Life cycle study on returnable glass bottles in the South African beer and cider industry

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Mini-dissertation submitted in partial fulfilment of the requirements for the degree Master of Business Administration at the North-West University

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Student number: 21311056
PLAGIARISM DECLARATION

I declare that this dissertation is my own work. References are listed to reference inputs from literature, acknowledging other parties’ work that has been conducted on the relevant topics. It is being submitted as a mini-dissertation for the degree Master’s in Business Administration at the North-West University’s Business School. The research has not been submitted at any other university for any other qualification.

_______________________________________
Andre Kellerman
MBA Student

_______________________________________
Date
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ABSTRACT

South Africa is ranked as one of the higher beer and cider consumption per capita countries in the world. The internal demand coupled with the growth of emerging markets makes South Africa an attractive investment for international and local brewing companies. In recent years, Heineken N.V, Distell Ltd. and SAB InBev have deployed substantial investments into new plant and equipment to increase their footprint within the country.

The market is made up of premium and mass-market products. The sales of mass-market products far outweigh premium products and is thus a strong focal point for alcoholic beverage producers. Mass-market products utilize returnable packaging materials to transport the goods sold. These returnable bottles, kegs, pallets and crates remain assets of the producers and return is incentivized by a deposit system. To maximize profits, producers aim to increase the lifecycle of these returnable packaging materials.

The lifecycle of the returnable packaging is dependent on several factors found in the producer's micro-, external- and macro environments. This is further governed by legislation and guided by international best practices and standards, which directly and indirectly impact the lifecycle of the returnable packaging materials.

This mini-dissertation will focus on investigating factors associated with the lifecycle of returnable glass bottles used by producers for packaging their finished goods. A research methodology will outline the approach followed in obtaining information which will be used as arguments to support the primary research objectives.

A review of current literature will be conducted to determine national and international approaches towards the operational aspects of returnable bottle’s lifecycle. The literature review will form the basis of the discussion points during qualitative data collection with experts operating in the South African returnable bottle market.

The study will be concluded through analyzing and comparing findings with existing literature elements. Recommendations for will be provided to highlight areas identified for further research. Additionally, recommendations are provided to the industry for consideration in an attempt to increase returnable bottle lifecycles.

Keywords: Returnable Packaging Material, Returnable Bottles, Beer, Cider, Glass
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<tbody>
<tr>
<td>CA</td>
<td>Competitive Advantage</td>
</tr>
<tr>
<td>CAPEX</td>
<td>Capital Expenditure</td>
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<tr>
<td>CLSC</td>
<td>Closed Loop Supply Chain</td>
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<tr>
<td>CO₂</td>
<td>Carbon Dioxide</td>
</tr>
<tr>
<td>CoGS</td>
<td>Cost of Goods Sold</td>
</tr>
<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
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<td>CVE</td>
<td>Consumer Value Engineering</td>
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<tr>
<td>DC</td>
<td>Distribution Centre</td>
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<tr>
<td>DOS</td>
<td>Days of Stock</td>
</tr>
<tr>
<td>EBI</td>
<td>Electronic Bottle Inspector</td>
</tr>
<tr>
<td>EBIT</td>
<td>Earnings Before Interest and Tax</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planner</td>
</tr>
<tr>
<td>FIFO</td>
<td>First In, First Out</td>
</tr>
<tr>
<td>FMCG</td>
<td>Fast Moving Consumer Goods</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>HACCP</td>
<td>Hazard Analysis and Critical Control Points</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
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<tr>
<td>Km</td>
<td>Kilometres</td>
</tr>
<tr>
<td>kW/h</td>
<td>Kilowatt per hour</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<td>--------------</td>
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</tr>
<tr>
<td>LSP</td>
<td>Logistics Service Provider</td>
</tr>
<tr>
<td>Ltd.</td>
<td>Limited Liability</td>
</tr>
<tr>
<td>MBA</td>
<td>Master of Business Administration</td>
</tr>
<tr>
<td>MBFU</td>
<td>Missing, Broken, Foreign and Unwashable</td>
</tr>
<tr>
<td>ml</td>
<td>Millilitres</td>
</tr>
<tr>
<td>MRP</td>
<td>Materials Resource Planner</td>
</tr>
<tr>
<td>N.V.</td>
<td>Naamloze Vennootschap</td>
</tr>
<tr>
<td>NDD</td>
<td>Nominated Delivery Date</td>
</tr>
<tr>
<td>NRB</td>
<td>Non-return Bottle</td>
</tr>
<tr>
<td>NWU</td>
<td>North West University</td>
</tr>
<tr>
<td>OPEX</td>
<td>Operating Expenditure (Cost)</td>
</tr>
<tr>
<td>PET</td>
<td>Polyethylene Terephthalate</td>
</tr>
<tr>
<td>Pty</td>
<td>Proprietary Company</td>
</tr>
<tr>
<td>R</td>
<td>South African Rand</td>
</tr>
<tr>
<td>RB</td>
<td>Returnable Bottles</td>
</tr>
<tr>
<td>RC</td>
<td>Returnable Crates</td>
</tr>
<tr>
<td>RK</td>
<td>Returnable Kegs</td>
</tr>
<tr>
<td>RONA</td>
<td>Return on Net Assets</td>
</tr>
<tr>
<td>RPM</td>
<td>Returnable Packaging Material</td>
</tr>
<tr>
<td>SAB InBev</td>
<td>South African Breweries Anheuser-Busch</td>
</tr>
<tr>
<td>SAP</td>
<td>Systems, Applications and Products</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollars</td>
</tr>
<tr>
<td>UV</td>
<td>Ultra Violet</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Circulation time</td>
<td>Time a returnable bottle takes from finished good to receiving it back at the production facility.</td>
</tr>
<tr>
<td>Craft beer</td>
<td>Beers and ciders made by independent micro-breweries.</td>
</tr>
<tr>
<td>Hectolitres</td>
<td>One hundred litres.</td>
</tr>
<tr>
<td>Industrial glass</td>
<td>Glass cullets collected from producers who incurred site losses. Industrial glass is generally cleaner and can be added to the manufacturing process earlier than post-consumer glass.</td>
</tr>
<tr>
<td>Logistic service provider</td>
<td>An entity providing distribution for producers. Refers to both internal and external providers of logistical services.</td>
</tr>
<tr>
<td>Market losses</td>
<td>RB’s not returned by the market.</td>
</tr>
<tr>
<td>Mass-market beer</td>
<td>Clients perspective of where price point, quantity and quality meet.</td>
</tr>
<tr>
<td>Mass-market cider</td>
<td>Clients perspective of where price point, quantity and quality meet.</td>
</tr>
<tr>
<td>Off consumption</td>
<td>Consumption of alcoholic beverages off the premises.</td>
</tr>
<tr>
<td>On consumption</td>
<td>Consumption of alcoholic beverages on the premises.</td>
</tr>
<tr>
<td>Post-consumer glass</td>
<td>Glass cullets collected from the market. Post-consumer glass is generally unsorted and high levels of impurities are evident. Requires additional steps in the manufacturing process for cleaning.</td>
</tr>
<tr>
<td>Producer</td>
<td>Within the value chain, this includes the production company responsible for filling the bottles.</td>
</tr>
<tr>
<td>Site losses</td>
<td>RB’s damaged on-site during production and distribution activities.</td>
</tr>
<tr>
<td>Tier 1 customer</td>
<td>Large retailers include companies such as the Massmart chain.</td>
</tr>
<tr>
<td>Tier 2 customer</td>
<td>Smaller retailers geographically spread. Includes companies such as Liquor City.</td>
</tr>
<tr>
<td>Tier 3 customer</td>
<td>Final sale entities. Includes bars and taverns.</td>
</tr>
</tbody>
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CHAPTER 1 – NATURE AND SCOPE OF THE STUDY

1.1 Introduction

The beer and cider industry in South Africa has seen tremendous growth over the past years, despite economic headwinds. A growth rate of 4.9% has been recorded, almost double the Gross Domestic Product (GDP) growth for the period 2011 to 2015 (Trading Economics, 2018). In 2015, the South African beer and cider market reached a production volume of 33,900,000 hectolitres and is projected to reach 38,850,000 by 2020 (Marketline, 2016). The industry has developed to a major player in the economy, with upstream and downstream activities creating employment opportunities and additional government tax revenue (Fieldgate et al., 2013).

Beer is the alcoholic beverage of choice, totalling 54.6% of the all liquor sold in South Africa (Holtzkampf, 2015). In 2015, South Africans spent more than R100bn purchasing beer and consumed around 60l per capita per annum (Kew, 2016). The strong growth rate and appealing future projections thereof has led to global interest and large-scale capital investments into new breweries.

Although South African’s have recently adopted a strong “craft beer” culture, the market is still dominated by the brewing giants SAB InBev, Heineken South Africa Pty. Ltd. and Distell Group Ltd. These companies control market shares of 80.4%, 13% and 5%, respectively (Marketline, 2016). The degree of rivalry in the South African alcoholic beverage sector is high due to the relatively consolidated market and requires agility in marketing, value offering and variety. In response, these companies target a wide range of market segments by offering products ranging from premium beers and ciders to more affordable, value-driven products, termed “mass-market products”. Mass-market beers and ciders make up a substantial amount of the sales of the three market leaders, contributing around 60% to their total sales revenue.

The mass-market beverages are offered at a lower price per millilitre without compromising quality and thus appeals to the mass-market. Although premium beers are seen to be coupled with personal identities (Eaves, 2014) and are considered more luxurious (Whyle, 2016), mass-market beers and ciders are strongly competitive on pricing. Thus, producers seek various ways of reducing mass-market beer and cider prices.
Returnable Packaging Material (RPM) enables producers to cost-effectively package and transport both premium and mass-market products. RPM consists of Returnable Bottles (RB’s), Returnable Kegs (RK’s) and Returnable Crates (RC’s). These three RPM’s follow different processes, and for this study, the focus was solely be based on RB.

These glass bottles can theoretically be re-used around 30 times (Whyle, 2016) based on their condition when returned. However, the amount of re-use is variable and is based on the producers’ quality standards required and the sensitivity of their Electronic Bottle Inspector (EBI) to discard broken or foreign materials.

In addition to reducing externalities through minimizing waste, the use of RB significantly lowers the Cost of Goods Sold (CoGS). The reduction is CoGS enables the producer to offer the beverages at a lower price (Shaw, 2018). The reduction in sales price lowers the risk of the producer losing market share due to substitute products and is vital to producers to maintain their competitive advantage (Huebsch, 2018).

In contrast to Non-Return Bottles (NRB’s), RB’s require substantial infrastructure investment and complex reverse logistics procedures to be in place. In addition to the standard NRB logistics process flow, the RB is required to travel from Tier 3 to Tier 1 customers, sorted, inspected, washed and re-labelled before re-use. With the exception of SAB InBev, the transportation of the RB’s poses a risk of possible breakage as the majority of the logistics services is contracted out to third-party providers. Thus, quality can only be controlled contractually and not through internal quality control processes.

The return of the RB’s is incentivized by a refundable deposit included in the sale price when the beer is purchased and the RB can be used as a deposit against the next purchase from most Tier 1 and Tier 2 customers. The deposit obtained by the customer for returning the RB’s is between R1 to R3, and between R8 and R11 for the packaging crate. However, the number of bottles returned to Tier 1 customers vary and the timeframe is unpredictable, due to several factors.

This variability on the returns of the RB’s leads to operational issues arising on the producer’s side, as a sufficient supply of packaging is required to meet continuous market demand. Generally, high levels of Days of Stock (DOS) are required to create a safety buffer of supply, which incurs additional cost to the producer. The variability of RB returned further induces issues relating to Material Resource Planning (MRP), as production scheduling relies heavily on accurate packaging stock level information.
The purpose of this study is to gain insight and critically assess the factors influencing the lifecycle of RB’s in the mass beer and cider market. This included factors both internal and external to producers. These factors were analyzed in accordance with RPM strategies and policies relating to RB’s of the largest players in the South African liquor producing sector. The assessment was compared to best practices around the world, given the specific South African macro environment and might not be applicable to all producers in general.

The envisaged benefit of conducting this study was to improve strategic elements and operational decisions around improving the lifecycle of RB’s. Areas of improvement were identified and analyzed in the study. This would lead to increased profits by producers, less glass filling up landfills and less CO₂ emissions from the production of these bottles. An investigation was done into the operation of bottle merchants, and how policy on operational transparency around RB’s could benefit their business model.

1.2 Problem statement

In a fast-growing and highly competitive market, South African beer and cider producers need to focus on several fronts to remain the brand of choice. Due to the rising prices of energy and raw packaging materials producers are working towards minimizing input and distribution costs. Lower CoGS enables producers to obtain increased market share, due to their ability to offer products at a more affordable price. Furthermore, by lowering CoGS, an increase Return on Net Assets (RONA) enables producers to expand their production capabilities by attracting investments for Capital Expenditure (CAPEX) projects.

To lower the CoGS, it requires effective management throughout the production, storage and logistical elements of the supply chain. High levels of accuracy in planning, low-price sourcing, lean production and effective distribution are required to realize effectiveness (Lewis, 2013). The potential for savings in the FMCG industry is relatively low in comparison to large-scale manufactured goods (Oliver Wyman, 2014) and is thus of utmost importance for producers to continue to eliminate any wasteful expenditure.

The variability of RB’s collected for re-use places a burden on all of these crucial segments, as mass-market beers make up a substantial volume of total sales. The initial disturbance introduced by incorrect RB quantities is propagated through the mass-market supply chain and results in loss of revenue and loss of market share. This can be
contributed to the general lack of RB transparency, as inaccurate information affects the producers’ ability to make efficient, proactive decisions (Kettering University, 2015).

