South Africa.

The research has established that there is overwhelming support and a positive perception of the concept of EPR among the producers in the packaging industry in South Africa. However, this perception is somewhat adulterated or corrupted by certain concerns by producers. The research has found out that the main challenge that is likely to hinder the successful implementation of EPR in South Africa, is the perception by business that EPR unfairly and disproportionately burden producers to implement EPR to the exclusion of other stakeholders particularly municipalities and consumers. Numerous studies have shown that implementation of policies on environmental issues can only be efficient and relevant when they involve all stakeholders particularly citizenry (Rio Declaration, 1992, Yasmin *et.al.,* 2017). Consumers are important stakeholders in the EPR framework. The way they purchase, use and dispose EOL products has a direct bearing on the effectiveness and success of EPR implementation. The role of consumers in an EPR system therefore needs to be better understood and articulated.

In this materialistic world, packaging ceased to be a product intended for storage, protection and movement of goods. It is now marketed as something which is aesthetically attractive to have a positive impact on the buyer's experience. The quality of the product itself is no longer considered as sufficient to attract customers but also its packaging. It is worth emphasizing that EPR does not contradict these marketing promotions or values, but it insists on striking a balance between marketing priorities and environmental priorities. In striking this balance, consumers play a very

crucial role in determining the factors that should be considered as important. Consumers and retailers have a strong incentive (cost to them) to demand minimal packaging from producers. This brings in the question of environmental education. As long as the consumer in South Africa is ignorant about environmental considerations, marketing promotions which do not consider environmental consequences will prevail. In this event, consumers will continue to shoulder the cost of attractive but unnecessary packaging material which will continue to have a detrimental effect on the environment.

The regulations do not contain robust provisions for monitoring and enforcement of EPR implementation by the Department. This creates fertile ground for non-compliance with EPR provisions by rogue companies and creates an environment conducive for free riders. Weak monitoring and enforcement is planting the seeds for failure. Free riding phenomenon can reduce the environmental benefits of EPR (OECD, 2016).

Individual companies see no reason to promote, pursue and invest in DFE within the framework of Collective Responsible Scheme framework. It is only through IPR schemes that companies see reason to pursue DFE (OECD, 2004; Dempsey *et al*., 2010). True to extant literature findings, it is not surprising that companies in the packaging industry in South Africa are not promoting DFE. The government should fill the gaps caused by companies' reluctance to pursue DFE and provide legislation to prescribe packaging standards.

Though EPR has laudable and lofty objectives, the premise on which EPR is based namely that producers have powerful and impactful control over a product's design and saleability therefore they should have the main responsibility to reduce waste and consequently reduce the environmental impact of their products (Oettinger, 2019) has not found favour with business. This research has established that business is sceptical about this view. This scepticism has led business to regard EPR as a C&C policy which merely has to be complied with by paying dues to the respective PROs. Perception plays an important role in policy or implementation of regulations (Tyler, 2006; Liu, 2007; Zhu, 2016). Generally, the more the people perceive rules or laws as fair or legitimate, the more the people are likely to comply with those laws or regulations (Nagin, Tyler & Blader, 2005; Murphy & Tyler, 2008; Telep, 2017; Walters & Bolger, 2019). Unless the concerns of business about EPR are addressed thorough dialogue, this negative perception can be a challenge to the successful implementation of EPR in South Africa. The EPR based concepts are complex (Quinn, 2011). Policy makers have therefore to fully understand the complexity of the system and the problems and barriers which can hinder the successful implementation of EPR.

Forging and upholding this policy which places excessive burden of waste management services on producers may face significant challenges which may lead to implementation deficit or failure. However, although some producers particularly manufacturers of packaging may see sustainable production and waste minimisation as a disadvantage, others such as brand owners may regard it as a business opportunity. Disadvantage or not, companies should not support wasteful production in pursuit of profit. In the same trace business should not or be tempted to consider EPR as burdensome devoid of any financial benefits to companies. The EPR can bring many benefits or opportunities to companies.

