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2024

Faculty of Engineering and Computer Science

Faculty Publications

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Original citation:

Ezeudu, O., & Kennedy, C. (2024). Insights and dynamics of circular business model in developing countries' context: The empirical analysis of the returnable glass bottles process. *Business Strategy and Development*, 7(1).

<https://doi.org/10.1002/bsd2.349>

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RESEARCH ARTICLE



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Insights and dynamics of circular business model in developing countries' context: The empirical analysis of the returnable glass bottles process

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Abstract

Despite the growing understanding that circular business models (CBMs) play a pivotal role in facilitating the transition from a linear to a circular economy, there is a lack of relevant literature on how CBMs can be implemented in businesses in developing countries. This study addresses this significant gap in the literature by revealing the insights and dynamics of the implementation of a CBM in a typical developing economy—Nigeria. A notable business model adopted by breweries and beverage companies in Nigeria—a returnable glass bottle process—was investigated through an in-depth exploration of six companies in a qualitative case study that involves collecting data through interviews, exploratory field observation, and documented evidence (literature). The study generated empirical-based evidence on how CBM can be implemented in a business value chain where formal and informal actors co-exist and interact. It also discloses several barriers and enablers associated with CBM implementation in the context of developing economies. Collaboration, social inclusiveness, waste management, durable product design, and cost reductions are some of the enablers identified in the study. The key barriers are largely external and conspicuously linked to the socio-economic disadvantages peculiar to developing economies such as the absence of effective legislature, lack of infrastructure, lack of technological innovation, unavailability of finance, and the emergence of large retail stores that operate on a disruptive business model. Finally, the current research provides practical suggestions and recommendations for the appropriate designing and transitioning of CBMs in developing countries' context.

KEYWORDS

barriers, circular business model, circular economy, developing economy, emerging economy, enablers, returnable glass process

1 | INTRODUCTION

Population growth is intrinsically linked to resource exploitation (United Nations, 2022). Developing countries are known for a steady

and marginal increase in population (Population Reference Bureau, 2023; Todaro & Smith, 2011). In exact terms, it is projected that the population of developing countries will account for about 90% of the global population by 2050 (Goyal et al., 2018). Linking this

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fact to economic realities, simply implies that there would be more demand on global finite resources, an increase in waste generation, and the associated environmental degradation. Consequently, it points to the need for more decisive actions toward circular economy (CE) transitions in these countries.

In the last decade, CE has been extensively discussed among researchers, policymakers, governments, and practitioners. This could be linked to the fact that the concept is perceived as having great potential to simultaneously promote the three key pillars of sustainable development—economic prosperity, social equity, and environmental protection (Lewandowski, 2016; Ngan et al., 2019). In principle, the CE keeps the resources in the closed-loop supply chain by providing an opportunity for a product at its end of life to be reused or recycled (Smol et al., 2015). CE principles are implemented either top-down or bottom-up. In the top-down approach the CE is introduced through the policy instrument by policymakers whereas in the bottom-up approach, the CE is introduced through organizational innovation in a business model (Ruggieri et al., 2016; Sousa-Zomer et al., 2018). As such, the business model has taken a key place in the extant CE literature (Geissdoerfer et al., 2020). According to Shafer et al. (2005), a business model is a representation of the primary core logic of a firm and the strategic choices made to create and capture value within a value network. Embedding the CE principles in a business model gave rise to the concept of a circular business model (CBM). A CBM has been defined as a business strategy in which the conceptual logic for value creation is based on the utilization of the residual economic value of the end-of-life product in the production of new products (Linder & Williander, 2015). The CBM is designed in a way that will foster the slowing and closing of the resource loop with a focus on extending the product life span and promoting reuse (Ferasso et al., 2020). However, transforming a linear business model to a circular one comes with several conditionalities, which could include collaboration across the value chain (Dervojeda et al., 2014; Van Buren et al., 2016); disruptive innovation in technology, and reconfiguration of the resource portfolio (Antikainen & Valkokari, 2016; Neligan et al., 2021). For an organization to successfully meet these conditionalities, they often encounter difficulties such as lack of capital, lack of government support/effective legislature, administrative burden, and so forth (Antikainen & Valkokari, 2016; Rizos et al., 2016). These conditionalities and difficulties are often classified as barriers in the extant CBM literature (Agyemang et al., 2019; Sousa-Zomer et al., 2018; Rizos et al., 2016).

Nevertheless, the CE is an evolving concept and therefore cannot be essentially implemented in the same way among different societies and locations (Ngan et al., 2019). For this reason, the European Union's directive on CE recognized that societies vary across social, political, economic, cultural, and even geographical lines, and therefore specified that CE should be implemented according to the particularities of the countries and regions (European Commission, 2015). A growing number of academic literature on CE has also discussed these differences (de Oliveira et al., 2020; Ferronato et al., 2019; Ngan et al., 2019; Ezeudu et al., 2021). The majority of the available studies

on how CBMs should be implemented have been conducted with developed world ideologies of business dynamics and insights, which makes it difficult to adopt and/or copy within developing regions (Ferronato et al., 2019; Patwa et al., 2021). For instance, a significant proportion of businesses in developing economies operate in the informal business environment; therefore, studies on circular business model innovations (CBMI) in these global regions must consider this informality.

In recent times, researchers and practitioners have stressed the criticality of CBM in facilitating the transitions to CE. This advocacy is mainly in developed societies evidenced by the high quantity of CBM literature produced in these global regions providing variants of insights and dynamics of implementing CBM. Conversely, studies on CBM in developing countries are still scant with few case studies in locations such as China, India, Pakistan, and North Africa (Agyemang et al., 2019; Mangla et al., 2018; Mehrotra & Jaladi, 2022; Mishra et al., 2019; Shao et al., 2019). Relevant knowledge and appropriate information are essential for the implementation of CBM in these global regions (Dos Muchangos, 2022; Halog & Anieke, 2021). To expand the knowledge and information based on the implementation of CBM in developing countries, (i) more case studies are required that explicate the developing countries' experience toward making theoretical and conceptual connections to the global discussions on CBM and (ii) there is a need to study different industrial sectors to extract barriers and enablers that could either hinder or drive the CBM implementations in the developing countries' context.

The challenges faced by developed economies are quite different from those of developing economies (Halog & Anieke, 2021; Todaro & Smith, 2011). The latter need high economic growth and are challenged by the ever-growing population that generates high quantities of waste which they have little or no capacity to manage (Goyal et al., 2018; Patwa et al., 2021). Therefore, it makes sense to suggest that emerging nations cannot simply import CE initiatives, such as CBM, from established economies without taking into account the unique circumstances that exist in these developing regions (Ezeudu et al., 2022; Ferronato et al., 2019; Ngan et al., 2019; Patwa et al., 2021). In a bid to understand how the CBM can be implemented in a typical developing economy context, the current study aims to investigate how the returnable glass bottle process (RGBP) works in Nigeria, the processes, and the actors along the value chain with the motive to make critical evaluations of the opportunities, challenges, prospects, and other conditions that could either hinder or promote its transitions to a CBM. The RGBP is a notable business model adopted by multinational brewery/beverage companies in Nigeria which created a veritable platform for both formal and informal businesses to coexist and operate. It operates in a value chain that includes multinational companies and small and medium-scale enterprises (SMEs). The following research questions were raised to guide the research objective:

1. What are the processes and practices involved in the RGBP adopted by brewery/beverage companies in Nigeria?

2. What are the enablers (opportunities) and barriers (challenges) that could hinder or facilitate the transition of the current RGBP in Nigeria to a CBM?

2 | LITERATURE BACKGROUND

In this section, streams of literature underlying this research are briefly reviewed. The literature is reviewed to systemize the link between CE, CBM, and CBMI in the context of developing economies.

2.1 | Circular economy and circular business model

In the linear economy paradigm, a product becomes a waste once it has outlived its useful life, which prompts the industrial production process to start afresh beginning with the extraction of raw resources (Puntillo, 2023). Besides having adverse health and environmental implications, the resultant waste from the linear economy model poses a great risk to the sustainable availability of economic resources (Hina et al., 2022). Following the earlier works conducted by scholars on concepts like blue economy (Pauli, 2010), natural capitalism (Hawkins et al., 1999), performance economy (Stahel, 2010), cradle-to-cradle (McDonough & Braungart, 2002), industrial ecology (Graedel & Allenby, 1995), and laws of ecology (Commoner, 1971), the CE was conceptualized (Ezeudu et al., 2021). The emergence of the CE acts to address the problem of the linear economy paradigm. The ultimate goal of the CE is to minimize resource consumption, waste, and emission leakages by adopting the principles of cycling, extending, intensifying, and dematerializing the material and energy loop (Ferasso et al., 2020). This can be achieved through digitalization, servitization, sharing solutions, long-lasting product design, maintenance, repair, reuse, remanufacturing, recycling, and refurbishing (Geissdoerfer et al., 2017; Ferasso et al., 2020; Geissdoerfer et al., 2022). However, in the CE, goods and materials are retained in the cycle for as long as feasible, and biological waste is either reintegrated into the biosphere or valorized in many ways. Within the social technosphere, the technical (non-biological) components of the systems might undergo repair, upgrading, remanufacturing, or recycling, resulting in a new life cycle (Puntillo, 2023).

