



The Impact of Packaging Arrangements on Consumer Satisfaction, Supply Chain Cost and Profitability” the Case of Heineken Breweries S.C. Ethiopia “

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A Thesis Submitted to the Department of Logistics & Supply Chain Management in Partial Fulfillment of the Requirements for the Degree of Master of Arts (MA)

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SUPPLY CHAIN MANAGEMENT**

November, 2024

Declaration

I Zegeye Bahiru hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted at any university for a degree.

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Abstract

This thesis investigates the impact of a 100% returnable packaging system on consumer satisfaction, consumption behavior, supply chain costs, and profitability in Ethiopian breweries, specifically focusing on Heineken Breweries S.C. The qualitative analysis uses sales personnel data as a proxy to gauge consumer satisfaction, revealing that a fully returnable packaging system reduces home consumption due to convenience limitations and lack of pricing incentives. Multivariate analysis based on data from 28 countries shows that home consumers are significantly affected by the 100% returnable arrangement, while the impact on out-of-home consumption remains statistically insignificant. Regression analysis further demonstrates that as the share of returnable packaging decreases (replaced by one-way packaging), consumption levels rise. Predictive modeling suggests that shifting to a mixed packaging model—60% returnable and 40% one-way—could increase per capita beer consumption from 12-13 liters to approximately 22.1 liters. Financial analysis based on quantitative results and Heineken's supply chain data indicates that while the 100% returnable packaging arrangement benefits overall cost savings through package reusability, it negatively impacts operational efficiency and revenue potential. The findings suggest that transitioning to a mixed packaging arrangement could improve customer satisfaction, boost home consumption, and increase profitability for Heineken Breweries S.C.

Key Words: 100% returnable packaging, consumer satisfaction, home consumption, supply chain efficiency, profitability

CERTIFICATION

This is to certify that Zegeye Bahiru has carried out his research work on the topic entitled, *“The Impact of Packaging Arrangements on Consumer Satisfaction, Supply Chain Cost Performance, and Profitability” the Case of Heineken Breweries S.C. Ethiopia* , the work is original in nature and is suitable for submission for the award of master degree in logistics & supply chain management

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Acronyms

- **ANOVA** - Analysis of Variance
- **GDP** - Gross Domestic Product
- **SPSS** - Statistical Package for the Social Sciences
- **RPM** - Returnable Packaging Material
- **HL** - Hectoliter
- **$\Delta\Pi$ mln** - Change in Profit in Million Birr ($\Delta\Pi$: Delta Pi)
- **CAGR** - Compound Annual Growth Rate
- **FMCG** - Fast-Moving Consumer Goods
- **ROI** - Return on Investment
- **OPEX** - Operational Expenditure
- **CAPEX** - Capital Expenditure
- **CI** - Confidence Interval
- **R&D** - Research and Development
- **ROI** - Return on Investment

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Chapter One: Introduction

1.1 Background of the Study

Packaging plays a pivotal role in the beverage industry, extending beyond its basic function of product containment and protection. It influences various aspects of production, logistics, supply chain efficiency, and consumer behavior (Drescher et al., 2014; Wong & Yeh, 2019). In an increasingly competitive market, breweries must carefully balance their packaging choices to meet operational demands while satisfying consumer preferences. Packaging decisions not only affect the perception of a brand but also impact profitability, production efficiency, and environmental sustainability (Steenis et al., 2017).

In many markets, including Ethiopia, breweries have traditionally relied on returnable packaging systems, such as glass bottles and crates. These systems are praised for their sustainability benefits, as they reduce packaging waste and allow for repeated use, lowering long-term raw material and energy costs (Oliveira & Santos, 2018). Returnable packaging can also foster brand loyalty, as consumers return bottles to be refilled, reinforcing a continuous relationship with the brand (Silva et al., 2016). Despite these advantages, managing returnable packaging presents operational challenges. Collecting, cleaning, and redistributing bottles involve complex logistics, which can increase costs and create inefficiencies in the supply chain (Molina-Besch et al., 2018).

Heineken Breweries S.C., one of Ethiopia's largest breweries, operates under a 100% returnable packaging system. While this arrangement aligns with global sustainability goals, it imposes several burdens on the brewery's operations and the overall beer market. Managing a returnable packaging system requires substantial investment in logistics, transportation, and sanitation, leading to increased operational costs (García-Arca et al., 2017). Additionally, the system's rigid nature may negatively impact consumer satisfaction, particularly among home beer consumers, who value convenience and flexibility in packaging (Verghese et al., 2015). This is especially critical in a market like Ethiopia, where beer consumption is still relatively low compared to global standards.