The findings of the research indicate that producers unanimously acknowledge without reservation that EPR has immense benefit to the environment. The environmental benefits of EPR include facilitating separation at source practices, increasing reuse and recycling rates. All Respondents hold the view that EPR can help to solve the problem of littering and illegal dumping which are prevalent in the country. The EPR is also widely acknowledged as a policy and practice to promote the CE (Lifset, 1993; Turner & Pearce, 1993; OECD, 2001; Tojo, 2004). The NWMS (DFFE, 2020) also recognises EPR as an important catalyst to facilitate the transition from a LE model to a CE paradigm.

On the other hand, the results of the research indicate that most producers do not believe that EPR can create jobs at least in the short term. In the long term, the findings suggest that the majority of business is ambivalent whether EPR can create jobs. The EPR when fully functional has the real potential of increasing collection rates of used material. This will require more and new companies to process or recycle the increased load. This will also create new jobs for people who will be employed at collection points and those who will transport the collected material from all parts of the country including those who will be employed in new recycling companies. The GPP has the prospect of bringing in opportunities for business. What need to be done are for business and other stakeholders particularly environmental NGOs to lobby Government to incorporate GPP in Government procurement legislation. Increased re-use and recycling of beverage bottles and cans have the potential to lower procurement costs for brand owners such as Coca-Cola and SAB.

5.3. Recommendations

The Research has discovered that although producers have in theory embraced EPR, there is a mismatch between theory and practice. The Research has shown that producers are content to pay EPR fees only and relegated the rest of the implementation burden to PROs. Top managers of companies should be encouraged by shareholders and stakeholders to commit themselves to

adopt and implement EPR as part of their corporate environmental and sustainability obligations (Xiang & Ming, 2011; Johnson & McCarthy; 2014). Government should open dialogue with producers to address their concerns. Government should invest in the policy to ensure its success. Part of the investment is to remove all challenges that have the potential to weaken EPR implementation. One of the challenges is the negative perception of producers with regards to the question of disproportionate burden thrust upon by the regulations on producers. This challenge can be addressed through dialogue between Government and producers.

To encourage business to fully embrace and assiduously implement the EPR concept, the following recommendations are suggested:

The Regulations should be amended to provide for roles of other important stakeholders. The research has highlighted the weakness of producers being the sole drivers of EPR implementation. Producers feel that it is unfair and disproportionate to bear the sole burden of implementing EPR. Amending the regulations to allow for other role players to play their part in implementation of EPR will go a long way to restore fairness and will help to encourage producers to fully embrace EPR and help to improve their perception of EPR. The Japanese model of shared responsibility resonates with the clamour of producers and extant literature which emphasises on collective responsibility. The proposed amended Regulations should assign and give clear, definitive roles and responsibilities to producers, retailers, consumers and municipalities. This will ensure the success of EPR in South Africa.

The EPR regulations should provide for an EPR Enforcement Team or Police. The Regulations do not provide for a robust and strong monitoring and enforcement regime. Monitoring, Reporting and evaluating provisions are contained in section 8 of the Regulations. It is pertinent and interesting to note that the Regulations do not contain an enforcement section. Section 8 (1) (5) states that: The Department may conduct verification audits on the obligations of the producers. This means that the Department has discretion to conduct verification audits on the obligations of the producers. The Regulations do not provide any provisions of physically monitoring implementation of EPR on the ground. It is not surprising that thin plastic packaging is still being sold with impunity in the country.

This research recommends that monitoring, control and enforcement of the EPR system should be robust, efficient and effective. To achieve a robust, effective monitoring and enforcement regime, firstly, an EPR Enforcement Team/Police should be established. Secondly, the Department must conduct verification audits annually. Roll out of collection points covering all corners of the country including the hinterland of South Africa should be done. Without easily accessible collection points, EPR in South Africa will not be successful. This point has come out

starkly in the research. A mechanism has to be agreed upon by all stakeholders as to how the establishment of accessible collection infrastructure can be rolled out. This research recommends that municipal office infrastructure and large retail shops should be used as collection points.