Supply of returnable RB’s, high circulation times, high DOS and losses mainly contribute to the problems experienced in the RB supply chain. These areas of concern impact all aspects of planning, supply and logistics in the RB industry is listed and described in more detail in the sections below:

1.2.1 Supply of returnable bottles

RB’s in the South African beer cider mass-market are mainly manufactured by Nampak Ltd. and Consol Glass Pty. Ltd. These manufacturers have limited production capacities in terms of the number of required units and bottle colour. Sourcing of RB’s thus requires scheduling to be in line with both the producers’ requirements and suppliers’ capabilities.

When a short supply of bottles manifests, producers have difficulty in meeting their demand and incur revenue loss as they forego sales. Further, short supply induces the risk of losing market share through substitute products. With mass-market beer and cider, switching costs are low and further emphasizes the requirement of maintaining sufficient stock levels.

When short supplied, the supplier can be pushed to deliver RB’s in a shorter timeframe, increases the risk of breakages or substandard quality. The lack of RB’s creates a shortage of circulation in the market and can directly affect the return patterns and logistics as some customers might have internal business processes only allowing the release of RB’s once a specific quantity is met.

When an oversupply is of RB’s is present, the producer has purchased packaging materials which are not used and thus incurs over-capitalisation of bottles due to excessive RB purchases. Simultaneously, the producer is required to store the unused RB’s in the production plant. If the storage area is not protected from sunlight and rain ingress, the RB’s requires to be washed before re-use and increases Operating Expenditure (OPEX).

1.2.2 High circulation times

Planning and forecasting can be affected by high circulation times of the RB’s in the market. RB’s remains assets of the producers and is re-used until the RB quality is not up to standard or if it reaches end of life. Depending on the producer, RB’s have an
amortization period of 4-7 years, and producers have the highest RONA if the RB can be used to its maximum theoretical limit before or before the quality starts to degrade.

High circulation time places a risk on the maximum utilization per bottle. When circulation times goes from high to extreme, it creates the possibility that the bottle will reach end of life before maximum RONA. This results in additional expenditure required to replace RB’s and negatively impacts producers’ revenue.

If the RB is retained in the market longer than anticipated, it creates operational issues due to the incorrect RB pool size available for bottling. Pool sizes are determined based on projected market demand and inflow of RB’s from previous purchases. The inaccurate estimation of pool sizes leads to higher required DOS and the effects thereof is discussed in paragraph 1.2.3.

1.2.3 High inventory requirements

If RB’s are returned sporadically, producers are forced to maintain high levels of completed products and empty RB’s at hand. The inventory held is described in terms of as DOS, a buffer which producers create to mitigate the risk of running out of stock.

Generally, mass-market beer and cider are stockpiled and the First In, First Out (FIFO) principle is used, as pallets of finished beer and cider are stockpiled to ensure that warehouse maturing is mitigated. Different batches cannot be stacked in the same bin to minimize floor space requirements, and thus leads to excessive floor space usage.

Returned RB’s are inspected once returned to determine batch numbers. This feeds into the calculation to determine circulation time. The issue is that a sample of one bottle is inspected per crate upon return. Limited sampling leads to the inaccuracy of data collected and can skew the circulation time calculations and force producers to maintain higher DOS levels.

1.2.4 Market and site losses

Market and site losses occur when RB’s are damaged during handling. This mainly occurs when the RB’s are transported from the warehouse floor to the distribution trucks or when these trucks are unloaded at the customers.

As indicated previously, the RB’s are company assets with a theoretical re-use limit. Damage to the RB’s result in them being discarded instantly and removes any future potential of RONA. Although crates are designed to protect RB’s from any form of
damage, they are limited to only when the RB’s are transported and not when they are removed. New RB’s are then ordered to replenish the RB pool size in accordance with planning and scheduling requirements.

Another key factor in market losses is the South African “throw away” culture (World Wildlife Foundation, 2017). Although the return of these RB’s is incentivized, they are often simply thrown away as the effort of returning them is perceived to be too high. The need for market education is necessary as mass participation and strategy adoption is crucial to collecting RB’s, increasing RONA and minimizing externalities due to the production of these bottles.

1.3 Core research question

Based on the problems in the mass-market beer and cider industry defined in paragraph 1.1, the core research question and purpose of this study can, therefore, be termed as the following:

- What changes can be made both internally and externally to maximize Return on Net Assets (RONA) of Returnable Bottles (RB’s)?

The core research question will be the ultimate measure of how accurately the primary objectives in the following section can be identified and addressed in the South African environment.

1.4 Objectives of the study

1.4.1 Primary objective

The primary objective of this study is to investigate to which extent related factors influence the lifecycle of RB’s. In a paper presented by Venkatesh (2015), the factors below were highlighted as areas of concern in operations at an Indian brewery. These primary objectives were utilized as a guideline for the research conducted within the specific South African environment. These objectives will be compartmentalised into three separate focus areas namely micro-, external- and macro environments.

1.4.1.1 Micro-environment

- Returnable strategy
  - Focus on what the strategic decisions are relating to the supply, bottling and distribution of RB’s
- Limited forecasting
- How the influence of market share growth and market invariability affect lifecycle of the returnable bottles.

- Lack of information flow
  - Relates to the methods of how accurately returns are captured

- Transportation capacity utilization
  - Includes the optimal utilization of truck capacity

- Unskilled labour
  - How the effect of unskilled labour influences decisions around the handling of RB's

- Responsiveness
  - Evaluation of how responsive producers are to variations in demand and the ability of suppliers to provide RB’s

- Variation of packs
  - How the variation of pack types affects upstream components such as transportation capacity utilization and producer specific requirements

1.4.1.2 External-environment

- Customer behaviour (charge of deposit)
  - How the incentivised returns affect the culture around the returning of empty RB's

- Consumer behaviour
  - How the incentivised returns affect the culture around the returning of empty RB's

- Bottle merchant roles
  - The effect of how much value addition bottle merchants can make to increasing the lifecycle of RB’s

1.4.1.3 Macro-environment

- Standards and legislation
  - Focus on how forces shape the liquor and transportation industries in general, such as liquor laws and carbon tax.

1.4.1.4 Externalities

Additionally, externalities of RB’s were investigated to determine the secondary effects of utilizing RB’s. These included the following:
• Although the purpose of the research is to assess strategic, operational and financial issues around the RB beer and cider mass-market, it cannot be ignored that recycling has an impact on the environment (Slater, 2017).
• These externality factors include the other two elements of the triple bottom line, namely people and planet (Hammer & Pivo, 2016). Secondary objectives will include pollution in the manufacturing process (Mavuso, 2015) and assessing the impact returnable has on communities, such as job creation (Whyle, 2016) and alcohol abuse.

1.4.2 Secondary objectives

Secondary objectives as presented below: Secondary objectives relating to the study includes the following:

• To use a literature study to define potential factors that could affect the lifecycle of RB’s.
• To interview industry experts operating in the RB industry and obtain a practical view on current.
• To determine which of these potential factors are most prevalent in the South African RB value chain.
• To propose measures to the industry to address the key contributing factors affecting the lifecycle of the RB’s.

1.5 Research methodology

The research followed the procedure as indicated in Figure 1-1. The method has been chosen as it allows a comprehensive understanding of the elements influencing the primary research question to be in place first prior to conducting qualitative interviews.

Through an understanding of best practices implemented globally and our specific socio-economic milieu, deductive interviews (Gilgun, 2013) can be constructed in such a way to obtain the most feasible results. This will form the basis of the input into constructing the interviews.

Based on the exclusivity of the field of study, convenience sampling methods within the RB industry was used. This will form the basis of interview selections to evaluate the cultural and operational impacts on the lifecycle of a RB in the beer and cider market.
Participants were sourced from the pool made available through interaction management from the various producers. A select amount of Tier 1 customers were interviewed to determine a more holistic view of the interaction between producers and the market.

Data obtained from the iterative interview process was analyzed and compared with examples from the literature study. Based on the outcome of the results, this allowed the formation of concepts negatively impacting the lifecycle of RB’s through a gap analysis of the mass-market of beer and cider in South Africa.

1.5.1 Research process

The research follows a qualitative approach, where the primary data collection method is interviews with representatives of all the stages in the RB value chain. A literature survey was conducted to determine and the captured perspectives on the South African mass-market beet and cider industry.

Figure 1-1 represents the flow of the research design process. The process allows for fine-tuning of the interview questions based on the results received. This is crucial as the interviews have the possibility to lead to new discoveries which may be more critical in answering the core research question than initially defined.

The research process is as follows:

1. Formulate research question

The formulation of the core research question is crucial and sets the requirements for the research design process. The core research question is available in paragraph 1.3.

2. Conduct a literature survey

The literature survey was aimed towards the understanding of the process producing, selling and transporting of RB’s globally. This will form the basis of preparing the conceptual foundation and the hypothesis for the study (Kundu, 2017). Furthermore, it focussed on the market and the recycle culture of South Africans and the effect it has on the lifecycle of RB’s.

3. Compilation of interview questions

Based on the literature study conducted, semi-structured interview questions were set up based on the understanding of the critical factors influencing the primary research question.
4. Formalizing meeting arrangements
As with any interview process, it is of crucial importance to maintain professionalism and etiquette (Brandman University, 2017). This includes respecting the time of the participants by timeously setting up appointments and sticking to the schedule. Meeting times were arranged at the choosing and convenience of the participant.

5. Conduct interviews and site investigations
During this step of the research process, contact was made with the various identified participants and semi-structured interviews were conducted. Site visits at each of the segments were requested in advance of meetings. During the visits, investigations were done in order to maintain an understanding of the physical process flow in the various sectors.

6. Interpret and analyze results
Interview results, including site investigation findings, was analyzed. A narrative - and partially deductive - approach was used to capture the individual perspectives in light of the existing understanding of RB’s. The analysis was conducted in accordance with the primary research objectives.

7. Compare analysis with literature expectation
The comparison process was deductive of nature (Rucker, 2016). Based on the understanding of existing literature around RB processes, the pre-existing theories and hypothesis were tested.
During this stage the possibility to conduct further research in newly discovered topics exists, which will feed into an amendment of the interview questions.

8. Table discrepancies and provide plausible solutions
This section of the research process included the write up of results and possible solutions to maximizing the lifecycle of the RB’s. Results and recommendations were provided for each of the individual segments participating in the study. A comparison of factors identified internationally and within South Africa was provided.
Recommendations regarding areas identified for further research were identified. This was based on the gap analysis and areas identified during this research which can further contribute to increasing the lifecycle of RB’s within South Africa.
For the purpose of the study, phenomenology will be followed. Phenomenology focusses on the study of a particular phenomenon (Astalin, 2013) observed within a study. The phenomena observed in the current study relates to the strategic and operational issues arising from preference of mass market beer and cider in the South African market.
The phenomena will be defined as far possible from current literature sources and will provide awareness and insights on key areas of concern affecting the lifecycle of RB’s within the country.

1.5.3 Empirical study

A qualitative approach was followed. The reason behind the selection of a qualitative approach include the following:

- The study is associated with human behaviour. The lifecycle of the RB’s is directly proportionate on the perception and culture of the customers purchasing mass-market beer and cider. Qualitative research enables capturing the various viewpoints on the recycling culture.
- The cultural concepts which were analyzed were emergent from interview data regarding the return of the RB’s. Due to the size of the existing mass-market, qualitative analysis has been rejected and qualitative analysis has been chosen to concentrate on common contact points.
- Flexibility within the investigation process is made available through the qualitative method (Brymen et al., 2016:51). This is achieved through the selection of industry experts within the RB field.
- This empirical study the aim is to collect accurate data from several key people in the value chain by means of interviews. Therefore, the social environment was studied as a paradigm that consists of different opinions, views and expectations.
- Amongst other areas, the study is associated with operations management at producers’ bottling facilities. Decisions made by senior staff has a direct impact on the processes followed enforcing quality and has a substantial impact on the lifecycle of the RB’s. The qualitative method aims to capture the decision-making factors and orientations of these staff.
- Open-ended equations will form part of the interview to allow for the probability of capturing elements which could have previously been missed.
- The empirical study was based on the interview participants' viewpoint. The viewpoint, if compared to others, can provide significant insight into potential misconceptions of members operating the RB value chain.
1.5.4 Sampling

For the purpose of this study, theoretical sampling was used. This will include sampling until saturation of the key concern areas retrieved from the literature occurs. This will allow saturation to occur on data rather than the statistical adequacy of the interview samples (Brymen et al., 2016:185).

1.5.4.1 Participant considerations

Participant selection was based on accessibility and the participants’ knowledge of the specific field of study. They were selected from individuals with from all stages in the RB supply chain. The aim of the sampling method is to collect information as diversely as possible from producers, suppliers and Tier 1 customers.

It is important to select participants based on their experience within the RB market. To achieve this, a list of typical characteristics has been set up (Koenig, 2018). Typical characteristics of the participants shall include:

- Expertise in the RB beer and cider market
- Understands internal policies of RB’s
- Understands the internal procedures of the RB’s
- Accessibility
- Interest in the study

The selection of the participants was such that they can be accessed easily based on their availability. Thus, participant selection is required to accommodate personal interviews based on the availability of the participant. Predominantly, most of the producer and supplier headquarters are located within a 50 km range from Johannesburg. This advantage was utilized to minimize the time and cost employed by the researcher due to similar geographical location. In addition, most suppliers, producers and customers have facilities within the proposed range and were sufficient in providing a holistic view of the industry.