Ethiopia's beer market presents a unique set of challenges. The country's per capita beer consumption remains low, which limits the growth potential of breweries (Alemu & Adnew, 2020). This situation is exacerbated by the operational inefficiencies of the 100% returnable packaging system. Heineken Breweries, like other Ethiopian breweries, operates at only 60% of its production capacity, which prevents the company from fully utilizing its resources and achieving economies of scale. These inefficiencies result in higher unit production costs, reduced profitability, and lower market competitiveness (Gebrehiwot, 2022).

As global beverage markets evolve, there has been a noticeable shift toward one-way packaging systems, such as aluminum cans and disposable bottles. These systems offer greater convenience for consumers, reduce logistical complexities, and eliminate the need for returns and sanitation (Mollenkopf et al., 2021). One-way packaging systems have been shown to enhance home consumption by providing a more convenient and user-friendly experience, particularly in markets with low per capita beer consumption, such as Ethiopia (Nguyen et al., 2020).

Given these challenges, this study seeks to evaluate the impact of Heineken Breweries' current 100% returnable packaging arrangement on consumer satisfaction, operational efficiency, and profitability. It will analyze the system's effect on different consumer segments—home and out-of-home beer consumers—and explore the potential benefits of transitioning to a mixed packaging system that combines both returnable and one-way packaging. By comparing the two approaches, the study aims to identify an optimal packaging arrangement that balances sustainability with cost efficiency, customer satisfaction, and market growth.

This research is essential not only for Heineken Breweries but for the entire Ethiopian brewing industry. The findings will provide insights into how packaging decisions influence consumer behavior, supply chain performance, and financial outcomes. They will also offer actionable recommendations for enhancing operational efficiency and profitability in a competitive and evolving market.

1.2 Statement of the Problem

In Ethiopia, Heineken Breweries S.C., like other breweries, operates under a 100% returnable packaging system. Although this system is traditionally valued for its environmental benefits—such as waste reduction and material reuse—it poses challenges that affect operational efficiency, consumer satisfaction, and profitability. Specifically, the logistics involved in bottle collection, cleaning, and redistribution increase transportation, sanitation, and storage costs. These inefficiencies are compounded by the fact that the Ethiopian beer market has relatively low per capita consumption, and Heineken Breweries operates at approximately 60% of its production capacity, limiting its ability to achieve economies of scale.

The reliance on a rigid returnable packaging system raises concerns about its suitability for a market that is increasingly shaped by changing consumer preferences. Home consumers, a critical market segment, often prioritize convenience and ease of use. However, the current packaging arrangement may deter consumption among this group, as it fails to accommodate preferences for accessible and user-friendly packaging. This potential mismatch between packaging and consumer demand could further reduce consumption levels, thereby limiting market growth and profitability.

A knowledge gap exists in understanding the full impact of the 100% returnable packaging system on different consumer segments (home and out-of-home consumers), cost structure, and profitability within the Ethiopian context. Additionally, there is limited research on whether a mixed packaging strategy—combining returnable and one-way packaging—could enhance consumer satisfaction, operational efficiency, and market performance.

This study aims to evaluate the impact of Heineken's current returnable packaging arrangement on consumer satisfaction, operational efficiency, and profitability, using both empirical data and cross-country analysis. By examining Heineken's packaging system as a case study, the research will assess whether a mixed packaging model could better meet market demands and optimize performance. The results will provide insights

into how Heineken and similar breweries in Ethiopia can strategically align packaging choices with consumer preferences, cost management, and Profitability..

1.3 Research Objectives

1.3.1 General Objective

To assess the impact of Heineken Breweries S.C.'s 100% returnable packaging arrangement on consumer satisfaction, home consumption levels, supply chain costs, and profitability in Ethiopia, and to explore the potential benefits of transitioning to a mixed packaging arrangement.

1.3.2 Specific Objectives

To evaluate the effect of the solely returnable packaging arrangement on consumer satisfaction

To analyze the impact of the 100% returnable packaging system on home consumption levels

To assess the potential impact of transitioning from a solely returnable packaging arrangement to a mixed packaging system on beer consumption levels

To examine the effect of the 100% returnable packaging arrangement on unit production costs

To evaluate the impact of the solely returnable packaging system on the revenue and profitability of Heineken Breweries S.C.

1.4 Research Questions

The study design to answer the below research questions

- What is the impact of the solely returnable packaging arrangement on consumer satisfaction among Heineken Breweries' customers?
- How does the solely returnable packaging arrangement affect home consumption levels of beer in the Ethiopian market?
- What are the effects of transitioning from a solely returnable packaging arrangement to a mixed packaging system on beer consumption levels among different consumer segments?
- In what ways does the solely returnable packaging arrangement influence the unit production costs at Heineken Breweries S.C.?
- How does the solely returnable packaging arrangement impact the revenue and profitability of Heineken Breweries S.C.?