The CBM is a method through which an organization creates value by adopting CE principles (Hina et al., 2022; Lewandowski, 2016; Geissdoerfer et al., 2022). The heightening search for practical ways of transitioning from a linear economy to CE triggered deliberation about this particular type of business model aiming to create, deliver, and capture value while implementing circular strategies that can prolong the useful life of products and parts (e.g., repair and remanufacturing) and close material loops (recycling) (Ferasso et al., 2020). This variant of the business model called the CBM is often defined following the three elements of the 'value' framework proposed by Richardson (2008)—value proposition, value creation, and value delivery—which is a succinct explanation of how organizations create, deliver, and

capture value while sticking to the CE principles (Osterwalder & Pigneur, 2010).

A CBM is therefore comprehensively perceived as the simplified description of how a company does business while adopting a CE ideology. Three key areas to assess in a CBM include (i) the product and service it offers (ii) activities, resources, and stakeholders brought together to offer these products and services, and (iii) how it generates revenue and profits from the delivery of those products and services to the customers (Geissdoerfer et al., 2020; Guldmann & Huulgaard, 2020). Chen et al. (2020) identified three aspects of CBM that have been studied in the literature which include (i) research examining the diversity and complexity of a specific CBM through cases and situations (ii) studies on the CBM definitions and mechanisms, and (iii) studies on the operational modalities that investigates methods of transitions. This third aspect mainly evaluates how businesses can transform from linear to CBM. These evaluations frequently have various objectives and targets. Evaluation techniques for identifying circular business opportunities, adjusting a business model canvas to create a CBM canvas, transition benefit analysis, creating circular indicators using life cycle assessment, and outlining a largely finished transition process are a few examples (Antikainen & Valkokari, 2016; EMF, 2024).

Factors that could motivate a firm toward transitioning from linear to CBM include contextual issues such as the regulatory activity of policymakers and international institutions (Centobelli et al., 2020). Examples include the European Union Circular Economy Action Plan of 2015 (Leipold & Petit-Boix, 2018), and the United Nation's Sustainable Development Goals of 2016 (Goyal et al., 2018). These factors are considered the most influential factors that affect the design and implementation of a CBM. The explanation is that the government and policymakers are considered to have a high degree of responsibility, since through their involvement, they can remove existing barriers and support the implementation of dedicated actions at the level of the market, society, and innovation systems (Kirchherr et al., 2018; Rizo et al., 2016).

Centobelli et al. (2020) used three main conceptual areas to define the CBM which include value creation, value transfer, and value capture. These three areas are perceived to capture all the decisions and actions undertaken by the company in the definition and implementation of CBM (Geissdoerfer et al., 2018). In detail, the value creation goes beyond the creation of goods and services in a closed loop to also include the maintenance of products and processes, the combination of resources and materials, the purchasing of upcycled waste, the total recycling of resources, the dematerialization of products, and on-demand production processes (Lewandowski, 2016). The value transfer involves all the elements related to customer segmentation and customer relationships that are traditionally included in the value proposition to ensure that all the costs associated with the eco-design of products and services are covered, toward addressing long-term sustainability (Geissdoerfer et al., 2018), whereas value capture is achieved through capitalizing on additional revenue sources, cost reduction, and through value preservation, preserving natural resources and societal well-being (Ranta et al., 2018; Geissdoerfer et al., 2018).

In terms of managerial practices, creating value in CBM could also entail design for X practices, effective resource utilization, product upgradability, even intervening at different stages of the product's lifecycle, and waste management. Design for X practices is measured using products and processes. For the product, CBM entails design for recycling, design for remanufacturing and reuse, design for disassembly, and design for the environment (Urbinati et al., 2017). Companies must adhere to all of these procedures to support product circularity and end-of-life issues. Redesigning processes of companies along the supply chain is also required to enable the transition toward a CBM (Galati et al., 2018). This entails rearranging the supply chain, putting new methods or manufacturing systems into place, and acquiring new skills. Furthermore, life cycle evaluation methods can be helpful in evaluating how well material efficiency reduces emissions (Gilbert et al., 2017). Since renewable energy can help achieve the CE's goal of closing the loop in many areas of production and consumption, it is also adopted as part of the process.

Managerial practices at value capture deal with the take-back systems and product-service systems (PSS) where the producer retains the ownership of products and the consumer enjoys the benefit without owning the products (Goyal et al., 2018). The take-back system works by converting products at its end-of-life system into resources. It requires the design of a take-back management system including channels and customer relations related to the system (Lewandowski et al., 2016).

Even though CBMs are typically thought of as having a networked nature (Antikainen & Valkokari, 2016; Centobelli et al., 2020) and often include collaboration (Urbinati et al., 2017), usually, the boundaries of a CBM are thought to align with the boundaries of a firm's conventional concepts (Henry et al., 2020) just as within the business model concept. A few CBM studies go beyond these boundaries by recognizing that, similar to a CE, components from the macro, meso, and micro levels should be incorporated into a shift toward sustainable CBM innovation and execution (Henry et al., 2020; Rovanto & Bask, 2020). The macro level deals with the company itself, the meso level deals with the supply chain, and the macro level deals with how the company interacts with society at large (Rovanto & Bask, 2020). The operationalization of CBM at these three levels varies among two types of companies operating on CE which include (i) companies founded on CE principles (natives) and (ii) companies transitioning to CE from a linear economy (adopters). The first variant (the natives) implements business decisions from the environmental and social inclusiveness standpoints and the three levels were integral in their systemic approach to CE. The adopters applied CE to varied degrees on all three levels and placed a strong emphasis on long-term economic sustainability at the corporate level (Rovanto & Bask 2020).

2.2 | Circular business model innovation

Organizations go through a process known as *business model innovation for the CE*, or CBMI, in order to arrive at a CBM (Geissdoerfer et al., 2022). CBMI is concerned with increasing positive advantages,

harnessing opportunities, and reducing negative impacts on the environment and society at large without undermining economic growth (Awan & Sroufe, 2022). CBMI is of two variants which include the design of a *new business model* or the *reconfiguration* of an already existing one incumbents (Massa & Tucci, 2014). In essence, this process of navigating challenges and opportunities toward creating a CBM could differ across societies because of differences in their levels of development. Again, several tools and avenues have been developed by both researchers and practitioners to support the assessment of business model innovation. The most popular is the business model canvas, which is common and has been widely applied (Osterwalder & Pigneur, 2010). A business model canvas is a tool used to encourage innovative and creative investigation of sustainable business models and developments with a focus on sustainability. With a visual platform outlining a company's or product's value proposition, it can be used to create new business models or document ones that already exist.

Strategies for managing and organizing CBM innovation are often different from those intended for dealing with modifications or adaptations to CBMs (Hofmann & Jaeger-Erben, 2020). Consequently, three types of business model reconfigurations with regard to CE have been identified in the literature, which include CBM adaptation, CBM innovation, and CBM adjustment (Saebi, 2015). The term "CBM adjustment" describes the process of adjusting and stabilizing the current business model in order to reduce linearity. The goal of the adjustment processes is to make small, progressive changes to the company's current network of resources and activities. Examples of these changes include cutting production waste and gradually changing operational procedures to improve energy efficiency. Networks, business resources, and the goods and services that are offered are still available. The change's scope is restricted to a small number of initiatives; modifications do not alter linearly oriented value-creation modes or conventional value-creation methods (Hofmann & Jaeger-Erben, 2020; Saebi, 2015). The expectations of the social environment and the demand for CBM adjustment are aligned. The CBM adaptation reflects ongoing, gradual improvements in response to the shifting social context. Activities that create value, resources, networks, and their results can all be changed concurrently to varied degrees. Repurposing byproducts and substituting recycled resources for raw components are two examples of CBM adaptation. The extent of the change may involve some novelty for the company, leading to modifications in the standard operating procedure for creating value and a minor shift in the value creation mode from linearity to closing resource flows.