Advanced Fee Modulation should replace the current basic fee modulation because Advanced Fee Modulation though complicated to manage is fair and it encourages DFE.

The Government should incorporate GPP and award special points to EPR compliance companies. This is a good boost and incentive for companies to implement EPR (Rahimifard *et al.*, 2009; Zhu & Tian, 2016; Yadav *et al*., 2020).

A comprehensive DRS should be introduced for all can and beverage packaging in South Africa. The DRS has been proven to exponentially increase the rate of collection of cans and bottle packaging (Nnorom & Osibanjo, 2008; Wath *et al*., 2010). It is not feasible to legislate that consumers should be legally obliged to take bake to collection points. Therefore, economic instruments are the only feasible and available ways to mobilize and incentivise consumers to take bake EOL products to collection points. MBIs such as DRS, should be introduced coupled with sustainable extensive public education and publicity campaign to educate consumers about the advantages of return EOL products to collection points. Consumers are ignorant about environmental problems associated with EOL products. Hence, consumers must be educated and informed through campaigns about environmental issues and the imperatives of collaboration with other stakeholders to implement EPR smoothly (Xiang & Ming 2011; Johnson & McCarthy, 2014).

This research has shown that internally imposed targets are less effective than externally imposed targets. The research therefore recommends that the Government should set realistic collection targets and penalties should be imposed for failure to attain the targets.

It is pertinent to note that the success of EPR is contingent upon the willingness and capacity to invest in this policy, as well as in its monitoring and enforcement. For EPR to succeed it is imperative to overcome challenges which have the potential to emasculate the effectiveness of EPR. These challenges include the question of innate weakness of the basic modulation fee. The problems of free riding, lack of accessible collections points, poor recycling capacity and general non-compliance of EPR regulations by rouge companies also pose serious challenges which also have the potential to enervate the effectiveness of EPR.

The EPR can be the most efficient multi-objective policy tool to deal with the safe environment friendly management of end-of-life products. Success of EPR however primarily depends on the issues related to implementation. Establishing accessible collection points, putting in place

measures to encourage or incentivise consumers to take back used products to collection points, establishing recycling capacity, setting realistic collection targets, establishing a robust monitoring and enforcement regime that will ensure compliance and prevent non-compliance are essential for the success of EPR.

5.4. Future Research

A firm and solid knowledge base on the economic and financial effects and implications of EPR on business has not yet been developed. In view of the scepticism and reluctance of business to fully embrace EPR, the perceived belief that EPR does not offer any benefits to business, it is important to conduct further research in order to come up with appropriate knowledge. This knowledge will inform business about the benefits or lack of benefits or otherwise. An empirical evaluation on economic and financial effects of EPR on companies based on quantitative research is necessary. Further research can be conducted in several areas pertaining to EPR such as exploring South African companies' readiness to implement EPR.

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ANNEXURE A: LETTER OF CONSENT

FOR ATTENTION:

RE: INVITATION TO PARTICIPATE IN RESEARCH STUDY

Introduction

You are being invited to participate in a research study conducted by Tshilidzi Mavulwana student no 23581204 under the supervision of Dr Reece C Alberts a Lecturer in environmental management at the North-West University. The study is entitled “Industry perceptions of South African Extended Producer Responsibility (EPR) Regulations: Challenges and Opportunities for the Paper and Packaging Industries” and aims to assess the paper and packaging industry perceptions of the opportunities and challenges associated with the EPR Regulations. You were purposively selected as a possible participant in this study because your business is implementing EPR regulations, and it falls under the category of the paper, packaging and some single use products. The research will form part of a master’s dissertation which will be submitted in partial fulfilment of the requirements for the master’s degree in environmental management with Waste Management at the North-West University.