1.5 Research Hypotheses

The following hypotheses are derived from the study objectives and supported by relevant literature and theoretical frameworks:

- H1:** A solely returnable packaging arrangement by Heineken Breweries negatively impacts consumer satisfaction.
- H2:** A solely returnable packaging arrangement by Heineken Breweries significantly reduces home consumer beer consumption levels.
- H3:** Transitioning from a solely returnable packaging arrangement to a mixed arrangement (returnable and one-way packaging) significantly increases beer consumption levels.
- H4:** A solely returnable packaging arrangement by Heineken Breweries results in a lower net unit product cost due to reusability.

□ **H5:** A solely returnable packaging arrangement by Heineken Breweries negatively affects the brewery's revenue and profitability.

1.6 Significance of the Study

This study contributes to the ongoing discourse on packaging systems within the brewery industry, particularly in Ethiopia, where returnable packaging remains the dominant approach. The research offers actionable insights into how packaging decisions impact consumer satisfaction, operational efficiency, and profitability. The findings will be particularly beneficial for key stakeholders, including: Heineken Breweries S.C.: By evaluating the effects of the solely returnable packaging system, the brewery can make informed decisions regarding the potential transition to a mixed packaging model, which could enhance production efficiency and customer satisfaction. Other Breweries in Ethiopia: The insights gained from this research will provide a comparative analysis of packaging strategies, enabling other industry players to adopt best practices that align with consumer preferences and market dynamics. Consumers: Improved packaging arrangements may lead to enhanced customer experiences, particularly for home consumers who prioritize convenience, ultimately resulting in increased satisfaction and consumption levels and Academic Community: This study adds to the academic literature on sustainable supply chain management and consumer behavior in the beverage industry by providing empirical evidence on how different packaging arrangements influence operational outcomes and customer satisfaction. The research can serve as a foundation for future studies and contribute to the understanding of sustainable practices within the industry.

Overall, the study offers a roadmap for strategic growth in Ethiopia's beer market, helping stakeholders navigate the complexities of packaging decisions in an evolving landscape.

1.7 Scope and Limitations

1.7.1 Scope of the Study

This thesis focuses on evaluating the impact of returnable packaging arrangements on consumer satisfaction, supply chain cost performance, and brewery profitability, specifically using Heineken Breweries S.C. in Ethiopia as a case study. The study is framed within the following boundaries:

- **Conceptual Scope:** The research examines the interplay between packaging types—specifically, returnable versus mixed packaging—and their effects on consumer satisfaction, operational costs, and profitability.
- **Methodological Scope:** Both qualitative and quantitative methods are employed to assess the effectiveness of the existing returnable packaging arrangement. The analysis includes consumer satisfaction surveys, cost analysis, and profitability metrics. Additionally, cross-country regression analysis is utilized to understand broader trends and predictions related to beer consumption patterns influenced by different packaging mixes.
- **Geographic Scope:** The study is geographically confined to Heineken Breweries S.C. in Ethiopia, providing insights relevant to the local market dynamics and operational challenges faced by breweries in the country.
- **Time Scope:** The analysis considers recent data to ensure the findings are relevant to current market conditions and consumer behaviors.

1.7.2 Limitations

Despite the importance of this research, the following limitations need to be acknowledged:

1. **Availability of Full Cost Information:** The lack of comprehensive cost data restricted the ability to conduct a thorough analysis of all cost components associated with different packaging arrangements. Consequently, the thesis presents impacts in terms of variables rather than actual monetary values.

2. **Large Population Size:** The extensive population within the Ethiopian brewing sector posed challenges in obtaining direct consumer feedback. As a result, proxy sales personnel were utilized to estimate consumer satisfaction, which may not fully capture the diverse perspectives of actual consumers.
3. **Use of Cross-Country Information:** Given the absence of mixed packaging arrangements in Ethiopian breweries, cross-country data was employed to derive insights and support findings. This approach introduces variability, as the contexts and market dynamics of other countries may differ significantly from those in Ethiopia.
4. **Limited Implementation of Mixed Packaging Arrangements:** The lack of practical examples and implementation of mixed packaging strategies within Ethiopia further constrained the analysis. This gap necessitated reliance on theoretical frameworks and models from other contexts to draw conclusions.

Chapter Two: Literature Review

The existing literature on packaging arrangements within the brewing industry encompasses various theoretical frameworks and empirical studies that elucidate the intricate relationships among packaging types, consumer satisfaction, supply chain cost performance, and profitability. This review synthesizes significant theories and findings pertinent to the scope of this thesis.