The third variant, CBM innovation is aimed at reshaping markets, industries, and society by forging novel and enduring connections between the systems of production and consumption (De Angelis, 2021). CBM innovation means finding a totally different business model within an existing business (Kristensen & Mosgaard, 2020). Therefore, moving value-generating activities, resources, networks, and their results from an existing business model to CBM is necessary for the change process (Rossi et al., 2020). The extent of the modifications includes novelties to the company that

lead to completely new procedures for creating value that needs to be tried, figured out, and stabilized again.

A firm's strategic capacity to navigate CBM innovation is often hampered by a practical understanding of CBM innovation processes, which in turn perpetuates organizational rigidity and structural inertia (Hofman & Jaeger-Erben, 2020). Building and selecting choices for action are required to absorb uncertainty and lessen such rigidity, even in the face of the diffuse openness of the evolution route (Hopkinson et al., 2018; Rovanto & Bask, 2020).

2.3 | Circular economy in developing countries' context

Despite the traction gathered by the concept of CE in developed countries, it has received little attention in developing countries except for China (Agyemang et al., 2019; Halog & Anieke, 2021). This is partly a result of a lack of information and the absence of data and appropriate knowledge (Ngan et al., 2019; Ezeudu & Ezeudu, 2019; Patwa et al., 2021). But recently, both the scholarly community and international development organizations have started to show a greater interest in CE in developing countries (Chertow & Park, 2016; Gower & Schroder, 2016). CE literature from a few emerging nations, such as Brazil, Nigeria, India, Ghana, Kenya, Bangladesh, Malaysia, Thailand, Taiwan, and others, have emerged in recent times (Gower & Schroder, 2016; Halog & Anieke, 2021; dos Muchangos, 2022; Ezeudu et al., 2021; Ahmed et al., 2022; Ngan et al., 2019; Marks et al., 2023; Wu et al., 2021). These papers primarily focus on the ways in which CE can support three pillars of sustainable development: economic prosperity through increased productivity; environmental quality through reduced pollution of air, water, and land; and social equity promotion through increased employment, both in terms of quantity and quality (Ezeudu et al., 2022; Halog & Anieke, 2021).

Specialized research is also beginning to appear in developing nations and localities that identify the key areas in which the CE may be applied to get the best possible effects. For instance, in the study conducted by Schröder et al. (2020), three core sectors were identified as where the CE can be effectively implemented in Latin America and the Caribbean which include; mineral extraction and mining, bio-economy, and municipal solid waste and recycling. The reason is that the studied regions are richly endowed in bioresources, and extractive minerals, and generate large quantities of municipal solid waste as a result of large human populations and socio-economic activities. The implementation of CE in these sectors will require specific knowledge and information on CBMs according to the geographical context. Studying CBM and CBMIs in relation to developing nations is therefore necessary.

2.4 | Research gaps

Recent years have seen a surge in interest in CBM research, with several facets of this subject having been examined. For instance, Mishra

et al. (2019) investigated collaborations in the business model. Policy dynamics of the CBM were studied by Milios, (2021). Connections between waste management and the CBM were studied by Shevchenko et al. (2021) and Puntillo (2023). Other areas studied include eco-innovation in CBM (Donner & De Vries 2021; Jabbour et al., 2015); the methods of CBM designs (Martin et al., 2021; Ranta et al., 2021); CBMI (Linder & Williander, 2015; Geissdoerfer et al., 2022); benefits of CBM (Urbinati et al., 2017); drivers of CBM (Jensen et al., 2019; Ranta et al., 2018; D' Agostin et al., 2020); and barriers to CBM implementation (Oghazi & Mostaghel, 2018; Rizos et al., 2016; Bocken et al., 2018; Guldmann & Huulgaard, 2020; Bocken & Geradts, 2020; Aid et al., 2017; Donner et al., 2021). A bibliometric analysis of these earlier studies reveals that besides China, few articles originate from the global south, including countries like India, the Philippines, North Africa, Pakistan, and Brazil (Mehrotra & Jaladi, 2022; Mangla et al., 2018; Hina et al., 2022; Ferasso et al., 2020; Goyal et al., 2018; Mishra et al., 2019; Agyemang et al., 2019). Instead, the majority of literature on the CBM is produced in developed economies of Europe and America, explaining the experiences of the Western world. Academic research on the re-evaluation of business models in global south locations is scarce (dos Muchangos, 2022). Few available studies on CBM implementation in developing countries are based on literature and conceptual analysis (Goyal et al., 2018; Mangla et al., 2018). With few case studies in specific industries (Agyemang et al., 2019; Mishra et al., 2019; Mehrotra & Jaladi et al., 2022). Empirical studies are still lacking. Understanding the differences and similarities in CE across geographies is a prerequisite to the global transition toward CE (Ghisellini et al., 2016). Therefore, it is necessary to go from categorization and description to testing and measurement of how value is generated and extracted from the CE in various settings and locations (Hopkinson et al., 2020). The nuances and conditionalities need to be studied and integrated for the advancement of the knowledge of the CBM since the growing field of CE currently requires an expansion in the knowledge base (Reichel et al., 2016). Implementation of CBMs in developing nations requires a thorough awareness of local knowledge and information about the current business environment when establishing a business model at the micro and macro levels (Lewandowski, 2016). Examining local business models in order to identify elements that may help or impede the shift to CBM is one of the most effective strategies for comprehending the dynamics and obtaining insights regarding CBMs in developing nations. This is the goal that the current work is set to achieve.

3 | RESEARCH METHODOLOGY

3.1 | Data collection

Multiple case-study method proposed by Yin (2008) was applied in this study. It fits under the exploratory category of open-ended questions, which aids in gaining an understanding of what is happening in reality (Saunders et al., 2016). The empirical data were therefore

obtained using interviews with six companies together with their value chain of actors. The value chains include the distributors, wholesalers, retailers, and consumers. These companies are engaged in beverage or beer packaging adopting RGBP. A case study-inspired approach with a comparative arrangement was used to collect and analyze empirical data from the sampled companies (Eisenhardt & Graebner, 2007). To identify and select companies for interviews, a database of Nigeria's beverage/beer-producing companies was first created. Using both publicly available and private data, information on these companies was collated which included their main offerings, their contact address, websites, and business reports. This collected database of companies was further scrutinized to include only those whose business model involves the RGBP. The final database consisted of 41 companies.

Following our subsequent mapping, six companies were purposively selected for in-depth interviews based on the spread and variety of their business activities, their availability for interviews, and their willingness to provide access to information (Yin, 2008).

Figure 1 shows the flow diagram for the company selection. The selected companies have extensive years of business (at least 20 years), coverage across Nigeria regarding beverage/beer production, and vast value chain actors—distributors, wholesalers, retailers, and consumers. To ensure the confidentiality of the participating companies, the companies were denoted as Company 1, Company 2, Company 3, Company 4, Company 5, and Company 6. Respondents were purposively selected for interviews both from the company and within the value chain of the companies as shown in Table 1.