1.5.4.2 Population sample size

Practical considerations coupled with the sample size is the availability of time and financial resources. As stated in paragraph 1.5.4.1, participants were selected to minimize the impact of both.
However, another key consideration is to determine the adequate sample size to support the reduction in resource deployment while still ensuring saturation. Thus, with the focus mainly being on the producers’ perspective of the RB market, an envisaged total of 10 participants was identified to be interviewed.

Table 1-1 below provides the prospected minimum participants which were originally included in the study to acquire the most holistic view of the RB beer and cider market.

### Table 1-1 : Population sample size

<table>
<thead>
<tr>
<th>Company</th>
<th>Area of operation</th>
<th>Expertise</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consol Glass</td>
<td>Supplier</td>
<td>Glass manufacturing</td>
<td>1</td>
</tr>
<tr>
<td>Nampak Ltd.</td>
<td>Supplier</td>
<td>Packaging solutions</td>
<td>1</td>
</tr>
<tr>
<td>Heineken</td>
<td>Producer</td>
<td>Beer and cider production</td>
<td>2</td>
</tr>
<tr>
<td>SAB InBev</td>
<td>Producer</td>
<td>Beer and cider production, distribution</td>
<td>2</td>
</tr>
<tr>
<td>Distell Group Ltd.</td>
<td>Supplier</td>
<td>Cider production</td>
<td>2</td>
</tr>
<tr>
<td>Makro</td>
<td>Customer</td>
<td>Tier 1 customer</td>
<td>1</td>
</tr>
<tr>
<td>UD Group</td>
<td>Customer</td>
<td>Tier 2 customer</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

1.5.4.3 Alternative unit of analysis

Alternative unit of analysis considered in this study is the following:

- International producers and suppliers

Due to the uniqueness of the South African economic and political climate, qualitative data from international producers and suppliers will not be considered within the study. However, the qualitative results were reviewed against practices deployed to identify possible shortcomings and improvement opportunities if feasibility within the South African context exists.

- End level customers

End level customers, mainly taverns, are not viable for answering the core research as provided in paragraph 1.3. This is due to the vast distribution of these entities across the country, and the general difficulty and security issues regarding access. Most of these taverns are operating without proper business documentation, thus cannot be identified
easily from an outsiders’ perspective. The general lack of technology utilization also poses a threat of hampering the collection of feasible qualitative data.

- Bottle merchants

Bottle merchants’ qualitative data will not be feasible to the study. This is mainly attributed to the fact that these entities are under development and have not yet formalized agreements with the relative producers. Thus, the inclusion of this population will pose a significant risk to the study as data might distort data received from knowledgeable participants.

1.5.5 Data collection

1.5.5.1 Data collection procedure

Individual, semi-structured interviews were conducted at the main data collection instrument. These interviews were scheduled based on if consent to conduct the research has been given and the availability of the participants.

The data collected was voice recorded and transcribed with the participant’s permission. The transcribed data will be returned to the participant for approval, from where it will be used to identify key shortcomings in the RB industry.

1.5.5.2 Criteria Requirements for Qualitative Interviews

The following criteria were adhered to when conducting interviews (Waters, 2017):

- Interview structure
  - Arrange an appropriate time and setting
  - Introduction of the researcher
  - Introduction to the topic and its applicability
  - Description of the interview structure
  - Discussion of data sensitivity and applicability
  - Interview questions and general discussions
  - Conclude
  - Follow up for approving minutes of the meeting

- Interview conduct
  - Be on time
  - Ensure the interview data collection is applicable to the core research question
Ensure that interview is as brief possible
- Remain unbiased
- Be attentive to non-verbal communication
- Remain attentive to interview question answers
- Remain enthusiastic
- Encourage participant response

### 1.5.6 Data analysis

The purpose of the data analysis is to interpret captured data and identify themes to correlate responses with the core research question and the discovery of new patterns (EvaSys, 2018). The data analysis exercise was concurrent throughout the research, as new concepts and patterns might provide new insight into answering the core research question. The following six steps was used during data analysis (Pell Institute, 2018):

- **Immediate recording of data**
  
  Immediate recording of data is necessary to maintain the highest level of accuracy.

- **Begin data analysis as soon as data is collected**
  
  By analyzing data as it is being collected, it creates the possibility to direct focus to particular areas influencing the core research question.

- **Data reduction**
  
  Data reduction is the process of transforming raw data into a more meaningful state. This step is not to be confused with the data analysis in the second step, as it refers to overall data reduction.

- **Identification of patterns and themes**
  
  Identification of key patterns and themes is the core of the qualitative analysis. This section was done by means of thematic analysis, which entails the grouping of the data into specific themes. These themes were directly related to the areas identified during the literature study which has a substantial effect on the core research question.

- **Data display**
  
  This step includes the physical display of the analyzed data in terms of tabular or textual format.

- **Conclusion and verification**
This step is subdivided into three steps, including:

- Taking a step back and evaluate what the findings show
- Determination of how the findings influence the answering of the core research question
- Drawing up implications from the findings

1.5.7 Quality and rigour of the research design

The qualitative research method has the risk of being viewed as biased due to the interpretation of data by the researcher. In order to ensure an objective approach, the following factors were considered during the research (CIRT, 2018):

- Reliability

Reliability refers to the extent which the findings can be consistently duplicated (Devault, 2018). Thus, in order to achieve reliability, all research findings were thoroughly documented. This included documentation of interview questions and responses, literature review documentation and the documentation of the final recommendations and write up. Reliability is supported by the proposed research methodology within this research report.

- Validity

The validity of the research method proposed is supported by the selection of participants to the study. A consideration of the various population groups has strengthened the envisaged validity of data collected. The groups are distributed through various value chains of suppliers, producers and customers. The qualitative data collected will form a true holistic representation of the RB beer and cider industry in South Africa.

Triangulation was deployed as another measure in assuring validity. Triangulation refers to viewing the research from various perspectives on the same phenomena (Kulkarni, 2013). Triangulation was supported through using qualitative methods and physical observation of the processes at each of the sample categories. In the proposed research, the various perspectives were that of:

- Suppliers
- Producers
- Customers
Leveraging these perspectives will give a good indication as to how the various segments of the RB market view the upstream or downstream operation pertaining to their business.

- **Transferability**

Transferability relates to the degree which the research can be used outside the bounds of the study. This study includes investigation of the RB landscape within the South African context.

The research carries managerial implications to suppliers, producers and customers of RB products. Successful investigation and implementation of the research carries tremendous financial and operational benefits.

This study will provide insight to all stakeholders in the RB market, and was made available to entities participating in the research.

- **Credibility**

Credibility relates to the trustworthiness of findings during the research. This was ensured by circulating the minutes of the meetings with participants for approval. This will ensure that data has accurately been captured during the interview process and that the participant is aware of the information given to the researcher.

- **Conformability**

In order to obtain privileged data from producers, non-disclosure agreements have been drawn up. These not disclosure agreements entail the distribution of the findings once research has been completed.

By distributing the completed research participants will not only have an opportunity to verify that sensitive data has been treated correctly but also ensure that the research has been conducted in a subjective manner not harming or promoting any specific company.

In further support of conformability, the researcher will evaluate data subjectively which is in support of the core research question. The core research question is in itself subjective as it focusses on no specific producer but prolonging the life of RB’s throughout the market.

**1.5.8 Research ethics**

Research ethics refers to ethical conduct throughout the collection, analysis, reporting and publishing of the research subject (Hajimia, 2014). This includes adhering to all the
ethical requirements stipulated by the North West University’s Business School (NWU Business School, 2018).

Informed consent forms providing the necessary information regarding the sensitivity of information gathered during qualitative interviews is provided in Annexure C. This informed consent letter is focussed on the key areas of the study, namely the mass-market beer and cider producers.

In addition, general best practices of ethical conduct were maintained throughout the entirety of the study. The following was adhered to as part of the ethical conduct in this research study (Sagepub, 2018:54-58):

- Do no harm

Companies and individuals in this study were assured that they will not be harmed in any way. Due to the nature of this study, harm specifically relates to reputational damage. Instead, as per the core research question, the study was beneficial to all participants.

- Privacy and anonymity

Any company or individual participating in the study was granted complete anonymity. This will include the removal of company names from any information received and referenced to as “a producer in the RB industry” or alternative pseudonyms.

- Confidentiality

As mentioned in the privacy and anonymity section above, confidentiality was ensured by keeping sensitive information confidential. Information received will primarily be used to draw up conclusions and recommendations during the study. The privacy and anonymity of data were verified by company representatives reviewing the outcomes of the study before submission.

- Informed consent

This will include informing the participants of the nature of the study and the proposed use of the interview results. The informed consent form is available in Annexure C. The informed consent includes the right to withdraw whenever a participant becomes uncomfortable or is unwilling to share proprietary information.

- Rapport and friendship
The researcher will do his utmost best in providing participants with a friendly and trustworthy environment in order to obtain most honest decisions.

- **Intrusiveness**

During the study, the availability and level to which entities participate were respected at all times. If an entity chose to not participate, their decision was respected and alternate sources for data acquisition was investigated.

- **Inappropriate behaviour**

Inappropriate behaviour includes defining the lines between the researcher and the participant.

Further, inappropriate behaviour includes being subjective towards participants based on previously collected data. In order to evade this, the researcher will remain objective at all times during interviews and data analysis.

- **Data interpretation**

Data interpretation closely relates to credibility as defined in paragraph 1.5.7. Thus, the interpreted data was distributed to all stakeholders which participated in the study in order to ensure unbiased data interpretation.

### 1.6 Limitation and scope of the study

The scope of the primary objectives of the study will lie within the bounds of the following elements:

- The South African alcoholic beverage industry
- Within 50 km range from Johannesburg, Gauteng, South Africa
- RPM strategies and policies
- Legislative requirements
- Beer and cider market
- 750 ml, 660 ml and 330 ml RB’s
- Most predominant suppliers, producers and Tier 1 customers

### 1.7 Assumptions

Given the unexpected changes in economic development of South Africa, the following assumptions are made with regards to the proposed study:
• The current logistical models of producers remain constant.
• The current manufacturing processes of suppliers remain constant.
• No significant policy changes take regarding the consumption and advertisement of alcoholic beverages.
• No significant policy changes were implemented regarding the incentivization of RB’s.
• No new RB products will enter the market.

1.8 Layout of the study
The layout of this mini-dissertation will contain the following chapters:

• Chapter 1 – Nature and Scope of the Study
• Chapter 2 – Literature study
• Chapter 3 – Empirical Analysis
• Chapter 4 – Results and Discussions
• Chapter 5 – Conclusion

1.9 Conclusion
South Africa has a high level of RB usage during the consumption of beer and cider. Due to the nature of the customer and consumer segments, suppliers of these products experience several difficulties as a result of the use of RB’s.

The preceding chapter discussed the problem statement in detail. The problem statement was converged into a core research question related to increasing the lifecycle of the RB’s. To answer the core research question, primary and secondary objectives were provided, breaking it down into several areas identified for investigation.

A research process was provided and summarized in Figure 1-1. The research process indicates logically sequenced steps to be taken in answering the core research question through addressing the several primary and secondary objectives.

Limitations of the study were provided demarcating the boundaries of the study within a predetermined portion of the RB value chain. The limitations were chosen based on the level of impact decisions and processes have within the specifically identified segment.

Lastly, assumptions were provided for the study. These assumptions indicate the expectations that the norms within the industry will remain constant for the duration of the study.
1.10 Chapter summary

The following key elements were discussed during this chapter:

- South African beer and cider industry
- Problem statement of the RB industry
- Objectives of the study
- Research methodology
CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

This chapter will provide a comprehensive overview of research that has previously been conducted in the field of RB’s. It will provide a theoretical context of the field of study and form the basis of knowledge on the strategy and operation regarding RB’s and the handling thereof within the South African mass beer and cider market. Although elements of the RB lifecycle are well documented individually, little to no overlapping occurs for South African specific conditions and will be addressed during the empirical study.

Although little literature has been published on the beer and cider industry, the principles of RPM packaging materials remain relatively constant across various fields of application. Commonalities between the two will be utilized to support the foundation of a theoretical base. The literature study will be aimed at identifying gaps in the current strategies, handling and implementation of RPM systems with specific reference to RB’s in the South African mass-market beer and cider industry.

The literature review layout will be ordered logically according to the progression in the strategic and operational requirements of RB’s. The literature study, in conjunction with the qualitative interviews, covers areas of investigation as per the primary objectives as in paragraph 1.4.1. The relationship between these factors will form the basis of addressing the core research question as listed in paragraph 1.3.

Firstly, the returnable strategy will be discussed. The returnable strategy lays the foundation for the operational process. This is contributed to the fact that that the strategy directs the operational requirements, and subsequent supply chain considerations are done to achieve the strategic goals. Although several returnable strategies exist, only the strategy currently implemented by producers will be presented. The strategy presented is considered the industry norm within the RB market includes the following elements:

- Returnable strategies decision drivers
- Deposit system strategy

Secondly, the lifecycle of the RB’s within its specific micro-, macro and external environmental milieu’s will be discussed. This will include the operational aspects of the production, processing and transportation of RB’s. The operational aspects discussed will be derived from the RB strategy as per paragraph 2.2.
The following key elements are applicable to RB operations:

- Overview of the lifecycle of RB’s
  - Supply of RB’s
  - Production of beer and cider
  - Forward and reverse logistics
  - Consumer behaviour
  - Recycling of RB’s
  - Market and site losses of RB’s

Further, the literature study will cover macroeconomic factors outside the physical domain of the RB’s. These factors will cover the underlying drivers of a RB strategy, namely customer psychology and regulation requirements, including the following:

- International best practice standards
- South African recycling culture
- Legislative frameworks

Thirdly, the externality effects of the use of RB’s will be briefly discussed. These externalities are effects that are not directly associated with the use of RB’s, and will include the following:

- Pollution
- Alcohol abuse
- Job creation

Lastly, a study will be conducted regarding alternative packaging materials that could be utilized in RB’s. The benefits will be compared with the possible detrimental effects it might have on the quality of the final product.