2.1 Theoretical Review

2.1.1 Theory of Planned Behavior

The Theory of Planned Behavior (TPB), developed by Ajzen (1991), serves as a foundational framework for understanding consumer behavior regarding packaging. According to TPB, an individual's intention to engage in a behavior is influenced by three key components: attitudes toward the behavior, subjective norms, and perceived behavioral control. This theory can be particularly relevant in the context of consumer preferences for packaging, as it allows for an examination of how consumer attitudes towards returnable packaging may affect their satisfaction and consumption patterns. Empirical studies have shown that consumers who perceive returnable packaging as environmentally friendly are more likely to express positive attitudes towards it, thereby influencing their purchasing decisions (Tanner and Wölfing Kast, 2003). Understanding these behavioral intentions can help breweries like Heineken tailor their marketing strategies to enhance consumer satisfaction and consumption levels.

2.1.2 Cost-Benefit Analysis in Packaging Decisions

Cost-benefit analysis (CBA) is a critical tool in evaluating the financial viability of packaging arrangements. Bennett (1996) emphasizes that CBA enables organizations to assess the economic impact of different packaging options by comparing the costs incurred with the anticipated benefits. In the context of breweries, the implementation of 100% returnable packaging can lead to significant cost savings through reduced raw material usage and waste management costs, while also potentially enhancing revenue

through increased consumer loyalty and brand image. Studies have indicated that companies adopting returnable packaging can achieve not only cost reductions but also improve profitability by appealing to environmentally conscious consumers, thereby enhancing overall market competitiveness (Mentzer et al., 2001). This analysis is vital for Heineken Breweries Ethiopia to understand the financial implications of their packaging choices.

2.1.3 The Resource-Based View (RBV)

The Resource-Based View (RBV) provides insights into how firms can leverage unique resources and capabilities to gain a competitive advantage. According to this perspective, a firm's internal resources, including its packaging strategies, play a crucial role in determining its performance and profitability (Barney, 1991). In the context of Heineken Breweries Ethiopia, the adoption of returnable packaging can be viewed as a strategic resource that not only meets consumer demand for sustainability but also differentiates the brand in a competitive marketplace. Research has shown that organizations that effectively manage their resources, including packaging innovations, are more likely to achieve superior financial performance and customer satisfaction (Kotler and Keller, 2016). Thus, the RBV underscores the importance of strategically aligning packaging decisions with consumer preferences and market trends.

2.1.4 Consumer Satisfaction and Packaging

Consumer satisfaction is a critical determinant of repeat purchase behavior and brand loyalty. Research has demonstrated that packaging plays a significant role in shaping consumer perceptions and experiences (Silayoi and Speece, 2007). Returnable packaging, when designed to enhance user convenience and product safety, can positively impact consumer satisfaction. The study by Wong and Yeh (2019) found that packaging type significantly affects consumer purchase intentions, with consumers expressing higher satisfaction levels towards products with sustainable packaging solutions. For Heineken Breweries, understanding how packaging influences consumer satisfaction can inform

product development and marketing strategies, ultimately driving consumption levels both at home and out of home.

2.1.5 The Impact of Consumption Patterns

Understanding consumption patterns, particularly in the context of home and out-of-home consumption, is crucial for breweries aiming to optimize their packaging strategies. Research indicates that consumer preferences for packaging may differ based on the consumption context (Bennett, 1996). For instance, consumers may prefer convenient, single-use packaging for out-of-home consumption while valuing sustainability and quality in home consumption. This nuanced understanding allows Heineken to tailor their returnable packaging offerings to meet the specific needs of different consumer segments, thereby maximizing customer satisfaction and driving sales across various channels.

The theoretical frameworks discussed provide a comprehensive understanding of the interplay between packaging arrangements, consumer behavior, cost considerations, and competitive advantage. The integration of these theories into the research not only highlights the significance of returnable packaging in enhancing consumer satisfaction and profitability but also underscores the need for breweries to adapt their strategies in response to evolving consumer preferences. The insights derived from this theoretical review will serve as a foundation for the empirical analysis in subsequent chapters, guiding the examination of Heineken Breweries Ethiopia's current packaging practices and their impact on consumer behavior.

2.1.5 Proxy Data and Its Justification

In research, using proxy data is often necessary, especially when direct measurement proves impractical due to logistical constraints. The decision to utilize sales personnel as proxies for assessing consumer satisfaction arises from the challenge of capturing data from a large and diverse consumer base. MacKenzie et al. (2011) argue that proxy measures can provide valuable insights into general trends, especially in large-scale

studies where surveying every individual is not feasible. While direct consumer surveys would provide richer data, the costs and time associated with such an approach often render it impractical.