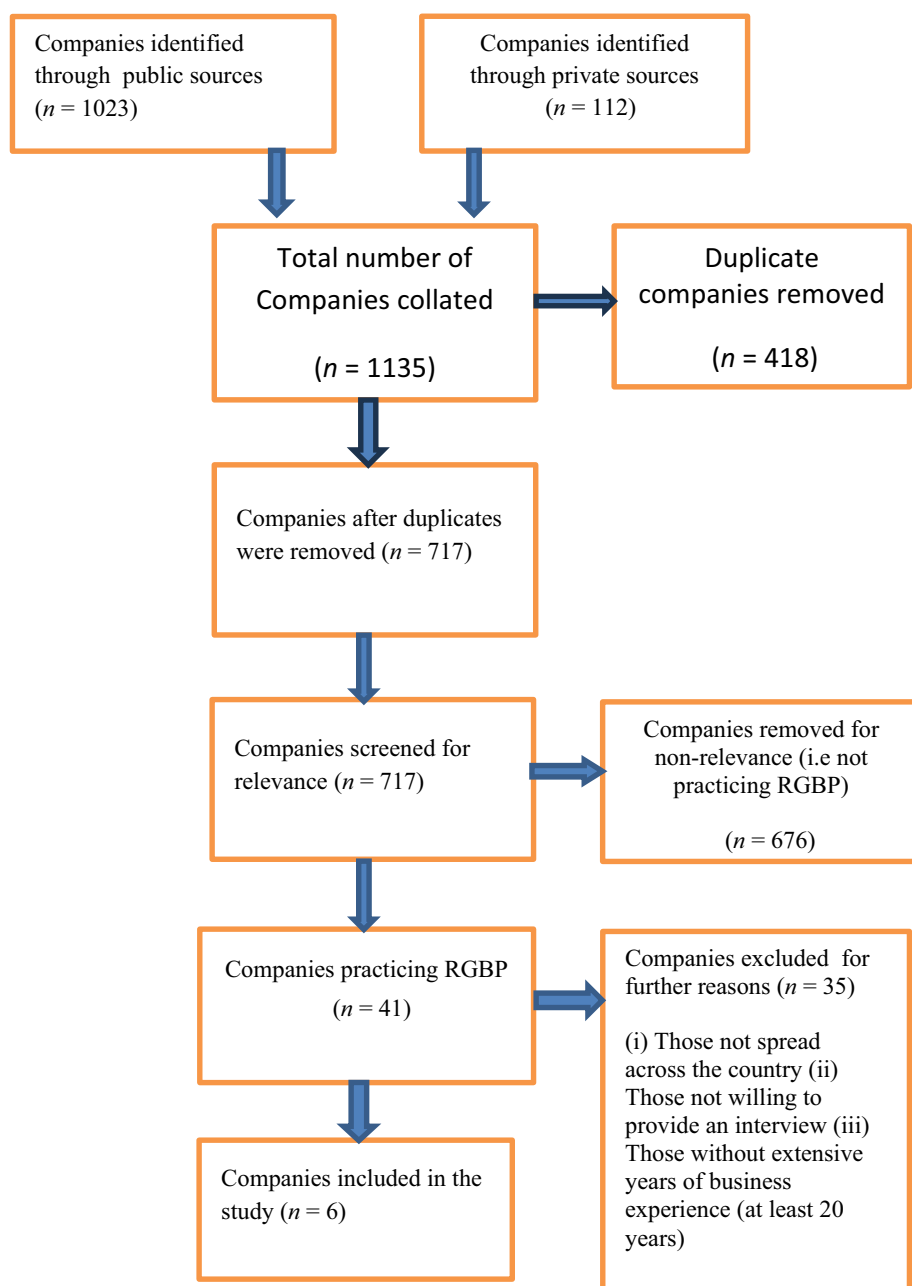


FIGURE 1 Flow chart for the company selection.

TABLE 1 Respondents, duration, and number of interviews.

Company#	Value chain actors interviewed	Average duration of interview (mins)	Number of interviews
1	*Company representative, distributor, wholesaler	75	3
2	Company representative, wholesaler, retailer	60	3
3	Company representative, wholesaler, consumer	80	3
4	Company representative, distributor, retailer	65	3
5	Company representative, distributor, retailer, consumer	80	4
6	Company representative, wholesaler, retailer, consumer	90	4

Abbreviation: RGBP, returnable glass bottle process.

*Company representative as used in this context is the officer of the company, responsible for the RGBP.

TABLE 2 Sampled company description.

Company	Product line	Value chain actors	Number of employees	Years of business in Nigeria	Company net worth (\$)
1	Beverage/beer	Distributor, wholesaler, retailer, consumer	300+	52+	100 m+
2	Beverage/beer	Wholesaler, retailer, consumer	4800+	70+	500 m+
3	Beverage/beer	Distributor, wholesaler, retailer, consumer	2500+	73+	1000 m+
4	Beverage/beer	Distributor, wholesaler, retailer, consumer	2800+	77+	1600 m+
5	Beverage/beer	Distributor, wholesaler, retailer, consumer	400+	28+	150 m+
6	Beverage	Distributor, wholesaler, retailer, consumer	800+	42+	500 m+

We chose respondents who were actively engaged in the direct handling of end-of-life bottles in the companies/value chain. A total of 20 interviews were conducted. The choice of this number of respondents is to guarantee reaching the saturation point. A saturation point in qualitative research is attained when the interviewer discovers that the same information is being repeated from the subject (Mwita, 2022). About three-quarters of the interviewed respondents were male (75%), whereas the remaining five (25%) were female. This is perhaps due to more males being in charge of managing the end-of-life bottle in the value chain. The average age of the respondents was 28 years (ranging 20–48 years). The interviews which focused on understanding the RGBP, practices, challenges, and opportunities lasted between 60 and 90 min. The main questions include the companies' business processes, the practices, the perceived barriers and enablers for the transition to a CBM, and the unique characteristics of the business model processes. The interviews were conducted face-to-face, audio recorded, and transcribed for further analysis. Informed consent of the respondents was obtained prior to the interview and the anonymity of the respondents was preserved, as required by our institution's Ethics Review Board. A detailed overview of the sampled companies is presented in Table 2

3.2 | Data analysis

The gathered data were analyzed using thematic analysis, which is an essential technique for finding, examining, and summarizing patterns and themes in data (Braun & Clarke, 2006). Initially, an inductive method was employed to codify the results as it was believed to be the crucial connection between gathering data and providing an explanation of meaning (Charmaz, 2006). Throughout, all of the data were carefully considered while increasing the examination of each theme (Ryan & Bernard, 2003). The summaries of the codes were then grouped into more manageable groups or themes after particular patterns had been identified (Miles et al., 2014; Xu & Zammit, 2020). Even though our literature review served as a guide for creating interview questions before data collection, the data analysis process also necessitates consulting the literature in order to evaluate any developing patterns that might be seen by comparing the results. Reconnaissance visits to the companies' locations for exploratory/participatory field observation were also conducted to supplement the primary data obtained through interviews. A month-long exploratory fieldwork was conducted by the lead author. The author visited the sampled companies and the identified value chain actors for activity observations between March and April 2023. The interviews were

TABLE 3 Description of the investigation plan.

Instrument	Technique	Sample	Focus
Semi-Structured Interview	Open-ended question/interactive session	Company representatives, other value chain actors (distributors, wholesalers, retailers, and consumers)	RGBP and practices, enablers, and barriers to CBM, indicators of sustainable development
Literature Evidence	Literature/document analysis	CE literature, company annual reports, project documents of agencies; publicly available documents (e.g., corporate websites, consultancy reports, archival records)	RGBP and practices, enablers, and barriers to CBM implementation
Exploratory field Observation	Taking photographs, making videos, and jotting notes	Brewery facilities, value chain business premises, transport, and packaging equipment	RGBP, enablers, and barriers to CBM

Abbreviations: CBM, circular business model; CE, circular economy; RGBP, returnable glass bottle process.

conducted during these periods. The participatory observation created a platform for the researcher to be situated in the problem context. Using multiple sources of data are necessary in case study research to strengthen the validity and improve the reliability of the study findings (Yin, 2013). Data collated from different sources were also triangulated for reliability (Leung, 2015). To further establish the reliability of the analysis, iterations of member checks were conducted in which the interviewees were provided with the transcripts of the interviews to assess the accuracy after the transcription (Buchholz & Rosenthal, 2004). This approach is similar to methods adopted in previous studies (Ezeudu et al., 2021; Gong et al., 2019; Kanda et al., 2021). The investigation plan is described in Table 3.

4 | RESULTS

4.1 | Returnable glass bottle process in Nigeria—How it works

This section focuses on the research question (1), “What are the processes and practices of the RGBP adopted by brewery/beverage companies in Nigeria? This section provides background information on the RGBP. Practices/processes were major themes identified in the collated data and it revolves around three sub-themes which include; the business product, the business process, and the business value chain actors. These are discussed in what follows:

4.1.1 | The product

The RGBP is a business model adopted by big beverage/beer companies in Nigeria where the company products are packaged in glass bottles that are returned to the company after the liquid content is consumed. The history of the RGBP is not known in Nigeria as only one master's thesis has studied the concept (Osifuwa, 2020). All the companies agreed that the history of the RGBP in Nigeria is not known. “...the practice may have originated from a historical informal drink-selling process in Nigeria, where drink buyers come to the

market to buy their drink with their container. This practice over time becomes a norm where the liquid content of drinks is sold while the containers are returned to the seller” (Company 3, interviewee 1). Archival documents suggest that the RGBP was introduced by Coca-Cola in the 1940s (Mereva Tulum, 2023).

The selected companies are into the production of either nonalcoholic beverages and/or beer alike. They sell these products in glass bottles with crown caps. The products are classified as fast-moving consumer goods. The bottle is regarded as the property of the company, meaning that what is being sold is the liquid content. These bottled drinks are packaged in crates and often moved across the value chain using several transportation media which include both heavy-duty haulage systems and light vehicular equipment. The packaging of the bottled drinks inside the crates is largely done manually across the value chain because of the limited available technology.