Understanding the strategic/process flow of the RB lifecycle and the external factors imposing limitations to the optimal handling of the RB’s will lay the foundation for the qualitative study. The critical areas of concern identified from the literature study will be discussed with experts within the South African mass beer and cider RB market. Gaps identified during the literature study will be encapsulated in the empirical interview questions. Suggestions on possible improvements in the industry will be based on the gap analysis through a theoretically supported literature study and insights gained from the various selected participants.
2.2 Returnable strategies

Due to globalization with little product differentiation, producers are required to achieve exceptional operational efficiency to maintain their Competitive Advantage (CA). A means of achieving this is through a hybrid strategy (dos Santos, 2017) of utilizing both NRB’s and RB’s with reverse logistics for different segments of the market. A key consideration in the hybrid strategy is to reduce input costs. To achieve this, producers focus on reducing costs associated with packaging.

Mass-market beer and cider products are consumed throughout South Africa. Producers have to evaluate the benefits of RB and NRB to deliver the most cost-effective solution, specifically looking at CAPEX investments for the RB’s and the OPEX spent on transporting their products. Figure 2-1 indicates a generic classification for packaging strategies in the RPM domain.

**Figure 2-1 : Bottling strategy decision classification**

![Bottling strategy decision classification](image)

*Source : Adapted from Dos Santos (2017)*
In the alcoholic beverage industry, the demand for mass-market beer and cider products are seen to be extremely high, as defined in paragraph 1.1. The high demand can be contributed to the fact that returnable products offer more value to the end consumer, as price per millilitre is lower than NRB products (Motsoeneng et al., 2018). The high demand tends to increase the favourability of RB’s over NRB, and as a result requires producers to have extensive reverse logistics system in place for producers to ensure collection of their assets.

Due to the South African been and cider market being continuously dominated by three major players, comprehensive logistical infrastructure already exists for product transportation (Arthur, 2016). Some producers own, operate and maintain their own distribution networks whereas other producers make use of contracted LSP’s for handling distribution on their behalf.

Through proper planning and utilization of the current logistical infrastructure, producers generally implement a Closed Loop Supply Chain (CLSC) strategy (Kumar & Kumar, 2013). CLSC makes use of the same logistical infrastructure to recuperate initial value added by allowing empty containers to be transported back to the producer’s site (Louca & Kokkinaki, 2012).

To ensure the producers keep input costs minimal, it is important that LSP’s footprint and logistical capability justifies CLSC implementation. According to an article by Deloitte Consulting, producers need to optimize forward logistics first as it will directly reduce the impact of implementing reverse logistic processes (Deloitte, 2014:9).

In CLSC systems structure follows strategy, resulting in the formation of departments, processes and technology to assist in meeting objectives (Spacey, 2016). These additional facilities are set up to reduce financial and operational impact of collecting returnable products from the market (Deen, 2017). Despite the additional resources deployed, reverse logistics still remains the most cost-effective solution (FlashGlobal, 2017).

In the alcoholic beverage industry, strategies are deployed based on the producer’s internal capability and business model selection. These are reliant on the demographic footprint of producers coupled with their logistical capabilities in serving the market. Three generic strategic approaches (dos Santos, 2017) to returnable products exist as indicated in Figure 2-2.
In the South African beer and cider mass-market, only the deposit strategy is used by all major players in the returnable industry. This is due to the reduction in risk by charging a return deposit on the RB’s, ensuring higher percentage returns within a reduced time.

Other strategies such as switch pool strategy and customer reliant strategy are inclined towards serving different industries. In switch pool strategy systems, each client has their own allotment of containers which are exchanged upon new deliveries. Customer reliant strategies places the requirement of the customer to ensure that empty containers are returned. Transfer strategy relates to the same containers being reused. Book system strategy is where the flow of containers and capturing of container related data are handled by a third party. However, due to the scope of this study these methods are not applicable.

The deposit system strategy will be explained in the sections below (Fleckenstein & Pihlstroem, 2015).
2.2.1 Deposit system strategy

The deposit system is a reverse logistics, depot-based strategy incentivized by the producer and handled by the LSP’s. In the deposit system, the producer charges Tier 1 customers a deposit on the RB’s purchased. These RB’s are provided in the producer’s crates which also carry a deposit, and with the RB’s constitute RPM. Each level of customer is charged a deposit on each RB purchased ensuing the predecessor is decoupled from the risk of lost or damaged RPM.

Upon return of these RPM’s, the consumer receives a discount towards their next purchase equal to the deposit amount. These deposits are typically valued at an amount which is still profitable for the producers and feasible for the consumers’ price sensitivity. The same discount applies for each reverse step in the CLSC as the RPM’s makes their way to the producer through additional purchases.

The success of this strategy lies in the fact that the property of the producers is returned due to the inherent value they carry. Outside the mass beer and cider business, the RB’s and RC’s carry little value to the consumer. The different tiered customers and consumers are motivated to maintain the current condition of the RPM’s as the refundable deposit relies on the state of return.

In the reverse logistical process, the deposits are handled by Tier 1, Tier 2 and Tier 3 customers. This is due to the increased footprint these customers have, making it economically viable for consumers to return RPM’s. In turn, the RPM’s are kept on the customers’ site until the pool size ensures economically viable returns to a higher tier customer.

Upon delivery of new stock from the producer’s distribution functions to customers, the RPM is collected and returned to the producers’ facility. The producers then credit the accounts of the customers ensuring that the entire value chain is reimbursed for their deposits regarding the RPM’s. The returned RPM is inspected and compared against internal quality requirements before re-use in the process.

In order to define the returnable strategy further, the elements in the RB lifecycle will be further discussed in paragraph 2.3. This section will describe the process the RB follows from cradle to cradle and the factors related to the purchase, transportation, handling and consumption of the South African mass beer and cider market.
2.3 The returnable bottle life cycle overview

An overview of the flow of RB’s within the South African market is presented in Figure 2-3. The figure highlights the most important elements in the RB value chain as well as the most crucial points of exchange. As indicated in the Figure, the RB’s has several exchanges of hands, however, it remains an asset of the producer throughout its lifecycle. These exchanges will be assessed according to micro-, external- and macroeconomic effects.

Figure 2-3 : Overview of the returnable bottle lifecycle

Source : Author
During the RB lifecycle, the key exchange areas are of concern. Each key area has a direct impact on the lifecycle of the RB’s due to the effect it can have on timeous returns. The overview is segmented into three strategical environments with similar focus as with a SWOT, Porter and PESTEL analysis. Each of these areas as indicated in Figure 2-3 will be discussed in more detail in the sections that follow:

2.3.1 Micro-environment

The microenvironment, as per Figure 2-3, indicates internal resources which the producers have considerable control. This relates directly to managing capabilities and operational efficiency within the production plant. Micro-environment from the producers’ perspective includes the production facility and distribution. In some instances, distribution is managed by third-party LSP contractors.

2.3.1.1 Producers

As stated in paragraph 1.1, the RB beverage market is dominated by three producers, namely SAB InBev, Heineken South Africa Pty. Ltd. and Distell Group Ltd. Beer and cider are made by the fermentation process of hops and apples, respectively. To achieve this, the producers have production facilities throughout South Africa, with SAB InBev having the largest footprint. Figure 2-4 indicates the producers’ representation in the various South African provinces as per location information by Maps (Google Maps, 2018)

Figure 2-4: Geographic locations of producers

Source: Author
Producers tend to market needs through a diverse range of products, which is achieved by the production of mass-market and premium beer and cider. The diversification of products ensures that producers maintain a competitive advantage by tapping into the various market segments. Heineken South Africa Pty. Ltd. and Distell Group Ltd. predominantly focusses on premium market products, where SAB InBev focuses more on mass-market beer and cider.

The table below indicates the RB product range supplied the three major players in the industry (Makro, 2018).

Table 2-1: Returnable products by producers

<table>
<thead>
<tr>
<th>Producer</th>
<th>Brand</th>
<th>Bottle size</th>
<th>Bottle colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distell Group Ltd.</td>
<td>Hunters Dry</td>
<td>660 ml</td>
<td>Green</td>
</tr>
<tr>
<td>Distell Group Ltd.</td>
<td>Hunters Gold</td>
<td>660 ml</td>
<td>Flint</td>
</tr>
<tr>
<td>Distell Group Ltd.</td>
<td>Hunters Export</td>
<td>660 ml</td>
<td>Flint</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Windhoek Draught</td>
<td>660 ml</td>
<td>Green</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Windhoek Lager</td>
<td>660 ml</td>
<td>Green</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Soweto Gold</td>
<td>750 ml</td>
<td>Amber</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Amstel Lager</td>
<td>660 ml</td>
<td>Green</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Strongbow Dry</td>
<td>660 ml</td>
<td>Flint</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Strongbow Original</td>
<td>660 ml</td>
<td>Flint</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Strongbow Red Berries</td>
<td>660 ml</td>
<td>Flint</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Tafel Lager</td>
<td>750 ml</td>
<td>Amber</td>
</tr>
<tr>
<td>Heineken South Africa Pty. Ltd.</td>
<td>Miller Draft</td>
<td>660 ml</td>
<td>Flint</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Reds</td>
<td>660 ml</td>
<td>Flint</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Black Label</td>
<td>330 ml</td>
<td>Amber</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Hansa Pilsner Quart</td>
<td>750 ml</td>
<td>Amber</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Black Label</td>
<td>750 ml</td>
<td>Amber</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Black Label</td>
<td>1 L</td>
<td>Amber</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Castle Lager</td>
<td>750 ml</td>
<td>Amber</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Castle Lite</td>
<td>660 ml</td>
<td>Green</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Castle Milk Stout Pint</td>
<td>330 ml</td>
<td>Amber</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Castle Milk Stout Quart</td>
<td>750 ml</td>
<td>Amber</td>
</tr>
<tr>
<td>SAB InBev Ltd.</td>
<td>Hansa Pilsner Pint</td>
<td>330 ml</td>
<td>Amber</td>
</tr>
</tbody>
</table>
The RB’s shipped from the supplier is used as containers for transportation medium of beverage products from the producers. These RB’s are stored in covered or uncovered areas on the production plant until required for filling.

Bottles are then filled based on current and calculated market demand. The inventory is stored within vendor-specific crates which protect the bottles from breakage or scuffing. A specific DOS level is retained on the producers’ premises in order to create a buffer for the unpredictability of RB returns and market demand and handed over to the LSP for distribution.

2.3.1.2 Site losses

Site losses relate to the proportion of RB’s at the production locations (including LSP’s) which is broken, discarded or lost. Site losses are not always captured correctly or accounted for and will not become available again and distorts accurate forecasting.

In order to capture accurate site loss figures, producers need to measure as far as possible. However, the lack of information both internally and with the appointed LSP’s results in misrepresented statistics.

When site losses occur, employees are required to file incident reports for each site loss incident, however, it is not the case. This is due to the possible disciplinary procedure which could follow as a result of the employee’s mistake. Site losses due to process machinery malfunction is better captured due to the blame not necessarily being placed on the employee and the recording being done automatically.

Site losses lead to additional CAPEX deployment required to buffer possible site losses by acquiring an estimate of RB’s which will be damaged during their handling on site. Significant site losses are returned to the supplier as cutlets for re-processing.

2.3.1.3 Logistics service provider

LSP’s ensure that the finished beverages are transported to the various customer segments. In addition, LSP’s are used to collect and return RB’s to the production plant upon new stock delivery. Both the forward and reverse logistics processes are handled by the LSP’s through directive of the producer.

Depending on the producer, this function is either contracted out or run internally at a cost-plus structure. In general, the costing model of LSP’s are dependent on the number of crates of finished product being moved. Costs are calculated according to specific
routes taken. Regardless if NRB or RB products are transported, these crates take up a set amount of space on the trucks, allowing LSP’s to plan accordingly.

The benefits of using LSP’s include amongst other scalability and flexibility (Wickstrom, 2015). Due to the contracting nature of their services, LSP’s can be remunerated for the number of products moved. This negates the need for producers to invest in capital-intensive logistical infrastructure. In addition, these LSP’s result in reduced operational cost due to their substantial resource network and ongoing optimization.

However, the use of third-party LSP’s has a major disadvantage, namely loss of control over shipments (Scolari, 2018). With customer satisfaction as a primary driver for success, LSP’s play a vital role in ensuring deliveries are completed on time. Any issues regarding deliveries negatively impact the producer’s image even though LSP were responsible for the delays.

In the forward logistics segment, delivery date agreements exist between producers and various customers. RB’s are shipped in crates of 12 bottles, which are standard across all South African beer and cider mass-market producers. Producers in the industry who utilizes third-party logistics have a set weekday for delivery, whereas producers with their own logistics service can deliver on a more frequent basis.

The reverse logistics segment ensures that RB’s returned to any of the customers are transported back to the producer for further cleaning and re-use. Reverse logistics requires significantly more infrastructure in comparison with standard one-way products (Forslund & Stolt, 2012). As stated, the return of these RB’s generally only happens on each new delivery of finished products. Thus, transportation capacity utilization needs to be accurately estimated (Venkatesh et al., 2015:4).

The effect of vertical integration has reduced turnaround time for RB’s where producers distribute their own products. Quality control measures for both forward and reverse logistics can also be better controlled due to the homogeneity of the producer and supplier’s processes.