Furthermore, sales personnel are positioned at the forefront of consumer interactions and can offer valuable insights based on their direct experiences and observations. Their feedback can reflect broader consumer sentiments and preferences, making them effective proxies. The use of proxies is well-documented in marketing research; for example, a study by Schlegelmilch et al. (1995) supports the notion that expert judgment, as represented by sales personnel, can effectively inform consumer behavior analyses.

2.1.6 Cross-Country Analysis and Its Relevance

Cross-country analysis serves as a valuable tool for understanding the impact of demographic and economic factors on consumer behavior. The global nature of the beer market necessitates an understanding of diverse consumer preferences, influenced by cultural, social, and economic variables. Hofstede's cultural dimensions theory (Hofstede, 1980) highlights the significant impact of cultural differences on consumer preferences, underscoring the need for breweries to tailor their packaging strategies to local markets.

Moreover, regression analysis in a cross-country context allows for the identification of relationships and trends that inform local practices. Ang et al. (2008) emphasize that cross-country studies can reveal insights into how various demographic and economic factors shape consumer preferences, enabling breweries to make informed decisions about packaging arrangements. This approach is particularly relevant for Ethiopia, where traditional packaging methods may not align with consumer expectations. By using international trends, breweries can predict potential changes in consumer behavior resulting from alternative packaging arrangements.

2.2 Empirical Literature Review

The empirical literature provides insights into real-world applications of theoretical frameworks, highlighting the outcomes of different packaging arrangements, their effects on consumer behavior, and the implications for profitability. This section reviews key studies that have contributed to understanding these dynamics.

2.2.1 Packaging Arrangements and Consumer Behavior

A study by **Wong and Yeh (2019)** explored the effect of packaging types on consumer purchase intentions within the craft beer market. Their research utilized a mixed-methods approach, combining qualitative interviews with quantitative surveys, and revealed that consumers are significantly influenced by packaging aesthetics and functionality. The findings indicated that attractive packaging designs lead to higher purchase intentions, suggesting that breweries should invest in innovative packaging to enhance consumer appeal. This study aligns with the notion that packaging is not just a protective container but also a critical marketing tool that influences consumer perceptions and buying decisions.

Similarly, **Silayoi and Speece (2007)** conducted a conjoint analysis to assess the importance of packaging attributes in consumer decision-making. Their results highlighted that factors such as color, material, and label design are crucial in shaping consumer preferences. The study demonstrated that while functionality is essential, emotional responses to packaging design can significantly impact consumer satisfaction and brand loyalty. This reinforces the idea that breweries should consider both practical and aesthetic elements when designing their packaging to maximize consumer engagement.

2.2.2 The Relationship Between Packaging and Profitability

Bennett (1996) examined the role of packaging in the marketing of bottled products, emphasizing its impact on profitability. The research highlighted that effective packaging not only enhances the product's visual appeal but also provides essential information that

can facilitate consumer choices. By improving product visibility and differentiation, well-designed packaging can lead to increased sales and, consequently, higher profit margins. This finding underscores the importance of integrating marketing strategies with packaging design to achieve financial success in the competitive beverage market.

Furthermore, **Kotler and Keller (2016)** outlined that packaging serves as a strategic element in the overall marketing mix, influencing both consumer perception and business performance. They discussed how packaging innovation can lead to reduced costs and increased efficiency within supply chains, ultimately enhancing profitability. This perspective is particularly relevant for breweries, as optimizing packaging can lead to significant cost savings while maintaining consumer satisfaction and loyalty.

2.2.3 The Impact of Consumer Satisfaction on Business Outcomes

Research by **Mentzer et al. (2001)** established a link between consumer satisfaction and long-term business success. Their empirical analysis indicated that companies with higher customer satisfaction rates tend to achieve better financial performance. In the context of breweries, this implies that enhancing consumer satisfaction through effective packaging arrangements can lead to increased sales and improved profitability. The study emphasized the importance of aligning packaging strategies with consumer expectations to foster loyalty and drive repeat purchases.

In addition, a study by **Tanner and Wölfing Kast (2003)** focused on promoting sustainable consumption and its effects on consumer behavior. Their findings revealed that consumers are increasingly concerned about environmental issues, which has led to a preference for sustainable packaging options. This shift in consumer values suggests that breweries adopting eco-friendly packaging solutions may enhance consumer satisfaction while also capturing a growing market segment concerned with sustainability. Consequently, this approach can improve profitability by attracting environmentally conscious consumers who are willing to pay a premium for sustainable products.