4.1.2 | The process

To ease the means of distribution and sale of these glass bottled products, the companies create chains of value actors across the country. The actors could include the distributors, wholesalers, retailers, and the final consumers. As shown in Table 1, not all companies have a distributor within their supply chain. Some of the value chain actors (e.g., the distributors and wholesalers) are registered with the companies in a formal contract, whereas in most cases, the remaining value chain actors (retailers and consumers) are not often formally registered. Retailers (Retail outlets) include supermarkets, small grocery shops, bars, restaurants, clubs, hotels, street hawkers and so forth. In essence, the RGBP as a business model integrates both formal and informal actors. In the forward supply chain of the business model, the distributor gets the product directly from the companies and sells it to the wholesalers. The wholesalers in turn sell to the retailers who finally sell to the final consumers. However, reverse logistics in the supply chain is planned and integrated into the business model which ensures that the end-of-life packaging bottles (often referred to as “empties”) are returned to the brewery/company following the same forward channels. Each of the value chain actors plays a role in

ensuring that the end-of-life bottles are returned to the company after use. Each value chain actor receives the supply of the product from the supplier with the condition that the glass bottles will be returned after the product is consumed. According to one of the interviewees (Company 1, interviewee 2):

The goal of the RGBP is to increase the value of glass packaging by creating new beverages/beer utilizing the returned bottle instead of creating new ones from scratch.

After the bottle is returned to the retailer by the final consumer, they store them, and send them back to the company through their supplier and the cycle continues. The collected bottles are inspected, washed, sterilized, and refilled for the production process to continue. At this stage, bottles with defects are crushed into cullets and sent to the glass manufacturers to be remanufactured. Bottles can be classified as having defects for reasons, such as cracks, scuffs, and discoloration. Glass material can be recycled as many times as possible before it loses its quality (Epure et al., 2023). The inability of recycling technologies to handle variations in chemical compositions, commonly referred to as recipe incompatibility, contamination even from minute amounts of impurities, and challenges in disassembling integrated glass products are some of the factors that can impact the efficient and continuous recycling of glass material (Bristogianni & Oikonomopoulou, 2023).

Because there is often no formal contract between some of the value chain actors (e.g., between retailer and wholesaler; retailer and consumer), at each stage of the product, the dealer receives collateral in the form of a cash deposit or empty bottles in exchange for the products. The business model's premise is that glass bottles have a defined worth or value, and the customer is not given their money back until the end-of-life bottle is returned (Osifuwa, 2020).

4.1.3 | The value chain actors

The value chain actors include the brewery/plant (Company), the distributor, the wholesaler, the retailer, and the consumers. These actors are not the same for all the studied companies. Some companies do not have distributors, as wholesalers get the products directly from the brewery companies. The transactions and interactions between these value chain actors do not start and end with the supply of the goods and products rather there are prior arrangements for the retrieval of the end-of-life glass bottles. Any of the value chain actors decide how the end-of-life bottles could be retrieved from the buyers. In certain arrangements, the end-of-life bottles are retrieved by ensuring that the buyer deposits funds as collateral. Company 2, interviewee 1 stated:

the business model operates in a way that the end-of-life bottle is an important part of the business design. Every actor under our value chain must devise

a way to ensure that the end-of-life bottles are retained within the business cycles. Being able to stay in business as a value chain actor is largely dependent on the quantity of the bottles you can return to the supplier.

Each supply chain actor can also source for their own end-of-life bottles and exchange for the products upfront in a business transaction. Any of the value chain actors can purchase bottles from the company or from the informal recyclers to ease its business transaction.

Further, a detailed explanation of the process was provided by the respondent in Company 4, interviewee 3:

In typical business transactions between value chain actors, two basic exchanges take place, the drink (liquid content) is exchanged for cash, while the containing bottles are exchanged either for cash or with empty bottles provided by the buyer upfront. The exchange for the bottle could be in the form of a cash deposit which will be reclaimed when the bottle is returned. The exchanged bottle has to be sound without any fault.

Company 1, 2, and 3 respondents unanimously noted that the exchanging bottle must not be for the exact product. All their company products can be interchanged. For example, an end-of-life bottle for product A can be exchanged for product B. The main aim behind the RGBP is to ensure that the end-of-life bottle is returned to the company. Once the end-of-life bottle is received back at the company, an in-house process begins which involves a quality control system.

4.2 | Enablers and barriers to the transition of RGBP in Nigeria to CBM

This section addresses the second research question, "What are the enablers (opportunities) and barriers (challenges) to the transition of the RGBP in Nigeria to CBM?". Table 4 summarizes the enablers and barriers for the sampled companies to transition to a CBM.

4.3 | Barriers

Barriers are challenges identified that can hinder the transitioning of the RGBP into an effective CBM. Barriers were major themes derived from the interview and revolved around the following sub-themes which include; the absence of legislature, lack of state-of-the-art infrastructure, lack of technological innovation, financial barriers, the emergence of large retail stores, activities of informal actors, and the proliferation of imitation products, lack of channel for proper retrieval of damaged bottles within the value chain, and absence of information. These are explained in detail in what follows;

TABLE 4 Enablers and barriers for transitioning a RGBP to CBM.

Internal/external	Barrier/enabler	Codes classification	Theme	Description	Cases companies providing supporting evidence
Internal	Enabler	Collaboration	E1: Internal collaboration	Value chain actors work together to return and reuse end-of-life bottles.	1,2,3,4,5,6
Internal	Enabler	CBM channel	E2: Product service system (PSS)	Customers are served drinks without actually owning the bottles.	1,2,3,5
Internal	Enabler	Financial	E3: Cost reduction	End-of-life bottles are returned regularly to the company, therefore cost of producing new bottles is reduced.	1,2
Internal	Enabler	Technical	E4: Durable product design	The glass bottles are made tough to withstand long reuse time.	4,6
Internal	Enabler	Sustainability	E5: Social inclusiveness	RGBP process promotes social equity by creating jobs across the value chain.	2,3,4,5,6
Internal	Barrier	Reverse logistics	B1: Non-retrieval of damaged bottles	There is no internal mechanism for the retrieval of damaged bottles for remanufacturing.	1,2,6
Internal	Barrier	Technical	B2: Lack of technological innovation	Many activities along the value chain are still manually conducted.	1,2,3,4,5,6
Internal	Barrier	Financial	B3: Financial requirement	The initial cost of investment is huge.	1, 4,5,6
Internal	Barrier	Organizational related	B4: Lack of information and absence of knowledge on CE	Some members of the value chain do not know what is CE.	1,2,3,4,6
External	Enabler	Sustainability	E6: Environmental protection	Need to reduce the quantity of waste deposited in the landfill.	3,6
External	Enabler	Society	E7: Existence of informal market	A functional informal market exists where the value chain actors can buy end-of-life bottles.	1,2,3,4,5,6
External	Barrier	Competition	B5: Emergence of large retail shops	Large retail shops operate a business model that is not based on the RGBP. This model handles glass bottles as disposables.	3,4,6
External	Barrier	Society	B6: Activities of informal actors	Activities of informal activities ensure that the glass bottles are diverted for secondary purposes.	1,4,6
External	Barriers	Society	B7: Proliferation of imitation products.	The end-of-life bottles could be used to package fake products by criminal elements.	1,2,5,6
External	Barrier	Policy regulation	B8: Absence of supportive policy	Non-availability of government support could hinder taking measures to transition.	1,2,3,4,5,6
External	Barrier	Government support	B9: Lack of infrastructure	Not building public infrastructure e.g., good roads, public railway system, and so forth.	1,2,3,4,5

Abbreviations: CBM, circular business model; CE, circular economy; RGBP, returnable glass bottle process.

4.3.1 | Lack of channel for proper retrieval of damaged bottles within the value chain, B1

In the course of moving these glass bottles along the value chain, some of them will be damaged. There is still a lack of appropriate

channels to retrieve these broken bottles and return them to the company for recycling. The common practice is that these broken bottles are disposed of in open dumps and landfills as components of municipal solid waste at whichever spot they get damaged.

We are not required to return a damaged/broken bottle to the company. We throw them into the wastebins (Company 5, Interviewee 2).

4.3.2 | Lack of technological innovation, B2

Technological know-how is critically essential to CE implementation in developing countries (Mangla et al., 2018). Both forward and reverse logistics in supply chain management require advanced technology. These technologies are lacking in the studied cases. The absence of these technologies may have prompted the value chain actors to resort to manual methods which are not effective and could lead to the loss of valuable work hours and resources, and increases in damages of bottles.

“...manual collection and sorting of bottles takes a lot of time and leads to an increased number of damages” (Company, Interviewee 3).

This will indirectly affect the retrieval rate of bottles. The technology for end-of-life product retrieval in reverse logistics is needed mainly at the lower end of the value chain (e.g., wholesalers and retailers) where the activities are mainly done manually which could lead to large damages to the end-of-life bottles. Technological challenges have been identified in the literature as a critical barrier to CBM implementation for SMEs (Rizos et al., 2016) and for companies in developing countries (Agyemang et al., 2019).