Thus, for producers utilizing third-party logistics company, a higher level of DOS is required to mitigate the effect of less granular RB collection due to contracting constraints. This can also be overcome by maintaining high levels of unfilled RB’s but adds to cost as additional storage space is required.
2.3.2 External environment

The external environment, as per Figure 2-3, indicates external sources of threats and opportunities to the producers which the producers do not directly control. It is important to understand which external forces are applicable, and how they interact with each other (Thompson et al., 2017:68). External environment from the producers’ perspective includes suppliers, customers and recycling agencies.

2.3.2.1 Returnable bottle supplier

In South Africa, the glass production market is dominated by two players, Nampak Ltd. and Consol. They provide the majority of the RB’s used by the various producers. The locations of the suppliers are presented in Figure 2-5 (Google Maps, 2018).

**Figure 2-5 : Geographic locations of suppliers**

Source: Author

The process of glass production is divided into three steps, namely batching, melting and forming (Consol Glass, 2018). The production of the RB’s rely on timeous inputs from suppliers in order to meet producers' demands.

Batching includes the delivery of sand, soda ash and limestone to be delivered as per glass recipe. Melting is the process of heating the batch to around 1 500 °C from where it is delivered to moulds for the specific bottle type. Forming is the process of moulding the opening of the container according to specifications.
The specific design and colour of the bottles are chosen based on the producers marketing requirements. Bottle designs and colours are used as marketing tools and distinguish them from their competitors.

Beer and cider bottles are supplied in three distinct colours. Besides having Ultra-Violet (UV) filtering properties, each of these colours represents the CVE component, thus distinctive to the market it is attracting (Barnett et al., 2016).

Initially, beer and cider bottles were initially produced in clear glass or flint. The issue around this is that the beer taste landscape changes due to the UV rays damaging the alpha acids found in hops (O.berk, 2016). Amber was chosen as an alternative, providing effective UV protection for the content. Green glass was introduced during World War II (WW II) when demand for Amber glass bottles exceeded the supply (O.berk, 2016). This led to the association of class with the green beer bottles during WW II, as it was mainly supplied by top-class brewers from European countries.

Within the South African sector, a combination of all three colours can be found. This places a risk on the producers as limited production capacity is available from suppliers for the different colours due to colour campaigning for periods of time.

### 2.3.2.2 Customer segment

The customer segment includes Tier 1, Tier 2, Tier 3 customers ultimately providing beverages to consumers. Reports indicate that the RB’s dominates the glass supply market and that 80% of beer sold in South Africa is in returnable glass bottles (Nampak Ltd., 2016). With high unemployment rates and a low average income, RB products appeal to South Africans due to its affordability. Figure 2-6 indicates the terminology applied to product segments sold to customers. Dotted lines indicate outliers which are treated as an exception to the rule.

**Figure 2-6 : Market description**

![Market description diagram]

*Source : Author*

Beer sold can be from producers to Tier 1, Tier 2 and Tier 3 customers, higher to lower Tiers or from tiers to consumers. In addition to formal retailers, an estimated 190 000 to
265 000 unlicensed shebeens or taverns are selling beers and ciders for on- or off-consumption (Charman et al., 2013). This is further supported by research indicating that lower-income South African residents are spending higher percentages of their total income on alcoholic beverages (South African Market Insights, 2016).

It is expected that the bottles returned from the various customers should reflect the batch numbers of bottles originally allocated to them. However, this is not always the case due to the de-localization of stock from Tier 1 and Tier 2 customers. Convenience drives the end level consumer’s return habits and can include returning bottles to a different merchant from where it was purchased.

Figure 2-7 indicates the population density of South Africa (Anderson & Bishara, 2013). The population density directly correlates with mass-market beer and cider sales. This is further attributed to the fact that the majority of the South African population is between the ages of 20-39 (Wazimap, 2016). For RB related reverse logistics to be most efficient, it is important for the producer to take note of high-density areas.

**Figure 2-7 : Population density of South Africa**

![Population density of South Africa](image.png)

*Source: Wazimap (2016)*

The market ultimately determines circulation time of RB’s as the shrinkage and losses of RB’s mainly happens in the customer segment. They attribute to the operational issues due to returns to the initial point of purchase, and thus adds to distorted information flow of RB return patterns. RB’s are returned unsorted in returnable crates, which further adds
to operational issues due to sorting requirements arising in the producer’s facility and increased OPEX.

2.3.2.3 Market losses

Market losses can be defined as the proportion of RB’s shipped into the market which is never returned. This requires a write off on the balance sheet under plant, property and equipment as well as reducing the current liabilities in terms of customer deposits (SABMiller plc, 2016:116). In 2016, SABMiller plc had a total returnable container write off of USD 111 million, which includes RB’s, RC’s and RP’s (SABMiller plc, 2016:130).

Write-offs of RB’s require a time lapse to allow the market sufficient time to return these items. To remain reactive, the variability of circulation times pushes producers into estimating return patterns. RB’s are selectively recorded upon receipt at the producer’s facility. Due to the vast amount of RB’s returned and time constraints, not all RB’s can be recorded. The reordered RB’s are seen to represent a specific batch of the bottles and they are marked as returned.

The granularity of the recordings leads to distorted information flow as discussed in the primary objectives in paragraph 1.4.1. By not recording each RB returned to the producer, estimation has to be made. These estimations have the possibility of drastically affecting the producers’ RB statistics and ultimately supply.

The over- or underestimation leads to higher RB pool sizes required or requires placing emergency orders with suppliers. Generally, market losses are captured over a 12-month running period. Figure 2-8 below indicates a typical one 12-month RB period captured by one of the players in the industry.

**Figure 2-8 : Typical RB circulation time graph**

*Source : Confidential*
2.3.2.4 Glass collection and recycling

The disposal of broken glass cullets are used in the recycling process, where similar coloured glass is melted and remoulded onto finished RB’s (Glass Packaging Institute, 2018). The recycling step generally bypasses the producers’ operation as glass collectors sell cutlets directly to the suppliers. However, some glass collectors capitalize on returning undamaged RB’s to the supplier (The Glass Recycling Company, 2016:16) and receiving the refundable deposit in return.

Recycling has a tremendous impact on the economy as 50 000 income opportunities were created (The Glass Recycling Company, 2016:2), either directly or indirectly within the glass recycling industry. Included in this figure is the current uprising of bottle merchants, who focusses primarily on returning sorted, undamaged RB’s to the correct producers. Similar to market returns through Tiered customers, bottle merchants returns are passed through the bottling washer plant before it re-enters the production stream.

However, with a market size held constant, the increase in revenues by glass recycling companies indicate a decline in RB’s returned to the producer. This has negative impacts on the EBIT as the decreased RB lifetime increases CoGS. Each addition in the recycling and return value chain is indirectly placed on the producer’s account as the initial capital has already been laid out with an expected amortization period.

2.3.3 Macro-environment

The macro environment, as per Figure 2-3, indicates factors which have an effect on the industry, even though it is found well beyond the bounds of the producers (Thompson et al., 2017:68). It is important to understand which macro forces and trends are applicable, and how they can possibly affect the RB requirements. The macro environment to RB lifecycle includes laws, standards and general economic climate.

2.3.3.1 Legislative compliance affecting the liquor industry

- Liquor Act 59 of 2003

The act regulates the production and distribution of liquor. All producers and Tier customers have to comply fully with the act in order to sell alcohol within South Africa. A key impact which the liquor act has on RB’s is that distribution of alcohol is only allowed to take place between 09:00 and 18:00 (LC Ltd., 2013). As stated earlier, RB’s are only collected on delivery of new products, thus limits collection windows of RB’s.
• Liquor Laws Amendment Bill

In early 2017, a new liquor bill has been circulated to political parties to receive inputs (BusinessTech, 2017). The new liquor amendment bill will include set windows for advertising, new legal drinking age changes to where liquor is allowed to be sold. If the new bill is passed, it will have a negative effect on beer and cider sales thus reducing the amount of RB’s required.

• Consumer Protection Act

Under section 66 of the Consumer Protection Act (CPA) states that retailers are obliged to pay back the RB deposit in terms of credit towards another purchase (Knowler, 2012). The deposit should be paid back, even if they have not been purchased at the retailer where the bottle is returned.

The deposit system strategy coupled with the CPA places strain on the reverse logistic procedures, as the deposit has to be paid back regardless of the location. This leads to increased difficulty in planning reverse logistics routes as collection quantities may vary from delivery quantities.

• Carbon Emissions Tax

A new draft carbon emissions tax indicating additional tax per at R 120 per tonne (South African National Treasury, 2017:27-30). The bill is separated according to specific industries, with glass production per tonne factorised by 0.2 and liquefied petroleum gas by 0.43. Both of these will have a significant impact on the cost of suppliers manufacturing costs and overall logistics costs associated with RB’s and the reverse logistics process.

2.3.3.2 Liquor sales and economic growth correlation

In 2010, SAB InBev Ltd. alone contributed 3.1% of the country’s GDP (BusinessReport, 2010). This excludes the contribution by Distell Ltd. and Heineken SA Ltd. The growing beer and cider market contribute significantly towards economic growth in South Africa, opening many needed job opportunities.

With beer, it has been found that sales are directly correlated with both income and unemployment rate (Reed, 2018). However, this is only an initial effect, as constant rising incomes lead to a reduction in beer sales (Swinnen & Colen, 2016). With more South African families entering the middle-income level, the beer and cider market will see growth and South Africa will reap the economic benefits.
2.3.3.3 Standards affecting the liquor industry

- ISO 9001

International Organization for Standardization (ISO) 9001 relates to the quality system management. Quality management includes all stakeholders from production to consumption (Vrellas & Tsiotras, 2015:1), and allows increased customer satisfaction through operational efficiency.

For the RB industry, this means producers commit to supplying customers with high-quality products. This has a direct impact on the amortisation period and EBI inspection sensitivity, thus can only negatively impact the lifecycle of RB’s. RB’s amortizes over a predetermined period of time, decided by each of the individual producers.

- ISO 14001

ISO 14001 relates to implementing efficient Environmental Management Systems (EMS). The management system quantifies methods on analysing and reducing the impact on the environment (International Organization for Standardization, 2018). Implementing an efficient EMS requires additional capital outlay and increases prices of RB’s as suppliers have to recuperate these costs.

- ISO 22000

ISO 22000 relates to food safety management by evaluating three key elements (Anjoran, 2015):

  - Personal hygiene
  - Facility hygiene
  - Premise hygiene

Assessing these three elements is generally done through conducting a Hazard Analysis and Critical Control Points (HACCP) analysis (Soman & Raman, 2016). Through the analysis, hygiene of the RB’s returned from the market can be identified as a critical point. Further, by full adoption of this standard employees and contractors working at breweries are encouraged to complete incident reports, increasing transparency of RB information.

2.4 Returnable bottle externalities

An externality is defined as the consequence unrelated third parties carry as a result of economic activity (Investopedia, 2018). Although profitable if implemented correctly, the
RB value chain has effects on communities not directly linked to the process. These effects typically include pollution, job creation and added alcohol abuse.

2.4.1 Pollution

Studies have indicated that for every 10% of recycled glass an energy usage of 2% to 3% is recorded at suppliers (Express Recycling and Sanitation, 2013). In a statement by Eskom SOC Ltd (Waste Recycling, 2018), they indicate that each recycled glass bottle saves enough energy to power a 100-watt lamp for up to four hours.

Thus, if glass is reused, a further reduction in energy costs and will be evident. The reduction in energy cost can be converted to energy usage which contains CO₂ emissions per generated kilowatt per hour (kW/h). Currently, it is estimated that for each one tonne RB’s reused 610kg CO₂ is saved (Vivier, 2018).

However, each reused RB requires cleaning and sterilization (Vivier, 2018). The nett environmental effect should be weighed by including net water usage for cleaning of RB’s and amount of CO₂ saved from being released to the atmosphere by new RB production (The Glass Recycling Company, 2016:26).

2.4.2 Job creation

The use of RB’s in the industry requires substantially more steps in the value chain. Besides the +R13bn addition to tax revenues from total liquor sales (van Walbeek & Blecher, 2013:117), the steps in the RB value chain attribute to job creation in South Africa as each of these are generally serviced manually.

The rise of bottle merchants is also a considerable factor on the positive externalities of the RB industry. These bottle merchants collect RB’s from shebeens and taverns and transports them back to the producers for compensation.

2.4.3 Alcohol abuse

The advantage of RB’s in the mass beer and cider market is that it is made affordable by the reduction in packaging expenditure. However, this leads to higher rates of consumption due to the reduction in alcohol price (Institute of Alcohol Studies, 2017). Research has indicated that beer and cider sales have a relatively minor price elasticity of roughly -0.5 in developing countries, indicating that sales will increase somewhat when price decreases (Euromonitor International, 2014).
In 2010, the South African government had expenditures totalling close to R16bn which was directly attributed to the misuse of alcohol (van Walbeek & Blecher, 2013:12). The costs were R6.8bn, R5.8bn and R3.4bn for the Department of Health, Department for Safety and Security and Department of Correctional Services, respectively. The expenditure is covered through tax revenues collected from the South African public, making it personal to the South African public (City Press, 2015).

The misuse of alcohol has led to 6% of global deaths, the majority being related to driving under the influence. South Africa has been ranked as one of the worst affected by drunk driving incidents in the world (Mokolobate, 2017). According to Collins (2016), around 139 million disability-adjusted life years have been lost worldwide due to alcohol abuse.

2.5 Alternative bottling methods

Alternative bottling methods have been successfully implemented in worldwide including neighbouring countries such as Zimbabwe by using polyethene terephthalate (PET) bottles. Amongst other factors, the success is attributed to the fact that recent research has indicated that the premium image relies more on the colour of the packaging than on the material of the bottle (Drew, 2016).