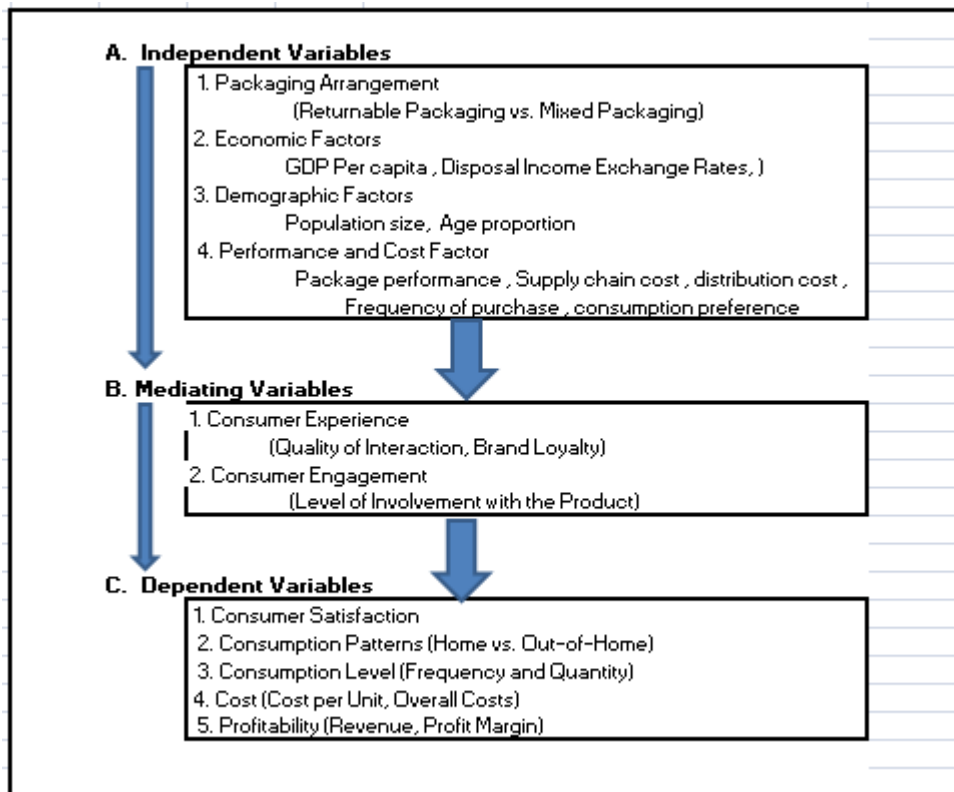
2.2.4 Gaps in the Existing Literature

Despite the significant findings from these studies, there remain gaps in the literature regarding the specific impact of 100% returnable packaging arrangements on consumer satisfaction and brewery profitability. Most existing research tends to focus on general packaging attributes without considering the unique context of the Ethiopian brewery market. This highlights the need for empirical research that specifically examines how different packaging arrangements, particularly returnable versus one-way packaging, affect consumer behavior and profitability in Heineken Breweries Ethiopia.

In summary, the empirical literature underscores the critical role of packaging arrangements in influencing consumer satisfaction and profitability. By leveraging insights from previous studies, this research aims to fill the existing gaps by exploring the specific dynamics within the Ethiopian brewing context.

2.3 Conceptual Framework

This conceptual framework provides a structured representation of the relationships between key variables in this study. The framework is grounded in established theories and empirical findings from the literature on consumer behavior, packaging arrangements, and supply chain performance. It highlights the primary constructs and their interrelations, providing a basis for the research hypotheses.



This revised framework effectively organizes the research elements to demonstrate how independent variables influence mediating variables, which in turn affect the dependent variables. This structure is designed to guide the analysis and conclusions regarding the impact of packaging arrangements and other factors on consumer satisfaction, consumption patterns, cost, and profitability.

Chapter Three: Research Methodology

Introduction

This research aims to assess the impact of packaging arrangements on consumer satisfaction, supply chain cost performance, and brewery profitability, specifically focusing on Heineken Breweries S.C. in Ethiopia. The study explores the effects of the current returnable packaging system compared to alternative mixed packaging arrangements. The methodology involves four key analyses:

1. **Qualitative analysis** to estimate consumer satisfaction with the existing packaging system.
2. **Quantitative multivariate analysis** to explore the relationship between packaging arrangements and consumer segments (Home consumer vs. Out-of-Home consumer).
3. **Quantitative multiple regression analysis** to investigate the relationship between per capita beer consumption and packaging arrangements.
4. **Financial analysis** of cost, revenue, and profit impacts based on the brewery's internal data..