Interview procedure

If you agree to participate in this study, you would be requested to do the following:

a) Indicate a time and date when you will be available for an interview. The interview should take no more than half an hour of your time.
b) Indicate whether you would prefer to be interviewed in person, telephonically or via a technology such as Teams.
c) Agree to the recording (audio only) of the interview to ensure that it can be accurately transcribed. The recording will be deleted as soon as it has been transcribed. You will have the right to review and edit the audio recording if you so choose.
d) Read through this consent form which is to be signed on the day of the interview.

Confidentiality

The records from this study will be kept as confidential as possible. No individual identities will be used in any reports or publications resulting from the study. All transcripts will be given codes (e.g., Participant 1) and stored separately from any names or other direct identification of participants. The information obtained through the interview will be used exclusively for this study and for no other purpose.

Potential risks and discomforts

No risks or discomforts are foreseen. In the event that a risk is identified, or discomfort is experienced, the interview will be stopped. You further have the right to end the interview at any time and for any reason.

Potential benefits to the interviewee and/or society in general

The EPR regulations assign the sole and exclusive responsibility to business for the implementation of EPR. The paper will assist in identifying the challenges of implementing EPR regulations and come up with possible mitigation measures to improve the efficacy of the EPR regulations in South Africa.

Compensation

No compensation can be offered for participation in the research.

Withdrawal

You may withdraw from the study at any time and do not have to provide a reason.

Ethical clearance

This research has obtained ethical clearance (ethic no NWU-01226-23-A9) from the Faculty of Natural and Agricultural Sciences Ethics Committee (FNAS-REC), If you have any concerns or questions in this regard, please contact Prof. Roelof Burger (roelof.burger@nwu.ac.za).

Contact details of researcher

If you have any questions or concerns about the research, please feel free to contact Tshilidzi Mavulwana on 072 749 7114 or Dr Reece C Alberts on 018 299 4267.

INTERVIEWEE CONSENT

I _____ confirm that the above information was explained to me in a language and in manner that I understood. I further confirm that I am older than 18 years of age and hereby volunteer to take part in the study.

Signature_____Place_____Date____

RESEARCHER CONFIRMATION

I _____ hereby confirm that the contents of this document was explained to the participant in a language and manner that he / she could understand.

Signature_____Place_____Date_____

ANNEXURE B: SEMISTRUCTURED INTERVIEW QUESTIONERS

The aim of the interview is to assess the industry perception of the Extended Producer Responsibility Regulations and the opportunities and challenges faced by business in the process of implementing the regulations.

Baseline Questions

a) Company Name:
b) What is your position in the company?
c) Does your company have a policy on EPR?
d) Is your company a member of any PRO?

Research questions

a) What challenges does your company encounter when implementing EPR?
b) What opportunities does your company see in EPR?
c) What is needed to turn challenges into opportunities?

ANNEXURE C: CERTIFICATES

TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Clinical Trials Centre
The University of Hong Kong

Tshilidzi Mavulwana

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/12/12
CID : 69WZKK7AMT

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY
SIWF FMH ISFM
Programmes de formation continue (2 crédits)
Continuing Education Programs (2 credits)

Foederatio Pharmaceutica Helvetiae
FPH
Programmes de formation postgraduée et continue
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[REV : 20220217]