The use of alternatives can drastically lower bottling costs and the savings can be passed on to the consumer. Further benefits of using PET bottles at large events specifically is the decreased risk of injuries due to glass shards or the use of the bottles as a means of a weapon (Kilroy, 2014).

However, beer packaged through alternative methods are seen to have a shorter shelf-life than others. The reason being is that glass is superior at keeping oxygen out in comparison with PET (Polymer Solutions News Team, 2016). The oxygen ingress leads to beer and cider turning stale faster than in glass (Li et al., 2015:4).

In addition, the properties of the amber and green bottles are such that it keeps UV rays out as discussed in paragraph 2.3.2.1. PET bottles must be coated with an additional protective layer to increase UV protection (PETPower, 2018). The additional coating changes the requirements of the recycling process of the PET.

Although PET bottling has been successful in many countries (Euromonitor International, 2015), the current South African bottling and recycling procedures from producers and suppliers have been implemented to accommodate glass. With no change in legislation regarding recycling, these processes will be kept as is.
2.6 Conclusion

In the current chapter the factors associated with the RB strategy, process and socio-economic factors have been discussed. RB’s remain the most cost-effective manner of packaging beer and ciders and appeals to the mass-market by ultimately lowering the price paid for beverages. However, several factors weigh in on the feasibility and efficiency in the use of RB’s.

The deposit system strategy is considered very effective in the South African market. The reason being is that returns are incentivised, and producers do not have to rely on the customer's environmental consciousness driving RB returns. The deposit system further ensures that value of the return is used against the next purchase of beer or cider products, ensuring business continuity.

Consideration has been given towards the various process settings in which the RB market operates. It is clear that producers’ control over the RB’s diminishes the further they are from the producers’ internal processes, as per Figure 2-9. Producers are heavy reliant on RB pool replenishment from suppliers, and due to the colour production schemes sufficient supply is often difficult to maintain.

Figure 2-9: Control over RB’s

Source: Author
Regarding logistics, the control is passed on to LSP’s who handles the distribution and collection. Although contractually obligated, LSP’s does not always report back on-site losses that occurred by means of their wrongdoing. In addition, producers remain reliant on consumers handling their assets with care and returning them within the shortest possible timeframes. The return process is incentivised through the deployment of a deposit obligation return strategy, ensuring that the consumers are reimbursed for the returned RB.

From the literature study, it can be concluded that producers should focus on internal and external factors affecting the RB industry, while still adhering to legislation and best practise standards within the macro environment. Suppliers and producers are extremely demographically localized (except for SAB InBev’s substantial footprint) and places an additional bourdon on the magnitude of reverse logistics required due to physical separation. However, the demographic locations of the suppliers and producers correlate with population density, thus indicating that the majority of their customer base has relatively low cost to serve.

The RB lifecycle cannot be seen as an independent phenomenon, and consideration should be given to externalities, as internal and external efficiencies are directly impacted by its consequences in a “catch 22” manner. Various externalities are attributed to the RB lifecycle with both positive and negative side effects. Thus, a fine balance should be maintained to increasing RB lifecycle, maximising profits and maintaining sound Corporate Social Responsibilities (CSR).

2.7 Chapter summary

The following key elements were discussed during this chapter:

- Overview of existing literature
- Returnable strategies deployed in South Africa
- Micro RB environment relating to the internal factors controlled by the producer
- External RB environment to the external factors controlled by the industry
- Macro RB environment to the external factors outside of the control of the producer and the industry
- RB externalities
- Bottling methods other than glass
CHAPTER 3 – RESULTS AND DISCUSSIONS

3.1 Introduction

The results and discussion section will focus on the information gathered from the key stakeholders in the RB lifecycle value chain. Furthermore, it will aim at critically discussing the primary objectives and their influence on the core research question as listed in paragraph 1.3.

Various interviews have been conducted with industry experts and role players as per research design parameters listed in Table 1-1. The individuals that partook in the study where interviewed through open-ended questions in order to converge to centralised topics of concern within the RB industry. The anonymity of the respondents and their input into the research investigations will be achieved through the use of pseudonyms such as Supplier 1, Supplier 2, etc.

Questions were constructed with a specific focus on the various segments the interviewees are operating in. As per Figure 2-3, these areas include the first three major role players in the RB lifecycle, namely the supplier, producer and Tier 1 customers. The sample selection was based on the fact that these three parties have the largest level of involvement in controlling the RB lifecycles.

Questions were based on gaining an understanding regarding the life cycle process flow of RB’s. More importantly, the process flow questions aim to achieve a general understanding of the key areas of concern within RB manufacturing, production and logistics sectors. Through successful identification of industries and elements reducing the lifecycle of RB’s, successive intervention can be done through any role player seeking to increase the lifecycle of the RB’s. Typically, this would be of most concern to producers due to increased profits through increasing RONA on RB’s.

The results will be discussed in for each of the segments identified during the study. Furthermore, the results will be summarized in paragraph 3.3.4 and evaluated against the primary objectives of the study. The summary will provide an overview of the levels of influence each of these constructs has on the RB lifecycle, including its externalities.
3.2 Demographic information of the study population

Participants of the study were included as per research design outlined in paragraph 1.5.4.2. The participants were selected based on their role within the organizations RB process.

In addition to the qualitative interviews, site investigations were conducted at one of each of the supplier’s, producer’s and customer’s facilities in order to obtain a holistic view of their current operations. Site investigations were done at the supplier’s plant, producer’s Distribution Centre (DC), producer’s production facility and the Tier 1 customers stores.

A summary of the participants and their positions within the respective companies is provided in Table 3-1 below.

Table 3-1: Summary of qualitative participants

<table>
<thead>
<tr>
<th>Company</th>
<th>Area of operation</th>
<th>Expertise</th>
<th>Interview Count</th>
<th>Participant Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consol Glass</td>
<td>Supplier</td>
<td>Glass manufacturing</td>
<td>3</td>
<td>• Category Manager&lt;br&gt;• Value Enhancement Engineer&lt;br&gt;• Key Account Manager</td>
</tr>
<tr>
<td>Nampak Ltd.</td>
<td></td>
<td>Packaging solutions</td>
<td>1</td>
<td>• Key Account Manager</td>
</tr>
<tr>
<td>Heineken</td>
<td>Producer</td>
<td>Beer and cider production</td>
<td>2</td>
<td>• Continuous Improvement Manager&lt;br&gt;• RPM Manager</td>
</tr>
<tr>
<td>SAB InBev</td>
<td>Producer</td>
<td>Beer and cider production, distribution</td>
<td>2</td>
<td>• DC Manager&lt;br&gt;• Logistics Manager</td>
</tr>
<tr>
<td>Distell Group Ltd.</td>
<td></td>
<td>Cider production</td>
<td>1</td>
<td>• Supply Chain Manager</td>
</tr>
<tr>
<td>Jumbo Crown Mines</td>
<td>Customer</td>
<td>Tier 1 customer</td>
<td>1</td>
<td>• Liquor Manager</td>
</tr>
<tr>
<td>Drinks Galore Liquor</td>
<td></td>
<td>Tier 1 customer</td>
<td>1</td>
<td>• Liquor Manager</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>10</strong></td>
<td></td>
</tr>
</tbody>
</table>
3.3 Study findings

The study findings will be presented in the sections listed below. The findings will be discussed in light of the primary objectives listed in paragraph 1.4.1 with specific reference towards the three main operational areas.

3.3.1 Supplier segment findings

This section discusses the operational findings of RB’s at the supplier segments. Suppliers relate to the glass bottle manufacturers and supplies producers with empty RB’s. However somewhat limited, the suppliers have the initial influence in the lifecycle process of an RB. This influence can relate to the ability to timeously supply the market with RB’s and the overall quality of the finalised product.

The internal process of manufacturing RB’s will be presented below. In conjunction with the description below, it should be noted that manufacturing lines do not necessarily run RB products only and can be manufactured in parallel with other NRB products of similar colour. This is dependent on the manufacturer’s plant and equipment at the manufacturing facility and the number of lines running from each furnace.

3.3.1.1 Internal manufacturing process

With regards to RB’s, producers compile an annual forecast for replenishing their foreseen RB requirement, based on the collection from trade and the potential increase in market demand. The forecasts form the basis of suppliers to plan production campaigns specifically focussed on the selected colour requirements. Once a colour campaign is selected, manufacturing is commenced based on the required volume.

The manufacturing of glass consists of silica, sand and soda ash. In addition, cullets of the same colour scheme are recycled and added to the manufacturing process. The cullets are generally acquired through suppliers tendering for broken glass from producer’s facilities, termed industrial glass. Additionally, post-consumer glass cullets are received from third party collection centres. The cullets are then cleaned, divided and stored in staithes containing similar cullet colour.

The raw materials, including clean cullets, are then melted in a furnace at predefined ratios. Typically, the furnaces are run on oil and gas in an attempt to mitigate the risk of rising electricity costs. Emergency supplies of oil and gas located on the manufacturing facilities site ensure that the furnaces run continuously.
An actuated measuring device then measures the correct amount of molten glass which is then dropped down a chute to moulds. The moulds are shaped according to the design requirements from the client. The moulded glass is then automatically removed from the moulds and placed on a conveyor belt feeding to the remainder of the process.

The conveyor passes the glass through an annealing process to allow it to slowly cool to ensure that no bursts or cracks occur. Once cooled, the moulded glass passes through bottle several test and inspection stations ensuring that each bottle is of desired quality.

Post-testing and inspection, the glass is then transported under dust protection shields from where it is automatically wrapped and palletized. The palletized RB’s are then moved to storage facilities both on and off site. The storage facilities act as a buffer for varying producers demands. In addition, the storage facilities location selection is such that they are demographically located close to the producer’s production plants. Figure 3-1 below provides an overview of the suppliers’ internal processes in the manufacturing of RB’s.

**Figure 3-1 : Suppliers internal RB manufacturing process**

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*Source : Author*
3.3.1.2 General supplier issues

The success of the RB process is subject to several upstream and downstream factors affecting sufficient supply. Within the supplier segment, the following general issues have been identified which places a bourdon on timeously delivering the market's RB needs.

- Producers forecasting is done annually, based on the allowed CAPEX budget allocated for RB's. However, more granular forecasting is required as the manufacturing of RB's is considered a long lead process.
- Producer's forecasting is not always accurate due to a disconnect between head office goals and plant production capabilities. Marketing campaigns initialized see to increased sales, regardless of the availability of both RB’s and production capabilities.
- The changeover of colour campaigns can take roughly eight days to complete. This is attributed to the fact that the manufacturing of glass should be a concurrent process.
- Producer's forecasting is not always accurate due to reliance from on RB calculation based on returns from trade. This is somewhat out of the supplier and producers’ control and deposit obligations are put in place to reduce the risk
- RB’s have higher storage costs in relation to NRB’s due to the higher amount required to be stored. This is due to NRB’s planning being much easier as it does not rely on the RTI from trade.
- Producers marketing campaigns result in demand shifting demand from one RB product to another. This is due to the market finding more value in substitute sizes and changing their purchasing habits.
- RB trends are difficult to track from internal data only. Manufactures does not necessarily have knowledge on the producer’s campaigns and can therefore only participate reactively from the producer's forecast.
- Post-consumer glass for recycling has to pass a rigorous separation and cleaning process before reuse. Recycled glass cullets received back from the market contain impurities which can affect the quality of newly produced RB’s.
- RB’s are designed for much higher re-use rates that are currently achieved by producers. Although not specifically an issue from the manufacturer's side, better handling of the RB’s can result in much higher RONA.
• Post high demand seasons RB’s are typically returned later than usual and requires suppliers to provide additional capacity. If producers forecast inaccurately, the replenishment required should be available from the manufacturer’s depots.

• RB’s are checked against the batch numbers upon return. Some suppliers can produce around 400 000 bottles within a batch. The reduced information leads to downstream planning efficiency negatively impacted based on low-resolution assumptions on the exact bottles received back from trade.

3.3.2 Producer segment findings

This section discusses the operational findings of RB’s at the producer segments. Producers purchase empty RB’s from the suppliers, fills them with their product and sells them in the market. Producers are seen to play the most significant role in the RB lifecycle due to their role as the strategy owner. As indicated in paragraph 2.3.1.1, RB’s remain the property of producers, hence the requirement for effective control. Decisions on purchasing of RB’s, sales campaigns, logistics and deposit obligation values all reside within the producer’s internal processes.

3.3.2.1 Internal producer’s process

The main objective for producers is to ensure that sufficient RB’s are available for meeting market demands. The three main drivers of ensuring a sufficient amount of RB’s is the current stock on site, the market returns and the RB’s received back from trade. Secondary objectives include increasing the RONA of RB’s. This is achieved by maintaining the lowest possible circulation times by ensuring that the RB’s and their logistical processes are handled timeously and with care.

Ensuring that sufficient amount of RB’s are available for production occurs through analysing historical market data and providing forecasts annually. The analysis is based on a projected amount of RB’s received back from trade. However, the amount varies due to the limited control over end consumers and market fluctuations. Throughout the year, RB’s can be replenished on shorter-term orders granted the suppliers can manufacture within the required time.

The RB’s are received and stored on the producer’s facility. From the storage, it enters the production process where it is filled with product and moved to a short-term finished
goods storage located on site. As soon as the finished product exits the production process, circulation time is calculated.

From the short-term finished product storage, the goods can either be shipped to DC’s or directly to Tier 1 customers. DC’s typically fulfil the role of having Nominated Delivery Dates (NDD’s) where distribution can happen to all tiered customers. A similar 1:1 agreement exists where producers exchange the finished product for empty RB’s at the DC’s. Due to the transport of NRB’s, additional capacity is created for utilization of returning RB’s. In some instances, Tier 1 customers do a collection at the production facility through their internal LSP’s. Typically, these LSP’s - which are external to the producer - only has agreements for one-way delivery and do not take accountability in returning empty RB’s.