3.1 Description of the Study

This study evaluates key factors surrounding returnable packaging arrangements, including consumer behavior, consumption impact, cost, and profitability, while also exploring the optimal packaging mix that could enhance these factors. The case study is conducted at Heineken Breweries S.C., one of the largest breweries in Ethiopia. Operating within Ethiopia's growing beer market, the brewery faces challenges related to packaging choices that significantly influence both operational performance and profitability. A mixed-methods approach—integrating survey data, cross-country demographic and economic data, and financial and supply chain performance data from the case brewery—is utilized.

3.2 Research Approach

This research adopts a **Mixed-Methods Approach** to assess the impact of packaging arrangements on brewery supply chain cost performance, consumer satisfaction, and profitability. The study centers on Heineken Breweries S.C., which currently relies on a 100% returnable packaging system, resulting in underutilization of production capacity (operating at 58%).

1. Qualitative Approach

Qualitative insights are gathered from Heineken sales personnel, who serve as proxies for consumer satisfaction due to logistical challenges in surveying actual consumers. Feedback from sales personnel provides an understanding of perceived consumer satisfaction with the current returnable packaging system.

2. Quantitative Approach

The quantitative aspect is divided into two main analyses:

- **Multivariate Analysis:** This analysis examines how Home Consumers and Out-of-Home Consumers (e.g., bars, restaurants) respond differently to various packaging options (returnable vs. one-way). This allows for a nuanced understanding of how different consumer groups influence packaging decisions and their satisfaction with different systems.
- **Regression Analysis:** A regression analysis is performed using cross-country data to assess the relationship between packaging arrangements and per capita beer consumption, incorporating demographic, economic, and packaging-related factors.

3.3 Research Design

The research design is structured around a Mixed-Methods approach, combining both qualitative and quantitative methodologies to analyze the impact of packaging arrangements on brewery performance.

1. Qualitative Component

- Insights are gathered from Heineken sales personnel, focusing on consumer satisfaction with the current returnable packaging system.
- Thematic analysis is employed to identify key patterns in consumer satisfaction related to packaging.

2. Quantitative Component

- **Multivariate Analysis:** Examines the relationship between packaging arrangements and consumer segments, specifically focusing on responses from Home Consumers and Out-of-Home Consumers.
- **Regression Analysis:** Evaluates the relationship between packaging arrangements and per capita beer consumption using cross-country data.

3. Cost and Profit Analysis

- A detailed financial analysis utilizes Heineken's internal data to compare the current returnable packaging system with alternative options, assessing costs, revenue, and profitability.

3.4 Population and Sampling

The population and sampling design align with the Mixed-Methods Approach, consisting of qualitative, quantitative, and financial analyses.

3.4.1 Population

- **Qualitative Component:** Sales personnel from Heineken Breweries S.C., providing indirect insights into consumer satisfaction.
- **Quantitative Component:** Data from 110 countries with diverse packaging systems.
- **Cost and Profit Analysis:** Internal financial and operational data from Heineken Breweries.

3.4.2 Sampling Design

- **Qualitative Sampling:** A purposive sampling approach selects 101 sales personnel based on their customer interaction frequency.
- **Quantitative Sampling for Regression Analysis:** A sample of 28 countries is selected from the 110, focusing on countries with diverse packaging systems and reliable data.
- **Cost and Profit Analysis:** Utilizes comprehensive internal data without the need for sampling.

3.4.3 Sample Size

- **Qualitative Analysis:** 101 sales personnel (50% of the total population of 202) are included.
- **Quantitative Analysis:** The regression analysis is based on data from 28 countries, balancing diversity and data availability.
- **Cost and Profit Analysis:** Uses extensive internal financial data without sampling requirements.

3.5 Variables of the Study

The study encompasses both qualitative and quantitative analyses to evaluate the impact of packaging arrangements on consumer satisfaction, beer consumption levels, and financial performance. Below are the relevant variables for each aspect of the study.

3.5.1 Qualitative Analysis Variables

The qualitative analysis seeks insights into consumer satisfaction with the current returnable packaging arrangement through proxy feedback from Heineken sales personnel. Key qualitative variables include:

- **Negative Influence on Home Consumption:** Measures the extent to which sales personnel perceive that the current returnable packaging arrangement discourages home consumption of beer.
- **Impact of Money Deposit Requirement:** Assesses the perceived likelihood that the deposit requirement for returnable packaging negatively affects home consumption.
- **Unwillingness Due to Return Obligations:** Evaluates the perception that consumers are unwilling to consume beer at home because of the obligation to return the packaging.
- **Price Parity with On-premise Outlets:** Gauges beliefs about whether consumers are discouraged from home consumption due to price parity with on-premise outlets.
- **Effect of Packaging Weight:** Determines the perceived likelihood that lighter and more convenient packaging could attract more home consumers.
- **Challenges of Returnable Packaging on Home Consumption:** Measures the perceived impact of the returnable packaging system on home consumption.
- **Environmental Perception:** Assesses the belief that consumers have positive feelings about the environmental benefits of the returnable packaging arrangement.