4.3.3 | Financial barrier, B3

Financial hindrances appear conspicuous in the studied cases. The initial cost of investment in the RGBP is often a huge burden for the value chain actors. The companies are expected to produce or buy glass bottles from glass manufacturers and each value chain actor is expected to make a huge initial financial investment in the acquisition of glass bottles directly or indirectly. Costs are also incurred for the remanufacturing of the damaged bottles by the companies. According to a respondent “...It is challenging to mobilize the initial capital required to register as a value chain actor. The company requires you to make a collateral deposit before they register you as a distributor. This funds is meant to cover the logistics required for initial set up including the glass bottles”(Company 4, Interviewee 2).

Financial and cost constraints have been reported in previous studies as a prominent barrier to CBM implementation (Agyemang et al., 2019; Kirchherr et al., 2018).

4.3.4 | Lack of information, B4

Apart from the interviewed company (representatives) respondents, most of the interviewed respondents down the value chain, especially the customers and retailers do not know what CE and sustainability are all about. Though they understand the need to retrieve the bottles

and send them back to the company as part of the business model, they do not understand the rationale for that action.

4.3.5 | Emergence of large retail stores, B5

Because of the absence of an effective regulatory framework such as extended producer responsibility (EPR) that could place sanctions or levies on linear business models in support of the RGBP in Nigeria, large retail stores have begun to emerge in the last decades where the same glass bottled products are sold in different business models that do not require the customer to return the bottles after use. “...In fact, because of the comparative cost advantage, these large retail shops receive large direct supplies from the companies bypassing the value chains which makes them sell both the drink and bottle cheaper than the RGBP that sells only the liquid content” (Company 5, interviewee 3).

4.3.6 | Activities of informal waste pickers, B6

Informal waste pickers have been an important element in the waste management framework in the developing country (Zisopoulos et al., 2023). They operate by salvaging recyclables within the cities. Though their operations have been adjudged as having a major contribution to effective waste management in developing countries, they are also responsible for the loss of glass bottles in the value chain. Through the activities of these informal waste pickers, end-of-life bottles are often diverted away from the value chain for secondary purposes.

Some customers who buy the product after making a cash deposit may fail to return the bottle. Somehow these bottles will find their way into the wastebins and the waste pickers will collect them... (Company 6, Interviewee 4).

4.3.7 | The proliferation of imitation products, B7

Because of weak institutional arrangements in Nigeria, there are incessant activities of vendors that fake these glass bottles and use them to introduce adulterated products in the market. Also, “...end-of-life glass bottles are often diverted away from the value chain and used by dubious people to produce fake products” (Company 3, interviewee 1).

4.3.8 | Absence of supportive legislature/regulatory framework, B8

All the sampled companies identified poor regulatory framework as a possible external barrier that could hinder the transitioning of the

RGBP into a CBM. Because the business model is not backed or supported by public policy, the essential elements that could turn the business model into a circular type are not pursued rigorously by the companies or any of the value chain actors. “Even when the laws exist, the government cannot enforce them because there are no resources and essential logistics to implement the law in Nigeria. Policies would have given obligatory responsibilities to the value chain actors and eliminate lapses” (Company 6, Interviewee 1).

The absence of legislature was reported in the literature as a challenge to CBM implementation at the macro and micro levels (Guldmann & Huulgaard, 2020; Linder & Williander, 2015; Mangla et al., 2018; Oghazi & Mostaghel, 2018).

4.3.9 | Lack of infrastructure, B9

Lack of infrastructure is identified as a barrier to the implementation of the CBM in the studied cases. Glass bottle products are breakables and therefore require extra care in handling. The movement of glass-bottled products along the value chain requires good infrastructure such as a good road network and/or railway systems. Company 1, (interviewee 2) noted that “...bad road networks often affect the movement of the glass bottled product across the value chain both in the forward and reverse networks. These bad roads often lead to accidents that cause bottles to be damaged in large quantities”. Inadequate infrastructure to support CE initiatives was also reported in the previous literature as a barrier to CE transitions (Gong et al., 2019).

4.4 | Enablers

Enablers are opportunities identified in the studied cases that could aid the transition of the RGBP to CBM. These enablers are much more aligned with each other than any other themes. These include collaboration, PSS, cost reduction, the existence of an informal market, improved environmental management, social inclusiveness, and durable product design.

4.4.1 | Collaboration, E1

The RGBP necessitates collaboration among the value chain players, including the main business and other stakeholders, as it is a system-level phenomenon. The adoption of the CBM is seen to be greatly facilitated by cooperation among stakeholders and actors along the value chain (Mishra et al., 2019). In the study cases, there is a collaboration across the entire value chain to retrieve the end-of-life bottle in reverse logistics. The collaborations exist in both formal and informal arrangements even in the absence of regulatory policies. “...Our value chain actors work together by providing the logistics necessary in retrieving the end-of-life bottle and returning it to the company to ensure the sustainability of the business” (Company 3, interviewee 1).

4.4.2 | Product service system, E2

The RGBP promotes the concept of a PSS. PSS is a business model where the consumer does not necessarily have to own things but benefits from using them. In the case studies described, the RGBP business model encourages consumers to only pay for the liquid content without owning the bottle. In essence, the ownership of the bottle and its management and maintenance is the responsibility of the company and not the consumer. The PSS model lessens the products' negative effects on the environment and increases energy efficiency (Kuo et al., 2010). PSS offering implies retained ownership of the end-of-life product by the producer after sale and during use (Linder & Williander, 2015).

4.4.3 | Cost reduction, E3

Because the end-of-life bottles are returned regularly to the brewery to be refilled and reintroduced to the market, the company saves the cost of producing new bottles at every supply cycle. The respondents agree that this cost reduction also translates to the product price which benefits the value chain actors and final consumers who purchase the product at a cheaper price.

adopting RGBP makes the running cost of the business lesser. This indirectly increases the Company's revenue and profit (Company 1, Interviewer, 1).

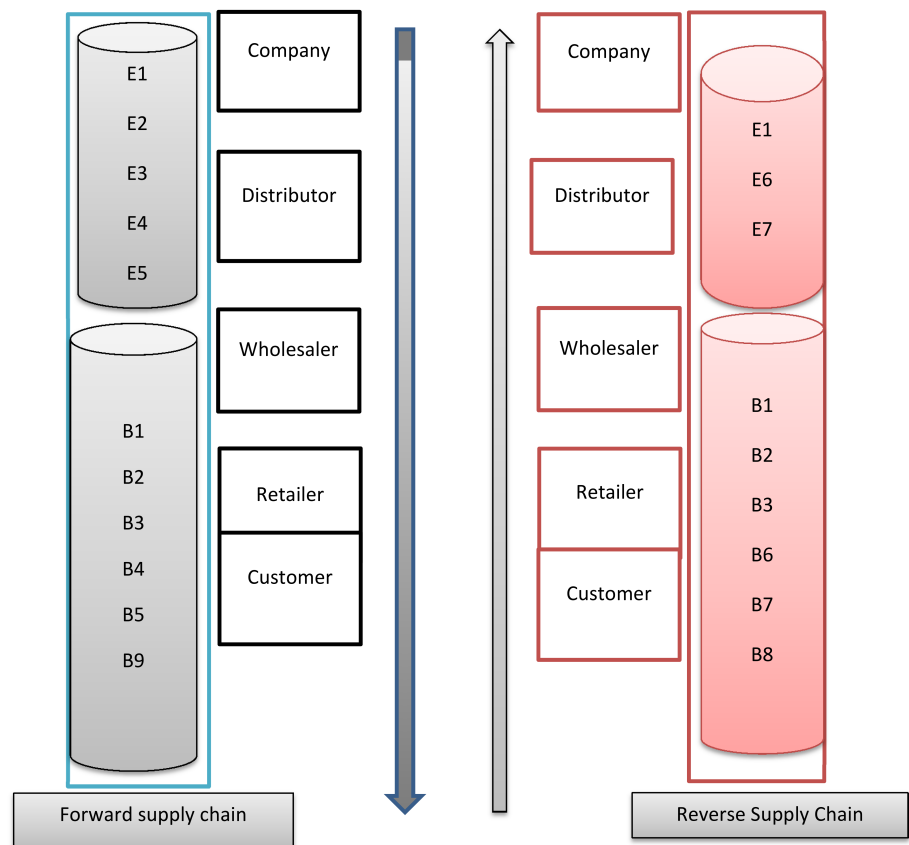
4.4.4 | Durable product design, E4

The end-of-life bottles are designed to be tough so they can withstand a long period of reuse. To also withstand the long trauma associated with its transportation, the glass bottles used in the RGBP are designed with characteristics that will make them survive the rigor. The shape and color are given special consideration in the design.