TRREE
Zertifikat
Certificat
Certificado
Certificate
Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants
Certificat de formation - Training Certificate
Ce document atteste que - this document certifies that
Clinical Trials Centre
The University of Hong Kong
Tshilidzi Mavulwana
a complété avec succès - has successfully completed
Research Ethics Evaluation
du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation
Release Date: 2022/12/12
Professeur Dominique Sprumont
Coordinateur TRREE Coordinator
APPROVED BY
SIWF FMH
ISFM
Programmes de formation continue (2 crédits)
Continuing Education Programs (2 credits)
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Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants
Certificat de formation - Training Certificate
Ce document atteste que - this document certifies that
Clinical Trials Centre
The University of Hong Kong
Tshilidzi Mavulwana
a complété avec succès - has successfully completed
Informed Consent
du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation
Release Date: 2022/12/13
Professeur Dominique Sprumont
Coordinateur TRREE Coordinator
APPROVED BY
SIWF FMH
ISFM
Programmes de formation continue (2 crédits)
Continuing Education Programs (2 credits)
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FPH
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TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Clinical Trials Centre
The University of Hong Kong

Tshilidzi Mavulwana

a complété avec succès - has successfully completed

South Africa

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/12/13

CID : GBXMbUqcsB

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

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[REV : 20220217]

ANNEXURE D: ETHIC APPROVAL LETTER

Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Fax: 018 299-4910
Web: http://www.nwu.ac.za

Senate Committee for Research Ethics
Tel: 018 910 3446
Email: Fiona.Maseleni@nwu.ac.za

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Faculty of Natural and Agricultural Sciences Ethics Committee (FNAS-REC)**, the Faculty of Natural and Agricultural Sciences Ethics Committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-SCRE) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

Study title: Industry perceptions of South African Extended Producer Responsibility (EPR) Regulations: Challenges and opportunities for the paper and packaging industry
Study Leader/Supervisor: Dr R Alberts
Student: T Mavuiwana

Ethics number:	N	W	U	-	0	1	2	2	6	-	2	3	-	A	9
	Institution				Study Number						Year			Status	

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

Application type: Single **Risk Category:** Minimal

Commencement date: 23/02/2022
Expiry date: 23/04/2024

Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.

Special in process conditions of the research for approval (if applicable):

- The following documentation are archived by FNASREC and should be complete and kept up to date:
  - Research proposal
  - Signed approval from the scientific committee indicating the proposed risk category
- All researchers involved in the study should submit signed NWU code of conduct statements annually.
- All researchers of low risk studies should submit proof of relevant ethics training every two years.
- All researchers that take part in activities that pose a safety and security threat to the researchers or the environment should submit a risk assessment form annually.
- All research involving human interaction should follow best ethical practise and keep documents as proof. This includes informed consent, questionnaires, incorporation of risk-benefit, and responsible data management.
- Any research at governmental or private institutions, permission must still be obtained from relevant authorities and provided to the FNASREC. Ethics approval is required BEFORE approval can be obtained from these authorities.

Special conditions:
The best practices with regards to interviews should be implemented, including proper negotiation of access to participants; representative sampling; documented informed consent that includes the important elements; alignment of information collected with research questions; anonymization of collected information, ensuring the integrity and security of all data collected. If personal information is collected as part of the study, it will change the risk level of the project.

General conditions:
While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- *The study leader/supervisor (principle investigator)/researcher must report in the prescribed format to the FNASREC:*
  - *annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and*
  - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the FNASREC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
- *Annually a number of studies may be randomly selected for an external audit.*
- *The date of approval indicates the first date that the study may be started.*
- *In the interest of ethical responsibility, the NWU-SCRE and FNASREC reserves the right to:*
  - *request access to any information or data at any time during the course or after completion of the study;*
  - *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*
  - *withdraw or postpone approval if:*
    - *any unethical principles or practices of the study are revealed or suspected;*
    - *it becomes apparent that any relevant information was withheld from the FNASREC or that information has been false or misrepresented;*
    - *submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or*
    - *new institutional rules, national legislation or international conventions deem it.*
- *FNAS-REC can be contacted for further information or any report templates via Roelof.Burger@nwu.ac.za 018 299 4269*

The FNASREC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the FNASREC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely,

Prof Roelof Burger
Chairperson Faculty of Natural and Agricultural Sciences Ethics Committee (FNASREC)