The finished product is then sold through each of the various distribution channels. The deposit obligation is paid to the producer at the same rate to which the customer charges subsequent levels. Upon return of the RB’s, the consumers and customers are reimbursed at the same rate at which they initially paid. The customer stores the empty RB’s onsite until the next scheduled delivery date or until a next order is placed manually and the exchange occurs, once again on the premise of a 1:1 ratio.

The empty RB’s are returned to the producer’s distribution centres though LSP’s or the producer’s internal logistics division. In addition to the exchange, a small percentage of RB’s are received back from the market through the utilization of bottle merchants. These bottle merchants collect RB’s within the rural areas and ensure transportation back to the producers for a monetary remuneration.

After RB’s are collected from the market, decentralised sorting occurs at the DC’s manually by dedicated sorting staff. Some producers utilized centralized sorting at the production facility, however, this results in a large amount of additional storage required which can alternatively be used for production. These producers are re-evaluating decentralizing the sorting process. Foreign bottles are placed within the competitor’s cases and stored until an exchange agreement is finalised between the various RB producers.

From the sorting process, RB’s are required to be cleaned before entering production. Only one producer makes use of offsite, third-party washing facilities. The other producers contain washing facilities on site and forms part of the continuous production process.
After washing, bottles are inspected by an EBI to ensure the integrity and quality of the bottles before being reused in the production process. The EBI discards any RB which is potentially broken or unwashable. The discarded RB’s are digitally recorded by the EBI and statistics are used to support the materials planning for future periods.

Figure 3-2 below provides an overview of the producers’ internal processes in the filling, transportation and sorting of RB’s.

**Figure 3-2 : producer internal RB processes**

![Producer Internal RB Processes Diagram](image)

*Source: Author*

### 3.3.2.2 General producer issues

Within the RB lifecycle, producers are seen to have the highest level of responsibility due to it remaining an asset on their balance sheet. Increasing the lifecycle of RB’s will have a significant impact the producers RONA and ultimately its net profit. Additionally, through effective management of RB’s producers can have positive effects on both identified externalities, namely job creation and environmental impact reduction. Some key issues faced by producers in increasing the lifecycle of the RB’s are listed below:
• Only one of the producers owns and operates their own logistical services. The introduction of LSP’s adds another point of exchange outside the direct control of the producer.

• Third party LSP occasionally hide site losses. This is due to their obligation to handle the RB’s with care and the possible risk to their service agreement with the producer. Site losses are thus not recorded and contribute to inaccurate forecasting.

• Internal processes affect circulation time KPI’s of RB’s. This is due to the circulation time being calculated from the moment the RB exists production. From production, a delay of between 2-6 weeks can be induced due to finished product travelling cross-country to reach the producers demographically spread depots.

• In some instances, LSP’s create an additional delay on getting the product out to the market. Although contractually obligated, internal issues arise prohibiting them to meet their targets. This is due to their fleet of trucks being utilized for transportation services outside of liquor delivery.

• Producers forecast accuracy is around 65-75%. This leads to additional CAPEX deployment requirements and supplier uncertainty.

• Due to the vast amount of bottles returned to the producer, samples of returned bottles are taken manually for batch inspection. Assumptions are made that all bottles on the selected pallet are of the same batch originally sent to the customer. This results in an accuracy of 1/924 bottles checked for the standard 12-bottle crates.

• Deposit prices range between 33%-50% of the replacement value of the RB’s.

• Roughly 3% percentage of site losses occur through the EBI.

• 7%-11% of market losses occur. This has a significant financial impact due to high levels of CAPEX spent on purchasing additional RB’s annually.

• Exchange programmes are skewed between producers due to the imbalanced market share. This results in high levels of RB’s being held between rival producers. Additionally, agreements of reimbursing producers for the deposit obligation paid towards the bottle are non-existent, placing an additional bourdon on the successful exchange between suppliers.

• High levels of rivalry exist between producers. This results in tremendous delays and difficulties with exchange programs.
Deposit obligations differ between producers. Thus, higher values RB’s are reimbursed at a lower rate by different producers. Additionally, customers are not always aware of the correct deposit obligation required to be charged to consumers.

RB’s stored in uncovered areas at either the DC’s or production facilities are subject to mould. The RB’s has the potential to collect rainwater and are left unattended for prolonged periods of time, increasing cleaning time with the possibility of having the RB’s discarded.

Seasonality of the producer’s product results in higher level of empty RB’s required which can be used in production. Seasonality can reach up to 160% of the producer’s regular season demand.

Varying in market share results in RB circulation time calculation errors. Without steady market conditions, RTI and circulation time becomes increasingly difficult to track.

The RB market is currently declining. Potentially, this could be due to the high levels of urbanization in South Africa and the increase in living standards for ordinary South Africans. This can potentially result in higher levels of RB’s existence as to the amount which is required for production.

### 3.3.3 Customer segment findings

This section discusses the operational findings of RB’s at the Tier 1 customer segments. Tier 1 customers are the initial contact point between the producer’s internal operations (inclusive of LSP) and the market. In general, Tier 1 customers supply Tier 2 and Tier 3 customers. In addition, they can supply the consumer directly, however, the cost benefit of purchasing from Tier 1 customers are generally outweighed by the convenience of Tier 3 purchases due to the number of products purchased.

#### 3.3.3.1 Internal returnable bottle process

Tier 1 customers purchase large amounts of finished product from the producers. Deposit obligation is paid to the producers which are used as collateral against the CAPEX investment the producers incurred. The deposit obligation is passed on to the customer’s account at the same value charged by the producers and is generally charged inclusive of both RB’s and RC’s.
The products are then transported to the various Tier 3 on-consumption sites where the end consumer is once again charged the deposit obligation to provide collateral. In some instances, higher values of deposit obligation is charged at these on-consumption sites in order to ensure higher rates of return on the RB’s. In contrast to account credit offered by the producers and Tier 1 customers, the on-site consumer is reimbursed the deposit obligation with cash.

The Tier 3 customer returns the empty RB’s to Tier 1 customers. In general, customers follow a specific trend on returning RB’s which typically occurs on Mondays. This is attributed to return batch consolidation efforts and the higher rate of sale achieved in preparation for weekends. These RB’s are returned in the RC’s accompanying the sale during the original purchase. The stock is then manually re-palletized and stored on the Tier 1 customers site until a next RB collection takes place.

Typically, RB’s are collected after Tier 1 customers creates a new purchase order and new stock is delivered. An ideal agreement between producers and Tier 1 customers exist that a 1:1 ratio is maintained where the amount of RB’s returned equals the number of new RB products purchased.

However, the 1:1 agreement is not always practical due to market losses incurred at each of Tier 1 -, Tier 2 -, Tier 3 customers and the end consumer. In some instances, damaged or foreign bottles are returned as RB’s which is ultimately reimbursed by the producer, resulting in financial losses. These RB’s are sometimes deliberately hidden between other bottles to receive higher deposit obligation payback. Tier 1 customers generally check if crates are filled to their maximum capacity and with the correct RB’s as they increase their risk of jeopardising their relationship with producers. However, not each crate can be individually checked, and crates returned might only be partially or incorrectly filled.

In the customer's segment, sorting is not conducted at the Tier 1 customers site. However, a culture of sorting at the source is implemented by some Tier 1 customers. This is ensured by continuous checking and education of Tier 3 customs in terms of sorting according to producer’s specific brands upon return. At the Tier 1 customers implementing this technique, around 80% success rate is achieved.

Figure 3-3 below displays a summary of the process within the Tier 1 customer segment.
3.3.3.2 General customer issues

The success of the RB process is subject to several upstream and downstream factors affecting efficient returns. Within the customer segment, the following general issues have been identified which decreases customers’ ability to handle the RB process optimally.

- Collection of RB’s are generally only executed on new stock delivery, leading to higher levels of RB stock on the Tier 1 customers site.
- Additional barriers introduced in collection of RB’s when LSP’s are used. LSP’s are not always contracted to do RB collection upon delivery.
- Some Tier 3 customers return more than purchased. This can be attributed to a Tier 3 customer purchasing from different locations and forces the Tier 1 customer to possibly purchase more stock than required due to the 1:1 agreement.
Specific products have much lower return rates in comparison to others. This is attributed to the fact that some of the Tier 3 consumers are unaware that the product is in fact an RB and the deposit obligation have been paid upon purchase.

Higher income customers are seen to have a worse returning culture in relation to tavern owners. This results in higher income customers stockpiling RB’s at their site and not returning as frequently.

In some instances, empty trucks have to be sent by producers in order to recuperate their RB assets if the 1:1 agreement fails. This can be due to stockpiling or customers returning at different locations in relation to where the RB’s were purchased.

Some producers have less frequent collection and delivery dates. This results in higher levels of empty RB stock kept on the Tier 1 customers site. In addition, this results in the producers RB pool size to be significantly larger to float the offset introduced by less frequent collection.

Missing, Broken, Foreign and Unwashable (MBFU) bottles are accepted and reimbursed to the customer resulting in financial losses incurred by the producer.

Producers do not have policies in place to collect RB’s when the product expired. The process would require an additional step to discard the product within the RB’s to prevent brand damage within the market.

Producers can potentially hold stock back due to annual price increases being on the horizon, resulting in additional levels of RB stockpiling at the Tier 1 customers site.

At certain store chains, credit received by the consumer for the deposit obligation is used to purchase items other than liquor.

### 3.3.4 Finding summary

The finding summary will aim to provide a weighting of importance to each of the supplier-, producer- and customer segments interviewed during the study. The weightings will be plotted against the primary objectives listed in paragraph 1.4.1. Additional areas of concern are added to the summary where participants indicated its impact on the lifecycle of the RB’s.

In determining operational areas requiring the largest amount of focus, the top three areas identified in Table 3-2 will be identified per segment. These areas are depicted in red based on the highest collective score of each of the objective’s constructs.
Table 3-2: Summary of primary and secondary objective findings

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### Primary Objectives

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### Additional Identified Areas of Concern

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3.3.4.1 Supplier segment summary

The issues faced in the supplier segment are mainly related to communication between producers and suppliers of RB’s. The three most predominant issues faced in the supplier segment are the following:

- Limited forecasting
- Responsiveness
- Variation of packs

Due to forecasting only done annually, manufacturing campaigns are planned out by suppliers well in advance. As with any industry, the manufacturing plans seek to make optimal use of plant assets. Any deviation in planning can have a tremendous effect on the producer’s ability to acquire the additional amount of RB’s required. Changeovers of colour campaigns on the supplier’s side can take upwards of eight days to complete and affects their responsiveness to market demand.

The variation in packs can relate to either the mould of the RB or more significantly the colour of the RB’s manufactured. As mentioned above, colour campaign changeovers can take anything from eight days upward. Manufacturing of RB’s can be only be done through a single colour scheme per furnace. Some modern furnaces have three output lines able of producing three different designs through individual moulds.

3.3.4.2 Producer segment summary

Main issues within the producer segment of RB’s include three mutually exclusive constructs. These include the lack of information flow regarding the granular identification of RB’s received back from trade. Furthermore, the lack of transportation utilization plays a significant effect on company revenues when the 1:1 agreement fails. Lastly, the sorting of RB’s has a significant impact on the process due to time delays introduced and a large amount of additional labour required.

- Lack of information flow
- Transportation capacity utilization
- Sorting of RB’s

The lack of information flow can be attributed to the fact that only one bottle per pallet is checked. As mentioned in paragraph 3.3.2, this result in a resolution of 1/924 of RB’s collected from trade. Assumptions are made that the entire pallet contains the empty RB’s
sold with the original batch. Circulation time and annual CAPEX calculations are reliant on the accuracy of the information of the RB’s returned.

The optimization of transportation capacity utilization will lead to fewer logistics cost incurred by producers. However, the collection of the RB’s is dependent on how frequently the market returns their RB’s as well as the percentage market losses incurred by producers.

One of the key challenges in reducing circulation time is related to the sorting of the RB’s. Currently, all RB’s are sorted manually, predominantly at decentralised locations. Manual labour has the disadvantage of not performing well to problems of scale and is capped to a certain amount of pallets per man hour. Additionally, some producers have seen difficulties in striking staff with prolonged wage negotiation periods, having a further negative impact on circulation times.

3.3.4.3 Customer segment summary

Within the customer segment, the three most significant factors influencing the process of the RB lifecycle includes the following

- Returnable strategy
- Transportation capacity utilization
- Consumer behaviour

The issues around transportation capacity utilization are attributed to some LSP’s are not contracted to do pick-ups of empties. Ultimately, these results in cash flow issues due to the customers not being able to claim the deposit obligation’s value captured in the empties in their possession. Additionally, the infrequent pick up of empty RB’s results in higher levels of empty stock needing to be stored on the customer’s premises.

Consumer behaviour impacts customers due to the risk they undertake if RB’s received back from the market is MBFU. In case of large discrepancies, the customers might be short credited by producers on their next purchase. However not yet fully implemented across the board, producers are starting to investigate the quality and amounts of their bottles received back from the market. Investigation entails ensuring that the crates are filled to capacity and within the correct producer’s crates.

The abovementioned relates strongly to the returnable strategy. This is due to the deposit obligation ensuring that most of the RB’s are received back from trade and that the
amount reimbursed is spent at the same store again. Tavern owners, especially, have high rates of return due to the value of the empty RB can have on their profits.

3.4 Conclusion

In the preceding chapter, findings relating to the RB lifecycle were discussed. The findings were extracted through qualitative interviews with RB stakeholders and industry experts. The aim of the open-ended questions was leading the participants to provide clarity on the process and the influence the primary objectives of the study has on RB lifecycle.