4.4.5 | Social inclusiveness, E5

One of the three pillars of sustainable development is social equity. The RGBP has provided an opportunity for both the formal and informal actors to work together in ensuring the retrieval of end-of-life glass bottles, thereby creating jobs. “in the course of this bottle retrieval, jobs are created which is a kind of economic empowerment. These jobs are created both directly and indirectly and they could be formal or informal jobs” (Company 5, interviewee, 1). Examples of jobs created include truck drivers, forklift drivers, crate loaders and off-loaders, bottle loaders, storekeepers, and so forth. It also created a source of livelihood for informal recyclers that sell recyclables.

FIGURE 2 Framework for the current returnable glass bottle process in Nigeria.



4.4.6 | Environmental protection, E6

The studied cases in the RGBP ensure a high recovery rate for end-of-life products and therefore, minimize the quantity of waste that would have been deposited in the landfill. “...the reuse of the end-of-life bottles and remanufacturing of defective bottles are all actions that could reduce the carbon footprint of the company” (Company 2, interviewee 2).

4.4.7 | Existence of informal recycling market, E7

An informal recycling market exists where the value chain actors can source the end-of-life bottle. It is a convenient way to replace damaged/lost bottles. It helps in ensuring the sustainable availability of end-of-life bottles.

...large retail outlets sell the same products in a linear business model where the customers are not required to return the end-of-life bottles to the retail shop. These bottles will be disposed of by the end consumers in the wastebins from where the informal waste pickers pick them for recycling (Company 3, interviewee 2).

These informal recyclers are part of a well-established value chain for informal waste recycling systems that exist in Nigeria and other developing countries (Nzeadibe, 2009; Zisopoulous et al., 2023).

5 | DISCUSSION

In this section, the results are discussed through the lens of the CBM which is a simplified representation of value proposition, value creation, and value capture elements and the interactions between these elements in the organization that is cycling, extending, intensifying, and dematerializing material and energy loops to reduce the resource inputs. This simply means that end-of-life products are recycled, and reused leading to a reduction in the use of raw input material and the use of energy. The discussion is also placed in the context of developing countries vis-à-vis developed countries. The current operating framework of the RGBP is shown in Figure 2 and discussed in what follows:

First, the RGBP as studied in the foregoing section showed several similarities with the CBM. As a business model, it incorporates key elements of CE which are the “reuse” of end-of-life bottles and the “re-manufacture” of damaged bottles while proposing, creating, and capturing values. Instead of generating value from a one-time sale of a product as it is obtainable in a linear economy business model, it



generates profits from the continual flow of reused materials and products over time (Guldmann & Huulgaard, 2020), thereby slowing and closing the material loop (Geissdoerfer et al., 2020), and slows the flow of resources through the economy by extending the material utilization period (Ferasso et al., 2020). As CBM has been hinted to promote sustainability (Ngan et al., 2019), the RGBP also promotes sustainability by (i) increasing economic productivity through reduced material use and cost of production, (ii) improving environmental quality by minimizing waste, and (iii) promoting social inclusiveness through the quality and quantity of jobs created in the value chain. It demystifies the hurdle of implementing CBM in a highly informal business environment by already articulating how both formal and informal actors can coexist and operate. The RGBP has also demonstrated how CBM can work in a value chain that is made up of both multinationals and SMEs in a developing country's context. Without a formal introduction of the policy, the RGBP as a business model already operates a CE initiative similar to some EPR schemes. Typical examples are the "PANT" system and the deposit-refund system in Europe. In these EPR schemes, the producers are mandated by regulation to take responsibility for the management of their end-of-life products. The law often requires the collection of a monetary deposit on recyclables (e.g., glass bottles, plastic containers, etc.). The deposit is partially or completely repaid to the redeemer upon the recyclable's return to an approved redemption center—or retailer, depending on the jurisdiction (Watkins et al., 2017).

However, the most prominent challenges associated with the transitioning of the RGBP to CBM are external and socio-economic which are majorly related to poor policy regimes, abysmal institutional arrangements, and the absence of state-of-the-art infrastructure. These are common elements in developing economies where the political will to make and enforce laws, and to deliver good governance is often weak (Agyemang et al., 2019; Ferronato et al., 2019). Lack of government support in the form of effective policies and infrastructure has also been reported in the literature as a barrier to CBM transitions in developed economies (Gong et al., 2019; Guldmann & Huulgaard, 2020; Rizos et al., 2016). However, these factors were mainly projected from different perspectives. For instance, in the developed world's context, the lack of government support was mainly viewed from the point of the inability of the government to support the already existing system with incentives such as tax rebates, awareness programs, subsidies to the customers, and so forth. (Guldmann & Huulgaard, 2020). The government in this context was considered as having the capacity to provide. But in the context of the developing countries, as seen in the current study, the inability of the government was highlighted from the point of incapacitation or inefficiency as they were unable to provide basic facilities that could support any type of business models such as good roads and railway systems, and so forth. In some developing countries (e.g., China and Malaysia), CE has made a remarkable impact because of the adequate involvement of the government through policies and provisioning of basic infrastructure (Ngan et al., 2019).

Second, another overarching internal barrier points to the issue of lack of knowledge and absence of information among the value chain

actors. A lack of environmental understanding was reported among Indian stakeholders as hindering the adoption of the circular/green model (Luthra et al., 2015). The business environment in the studied cases is largely informal meaning that there are large pool of informal actors which is majorly the reason for the absence of knowledge and lack of information. In developed countries' perspective, the absence of knowledge as a barrier to CBM implementation is mainly highlighted from the point of customers unaware of the changes in business innovations (Mont et al., 2006; De Angelis, 2021). In the current study, the value chain actors that operate within the formal circles such as, at the company and distributor level displayed higher knowledge of CE and sustainability probably as a result of their level of education and overall exposure compared with the informal actors operating down the value chain. Having appropriate information and essential knowledge is a critical factor that could drive the transition from a linear to a CBM (Agyemang et al., 2019; Ilić & Nikolić, 2016). CE is relatively a new concept in most developing countries, therefore information and knowledge about the concept are still scarce (Ngan et al., 2019).

Third, there is the issue of inefficiency in the retrieval rate of the end-of-life glass bottle. Results of our study show that this inefficiency is caused by two factors which are (i) the absence of appropriate technology and (ii) the diversion of end-of-life bottles due to the activities of the informal waste pickers. However, in the extant CBM literature, challenges of inefficient product retrieval are often linked to unpredictability and unreliability of flow, to which closer customer relation was often suggested as a mitigation factor (Linder & Williander, 2015). In the context of the current study, the appropriate technology that could ease these end-of-life bottle retrieval in the reverse supply chain is not available. Even when the companies can afford the technology to operate, the inefficiency would still be introduced from the value chain actors down the chain (mainly SMEs) who are not able to afford the right knowledge and capacity to manage the technology. The SMEs that made up a large proportion of the RGBP value chain would probably have the general challenges that SMEs encounter in business model innovation. These include insufficient capital, poor managerial culture, poor support from the supply and demand network, lack of technical and technological know-how, absence of information, and absence of government support (Rizos et al., 2016).

Other essential elements already happening in the developed societies that serve as the drivers to effective transitions from linear business models to circular ones such as digitalization, dematerializing (replacement of product/services with software solution), sharing-solution, and product redesign were never mentioned in the collated data. This is probably an indicator of the knowledge gap and/or lack of information that has hindered transitions to CBM in Nigeria and other developing localities.

In terms of contribution, our findings build on the previous literature that has sought to understand CBM, its enablers, and barriers especially in developing countries context (Rizos et al., 2016; Mishra et al., 2019; Agyemang et al., 2019; Mangla et al., 2018; Goyal et al., 2018). The results of the current research share similar findings

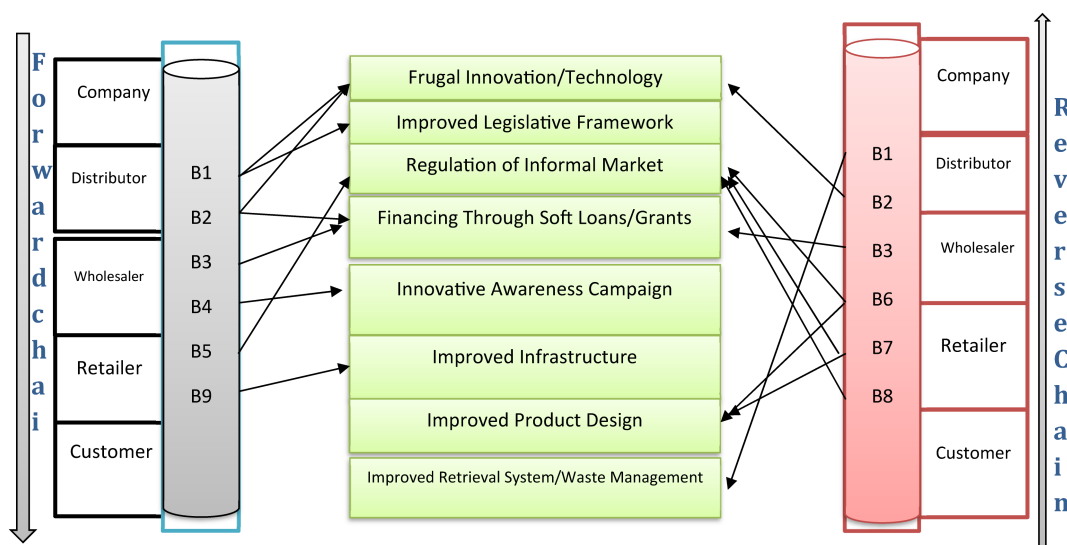


FIGURE 3 A revised framework for the transitioning returnable glass bottle process to circular business model.