The key findings for the supplier segment is related to limited forecasting. Due to the required lead time for production, sporadic requests from producers have to be pooled with the next campaign of similar colour. The most predominant findings in the producer segment include the lack of information flow. This is attributed to low-resolution information when assessing which bottles are received from trade due to no unique bottle identification. Lastly, the most prevalent factor in the customer segment is the returnable strategy. This relates to the deposit obligation paid by Tier 2 and Tier 3 customers as well as the collection methods imposed by producers. The deposit strategy allows recurring customers due to store credit being provided, rather than actual monetary reimbursement.

A summary of the findings was presented in Table 3-2. The summary includes a weighting assigned to the level of influence each of the specific objective elements has on the lifecycle of the RB. From the summary, the three most influential factors have been chosen and discussed further. These areas are the focus points for addressing the core research question as per paragraph 1.3. Through a KAIZEN like approach, addressing these identified areas will contribute to increasing RONA on the use of RB’s.

The following chapter will discuss recommendations on improving the largest areas of concern to ultimately increase the lifecycle of the RB through optimization physical and business processes.

3.5 Chapter summary

The following key elements were discussed during this chapter:

- Study findings of the supplier segment
- Study findings of the producer segment
- Study findings of the customer segment
- Summarized findings evaluated against the primary research objectives
CHAPTER 4 – CONCLUSIONS AND RECOMMENDATIONS

4.1 Introduction

The following chapter will focus on discussing industry recommendations and highlighting areas of future research. The industry recommendations will seek to bridge the gaps experienced between supplier-, producer- and customer segments. The future research section will highlight areas where research can be continued to further investigate methods to ultimately increase the lifecycle of RB’s within the South African beer and cider industry.

Furthermore, the study will be concluded by evaluating the achievement of the objectives as in paragraph 1.3 and core research question as in paragraph 1.4.

Lastly, a summary of the research will be provided. This section will include a brief overview of each of the chapters and the elements they contain. These will be discussed in light of the problem statement as described in earlier in paragraph 1.2.

4.2 Industry recommendations

The study findings discussed in paragraph 3.3.4 highlights the current processes followed by the various segments. Furthermore, it discusses the areas currently negatively impacting the lifecycle of RB’s. The industry recommendations presented below are suggestions to increase operational efficiency with regards to RB’s which can be implemented in the short and medium term.

4.2.1 Improved communication

Improved communication’s impacts are mainly felt by the supplier segment. Due to them planning their campaigns around producer’s forecasts it is of utmost importance that these should be as accurate as possible. Both parties are required to increase transparency regarding their communication to ensure sufficient supply of RB’s throughout the year. This could include regular contact sessions or possibly allowing Systems, Applications and Products (SAP) view nodes for suppliers. This will allow suppliers to plan their colour campaigns more accurately, ultimately fulfilling the demands of the producers and the market based on the information received from the Enterprise Resource Planner (ERP) system.
4.2.2 Ensuring regular pick-ups

Ensuring more frequent pick-ups will benefit both the producer and customer segments. Due to returns not always matching the customer’s levels of purchase, an imbalance of RB returns can increase. High levels of empty RB’s are being stored on customer’s premises, placing a bourdon on operations. More frequent pick-ups can include sweeping trucks collecting empties at depots or customers with known RB stock level issues. Producers can benefit by decreasing circulation times thus increasing potential RONA. In addition, exchange agreements between producers should be formalised to an extent where all RB’s return to their original producers within the least amount of time without affecting the deposit obligation paid by their rivals.

4.2.3 Automated sorting

Currently, sorting is being done manually at each of the depots or producers’ sites. This places heavy reliance on manual labour efficiency and can lead to increased circulation times. Automated bottle sorting is recommended. Automated sorting will increase the production plants throughput and minimize site losses incurred from sorting activities. A cost-benefit analysis is to be conducted to quantify the potential gains and the effect that it would have on the employed labour force.

4.2.4 Unique bottle identification

Currently, bottles only contain batch identification as indicated in paragraph 3.3.1.2. Due to the vast amount of RB’s manufactured within a batch, low levels of granular information exist. By uniquely identifying each RB used in production, producers can increase current levels of forecasting efficiency pinpoint problem customers. The unique identification will greatly assist producers and suppliers in increasing forecasting accuracy and drastically increase the producers’ control over their assets.

4.3 Achievement of the objectives of the study

Objectives of the study can be categorized into three separate sections, namely the core research question, primary objectives and supporting secondary objectives. If achieved and addressed, primary and supporting secondary objectives will ultimately answer the core research question as stated in paragraph 1.3.

Through specifically orientating the literature study and qualitative interview questions, all the above-mentioned areas were discussed within the report. Study findings have been
presented to highlighting the areas or concern in the RB lifecycle. Furthermore, industry recommendations have been provided to potentially decrease the misalignment between the various segments in the South African mass-market beer and cider industry.

4.4 Recommendations for future research

This mini-dissertation focussed on RB’s within the South African beer and cider industry. Further expansion of the qualitative sample population to end consumers as well as including other elements of RPM is recommended for future research.

The expansion of the qualitative sample population should aim to include end consumers, specifically tavern customers. These end level consumers are responsible for over 80% of RB sales within South Africa and is a significant stakeholder in the RB value chain. Tavern owners are known to implement more stringent rules around RB’s in order to ensure that high levels of return are achieved.

Furthermore, the inclusion of other RPM will further increase the understanding of the RB trade. The inclusion of items such as RP’s and RC’s as a means of transporting RB products will provide a deeper understanding of the entire returnable process.

4.5 Conclusion

South Africa has seen strong growth in the beer and cider industry over the preceding years. The South African market, dominated by SAB InBev, Distell Ltd and Heineken N.V, utilizes RB as a method to maintain the lowest possible production costs. Throughout its lifecycle, RB’s remain the property of the producers. The use of RB’s ensures that producers receive higher levels of RONA in comparison to NRB’s.

Although the RB market is seeing slower growth in relation to NRB’s it still makes up the vast majority of beer and cider sales. The use of these RB’s requires extensive reverse logistics infrastructure to ensure that producers receive their assets back from trade.

This study was aimed at investigating factors influencing the lifecycle of RB’s within the South African beer and cider market. Four critical issues exist, namely the supply of RB’s, high circulation times, high inventory requirements and high levels of site and market losses. These issues were converged into a core research question, namely:

- What changes can be made both internally and externally to maximise RONA of RB’s?
The core research question was analyzed and diverged into several primary and supporting secondary research objectives, partially supported by a RB study conducted in India. The research objectives identified areas in need of investigation to ultimately answer the core research question. A research methodology was constructed around the specific requirements of the study. The research methodology was based on qualitative data collection methods due to the nature of the study.

A literature survey was conducted to provide a basis of understanding of elements within the RB trade. The literature survey was based on an investigation of the internal-, external- and macro environments of producers. To understand the basis of operation, an investigation on the RB strategy deployed by producers was conducted. Furthermore, consideration was given to understand the process of RB supply, production, logistics and customers to identify key areas affecting its lifecycle. Research around the macroeconomic effects affecting the RB trade was added to form a holistic view of elements which has an influence of the primary objectives.

Qualitative interviews were conducted with various industry experts. These interview participants were selected to represent each of the major stakeholder segments within the RB trade, namely the suppliers, producers and Tier 1 customers. The study findings were presented with a specific focus on the issues experienced relating to the primary objectives of the study. The issues were coded based on the perceived level of impact at each key segment to identify the core problems affecting the lifecycle of RB’s in South Africa. The key areas of concern can be summarized as follows:

- **Suppliers**
  - Limited forecasting
  - Responsiveness
  - Variation of packs
- **Producer**
  - Lack of information flow
  - Transportation capacity utilization
  - Sorting of RB’s
- **Tier 1 customers**
  - Returnable strategy
  - Transportation capacity utilization
  - Consumer behaviour
Lastly, the study was concluded by presenting recommendations to both the various segments in the industry as well as recommendations for future academic research. These recommendations were based on areas identified through both the literature survey and qualitative interviews with industry experts.

In conclusion, the study was successfully conducted in terms of addressing the core research question through the investigation and unpacking of the primary objectives. The limited availability of literature was overcome through a series of informative qualitative interviews with experts operating in the field. In summary, the use of RB’s remains the most economically viable and environmentally friendly solution to beer and cider sales within South Africa, regardless of the challenges faced.

4.6 Research summary

Paragraphs were developed around addressing the core research question through gaining an understanding of the effects of the primary objectives on the lifecycle of RB’s within the South African beer and cider mass-market. The research summary is presented below.

- Chapter 1 – Introduction and an overview of the problem statement. The problem statement was translated to a core research question coupled with research objectives required to gain an understanding of factors influencing the RB trade. Additionally, the section provided a research methodology approach.

- Chapter 2 – Literature study on the internal, macro and external environment of RB’s. Internal refers to producers’ control, external refers to organizations supplying and using the RB’s and macro indicating the factors falls outside of the control of any of the stakeholders.

- Chapter 3 – Provided findings based on the qualitative data obtained from interviewing participants. The data was analyzed and critical issues within the industry have been derived in light of the primary research objectives.

- Chapter 4 – Provided an overview and conclusion of the study conducted. Additionally, the section provided industry recommendations and recommendations for further areas requiring academic research. These areas mainly included expanding research into the RPM supporting RB’s, such as RC’s and RP’s.
ANNEXURE A – BIBLIOGRAPHY


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# ANNEXURE B – QUESTIONNAIRE

**MBA Study: Lifecycle Study on Returnable Glass Bottles in The South African Beer and Cider Industry**

## Section A: General

1. Which department/function do you belong to?

2. Which department/function do you belong to?
   
   - National
   - Gauteng
   - Limpopo
   - Mpumalanga
   - North-West
   - Free State
   - Northern Cape
   - Eastern Cape
   - Western Cape
   - Kwazulu-Natal

3. In your opinion what are the main challenges of returnable bottles within the area that you manage?

4. What have you put in place to address these challenges within the area that you manage?

## Section B: Supplier Specific Questions

5. Do you deal with bottle merchants? If yes, what are the benefits? How are they remunerated?

6. Do you understand how the implications of international standards, legislation and economic growth impact the RB trade?

7. Will you recommend a collection centers to return the bottles to, other than the current method employed?
8. How quickly can you change color campaign on large scale orders?

9. Is RB inherent seasonal? Which seasons sees the highest demand for RB’s?

## Section C: Producer Specific Questions

5. Which percentage of bottles received are sorted?

6. Do you deal with bottle merchants? If yes, what are the benefits?

7. Where are RB’s sorted?

8. Do you understand how the implications of international standards, legislation and economic growth impact the RB trade?

9. How would a reduced circulation time benefit your company?

10. How are the bottles returned to the production site?

11. Would you say that the current method of the bottles being returned is effective?

12. What more can be done to speed up the circulation time?

13. Will you recommend a collection centers to return the bottles to, other than the current method employed?

14. At which premises do you believe bottle sorting should be conducted?

15. How are losses managed at site? Are all losses recorded?

16. How is the sorting process managed?

17. What is done with competitors’ bottles if an unsorted, mixed crate is returned?

18. What percentage of market losses do you have?
19. Is RB product sales inherent seasonal? Which seasons sees the highest demand for RB’s?

20. What percentage of site losses do you have?

**Section D: Customer Specific Questions**

5. Which percentage of bottles received are sorted?

6. Do you deal with bottle merchants? If yes, what are the benefits?

7. Do you understand how the implications of international standards, legislation and economic growth impact the RB trade?

8. How are the bottles returned to the producers’ site?

9. Would you say that the current method of the bottles being returned is effective?

10. At which of the following premises, do you believe, the bottle sorting should be conducted? (tick the applicable box)

11. Is there a specific customer segment which has a “poor” returnable culture?

12. Are there any issues with quality of RB’s received from producer?

13. Is RB product demand inherent seasonal? Which seasons sees the highest demand for RB’s?

14. Do you experience difficulty in collection of RB’s from producers?
Dear Interviewee

This Informed Consent Statement serves to confirm the following information as it relates to the MBA mini-dissertation on the "Lifecycle of Returnable Glass Bottles in the South African Beer and Cider Industry".

1. The sole purpose of this study is to obtain information from experts (such as yourself) employed and/or operating in the energy industry in an attempt to determine the nature of your everyday experience related to the research topic.
2. The procedure to be followed is a qualitative research design, which includes open-ended questions where you will have the opportunity to communicate your views on the relevant topic during a face-to-face in-depth interview. Basic background information related will be asked e.g. your name, academic qualifications and related experience to the topic.
3. The duration of the interview will take no longer than a maximum of 1 hour.
4. If at any point during the interview you should feel uncomfortable, you will be provided with the opportunity to make your discomfort known or immediately have the option to end your participation.
5. This interview takes place on a voluntary basis.
6. The confidentiality of the interview data is guaranteed. Fictitious names will be utilised when quoting statements in the dissertation.
7. Any confidential information that prohibits the researcher to publish it in the final dissertation should be communicated during the interview.
8. A list of questions to be asked in the interview will be made available to the interviewee prior to the interview. This is done to ensure a mutual understanding of what will be asked to avoid confusion during the interview.
9. A summarised copy of the final dissertation will be made available to the interviewee upon completion.
10. The data gathered from the interview will only be used for research purposes.

I, ____________________________ (name and surname), hereby declare that I have read and understand the contents of the Informed Consent Statement and give my full consent to Mr. A. Kellerman to progress with the interview and use the information communicated by myself to him in his MBA dissertation.

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<tr>
<th>Interviewee</th>
<th>Company</th>
<th>Designation</th>
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