with previous studies that equally identified factors such as environmental safeguards, improved product quality, technology availability, social equity, and collaboration as drivers for CBM implementation (Agyemang et al., 2019; Mishra et al., 2019; Mangla et al., 2018). The absence of expert knowledge, financial constraints, and lack of technical and technological capacity are some of the internal barriers identified in the previous literature. Similar to our study, which investigated breweries and the beverage industry, the lack of government support was equally considered an external barrier to CBM implementation in the automobile industry in the previous study (Agyemang et al., 2019). Lack of environmental laws, lack of information, and lack of collaboration were also identified as barriers in the previous literature (Mangla et al., 2018).

6 | WAY FORWARD

The transition from a linear to a CBM in CBMI can happen either through start-up or through transformation of the already existing business model. The RGBP as studied in the current research has shown that the business model has strong attributes that could propel it toward achieving a CBM status.

In the revised framework shown in Figure 3, practical solutions that could be implemented to achieve CBM have been suggested and discussed in what follows:

- i. One way to overcome technological challenges in business in developing countries is by the democratization of technology through frugal innovation. Frugal innovation has been suggested as a veritable tool through which a CE can be promoted in developing countries (Ezeudu et al., 2022). With collaboration between the industry and local research institutions, affordable and appropriate technology can be created for the RGBP in Nigeria. Providing access to funds by making loans accessible to

SMEs will give the value chain actors access to funding and technology. Improvements in funding and technology will ease the end-of-life product retrieval system.

- ii. The absence of effective regulation has made large retail shops operate a business model that could undermine the goals of achieving CBM through the RGBP. Appropriate legislature like EPR can address this issue. Collective producer responsibility has been suggested as the most appropriate EPR program for developing economies like Nigeria, where additional revenue could be mobilized from grants and consumer taxes (Ezeudu, 2024). Also strengthening the overall glass waste management policy in Nigeria will ensure the introduction of channels for retrieving broken glass bottles along the value chain and would reduce the quantity of glass waste going to landfills.
- iii. Through the activities of informal waste pickers, end-of-life glass bottles are diverted away from the RGBP value chain for secondary and unscrupulous use. Despite their critical contributions to effective waste management in urban cities, there is still a consistent call for their activities to be monitored and regulated (Nzeadibe et al., 2009; Zisopoulous et al., 2023). Ensuring that they are registered under cooperatives and issuing identity documents to the operators is one way to checkmate bad elements among them. In addition, the improved design of the bottles could make it difficult to be adulterated.
- iv. There is a huge knowledge gap on CE in Nigeria and this is common in many developing economies (Ferronato et al., 2019; Halog & Anieke, 2021). As a matter of urgency and importance, if Nigeria would benefit from the CE as a means of achieving sustainable development goals, there must be a need to devise appropriate measures to engage the public through awareness campaigns and extensive dissemination of information. The situation is similar to that of other developing nations, where it has been recommended that policymakers implement innovative apprenticeship programs, degree programs on sustainability and

- the CE, and training facilities to increase the number of managers and skilled laborers (Lacy & Rutqvist, 2015; Mangla et al., 2018).
- v. RGBP could be financially intensive to set up and run, probably because of the financial requirement for investment in glass manufacturing. This huge cost will indirectly reflect on the other value chain that is mainly dominated by SMEs and informal actors. It is even worse in developing countries due to underdevelopment. Providing financial support in soft loans, tax rebates, and grants will be critical in easing the transition from linear to CBM in developing economies (Rizos et al., 2016).
 - vi. Improved infrastructure such as waste management facilities are also important elements required for the effective transitioning of RGBP to CBM. Credible governance and a reliable political system are generic issues that need to be tackled for this improvement to happen in CE transitions in developing countries.

7 | LIMITATIONS OF THE STUDY AND FURTHER RESEARCH

The current study has empirically shown how CBMs can be achieved in businesses operating in a typical developing economy by identifying the barriers and enablers. This study however serves as a conceptual lens to understand the practical implementation of CBM and as a heuristic model for further empirical studies on CBM in developing countries. However, being a case study of one type of business model may not adequately bring out all the needed rigor and insights. The current work, for instance, highlighted cost and finance as a barrier to CBM implementation. This cost was mostly viewed from the point of initial capital required for acquiring glass bottles in the RGBP. However, a previous study highlighted financial constraints from the point of cost of restructuring a decade-old plant toward achieving a CBM in the automobile industry (Agyemang et al., 2019). The implication is that the same barrier to CBM implementation may mean different things in different industries which calls for further studies on other industries to build a stronger theoretical framework.

Although, our work accomplished its aim in providing insights and dynamics to CBM in developing countries' context. First, part of the insights provided is the influence of informal waste recycling on the RGBP in Nigeria, where they exert a double-edged influence on the business model. On one hand, they served as a medium for maintaining the flow of glass bottles in the value chain, whereas on the other hand have a detrimental impact by acting as a medium for the diversion of the glass bottles away from the value chain. Informal waste recyclers operate in almost all the developing locations of the world, and the influence of their activities on the implementation of CBM in developing countries needs to be investigated in further research.

Second, the technical and technological challenges pose a strong barrier to the RGPB achieving a CBM status. These factors also appear as a significant barrier to CBM transition for developing countries in the

previous literature (Mangla et al., 2018; Rizos et al., 2016; Agyemang et al., 2019; Goyal et al., 2018). The challenges center more on the high cost and unaffordability of the technology. Considering the criticality of technology to CE transitions, there is a need for further research that could provide practical technological solutions for effective CE transitions in developing regions of the globe.

Finally, the current study also focuses more on bigger companies rather than SMEs. The SMEs would generally find the transition to CBM even more difficult. Scholarly inquiries adopting a quantitative approach can also be conducted as future research for better generalization of the results.

8 | CONCLUSION

Understanding how CBM works in a typical developing country and the associated barriers and drivers is critical to its effective implementation. RGBP adopted by breweries and multinational companies in Nigeria was studied in a qualitative case study that involved collecting data from six companies which was analyzed using thematic analysis. Apart from providing insights, the results also reveal dynamics, drivers, and barriers that could hinder or promote the transformation of the RGBP to CBM. The business environment in developing countries is largely informal and must be considered while designing CBM in these localities. Collaboration among the stakeholders, durable product design, social equity, and environmental gains are some of the enablers identified in the study. Some of the key barriers include lack of knowledge, absence of information, poor regulatory framework, and lack of state-of-the-art infrastructure. There is evidence to suggest that the identified barriers are consistent with challenges faced in operating businesses in a typical developing economy. Policy improvement through the effective legislature, seeking technological redress through frugal innovations, and pursuing initiatives that will empower stakeholders on knowledge and CE expertise are some of the suggested solutions.

FUNDING INFORMATION

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTEREST STATEMENT

The authors declare no competing interests.

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How to cite this article: Ezeudu, O., & Kennedy, C. (2024). Insights and dynamics of circular business model in developing countries' context: The empirical analysis of the returnable glass bottles process. *Business Strategy & Development*, 7(1), e349. <https://doi.org/10.1002/bsd2.349>



APPENDIX: Interview Protocol

Introduction

1. Can you describe your position and role in the company/value chain?
2. Can you describe your daily task and activities?

Returnable glass bottle process

1. How does RGBP work in your company/value chain?
2. Where do you get your goods from?
3. How do you get your goods supplied?
4. Do you own your end-of-life bottles?

5. How do you get and return your end-of-life bottles to your supplier?

Barriers and enablers to transitioning to CBM

1. What are the obstacle for the RGBP to transition to CBM?
2. What are enablers to support the transition towards CBM?

The engagement of value chain members

1. How do you engage the value chain members to ensure the success of RGBP?

Concluding

1. Is there anything else you would like to share about the RGBP?