3.5.2 Quantitative Analysis Variables

The quantitative analysis consists of two main components: Multivariate Analysis and Multiple Regression Analysis. Variables are categorized as independent and dependent:

- **Independent Variables (from cross-country data):**
 - **Population Size:** Total population of a country.
 - **Young Population Percentage:** The proportion of the population within the young demographic, significant for beer consumption.
 - **Per Capita Income:** Average income per person in the country.
 - **Disposable Income:** Income remaining after taxes, critical for assessing consumer spending power on beer.
 - **Proportion of Returnable Packaging:** Percentage of returnable packaging used in total packaging arrangements.
- **Dependent Variables:**
 - **Home Consumption Level:** Measures the volume of beer consumed at home.
 - **Out-of-Home Consumption Level:** Refers to beer consumption levels outside the home (bars, restaurants).
 - **Per Capita Beer Consumption:** Represents average beer consumption per person in a country, the primary dependent variable for regression analysis.

3.5.3 Cost and Profit Analysis Variables

For cost and profit analysis, variables related to packaging costs, operational efficiency, and profitability are utilized:

- **Volume of Product:** Amount of beer produced and packaged.
- **Package Cycle Time:** Duration of a full return cycle for a package.
- **Breakage Rate:** Percentage of packages damaged or lost during use and transport.

- **Package Upfront Purchase Cost:** Initial cost for purchasing returnable packaging.
- **Lifetime Packaging Cost:** Total cost calculated based on cycle time, breakage rate, and upfront cost.
- **Finished Goods Warehouse Cost:** Cost of storing the packaged product before distribution.
- **Empty Package Warehouse Management Cost:** Costs associated with managing and storing empty returnable packages.
- **Sanitation Cost:** Cost of cleaning and sanitizing returnable packages for reuse.
- **Round-trip and One-way Transport Cost:** Transportation costs for delivering beer and returning empty packages.
- **Average Product Selling Price:** Average price at which the brewery sells its beer.
- **Capacity Utilization:** Operational cost implications of different production capacity levels.

3.6 Measurement Design and Scale Reliability and Validity

- **Qualitative Feedback:** Sales personnel feedback is deemed reliable due to their direct customer interactions.
- **Cross-Country Data:** Publicly available economic databases and industry reports ensure data reliability and validity.
- **Internal Brewery Data:** Financial and operational data from Heineken's internal systems provide robust metrics for calculating costs and profitability.

3.7 Data Sources and Collection Procedure

The research integrates qualitative, quantitative, and internal financial data to explore the effects of packaging arrangements on consumer satisfaction, per capita beer consumption, and brewery profitability.

3.7.1 Qualitative Data

Qualitative data was collected from 101 Heineken Brewery sales personnel who interact with customers, serving as proxies for consumer satisfaction with the returnable packaging arrangement. A structured questionnaire captured perceptions regarding:

- The influence of returnable packaging on home consumption,
- Financial burdens of deposit requirements,
- Consumer willingness to return packaging,
- Environmental perceptions related to returnable packaging, and
- Other factors impacting the appeal of beer packaging for home consumers.

3.7.2 Cross-Country Data

Quantitative data was sourced from 28 countries based on the availability of beer consumption and packaging arrangement data. The data was extracted from international industry reports and databases, focusing on key variables like:

- Per capita beer consumption,
- Proportion of returnable packaging in total beer sales, and
- Demographic and economic indicators (population size, young population percentage, per capita income, disposable income).

This dataset facilitated a robust analysis of packaging type impacts on beer consumption across various markets.

3.7.3 Internal Financial and Supply Chain Data

For cost and profit analysis, detailed internal data from Heineken Breweries' financial reports and supply chain performance records were utilized. This data included:

- Cost details related to packaging (upfront costs, cycle time, breakage rates, sanitation costs),
- Revenue and profit data from beer sales under different packaging arrangements,

- Operational data on capacity utilization, warehouse management, and transport costs.

This internal data enabled a comprehensive financial analysis, assessing the profitability and cost-effectiveness of various packaging arrangements and their overall impact on brewery performance.

3.8 Model Specification

The research uses a combination of qualitative and quantitative models (multivariate analysis, regression models, cost-revenue-profit models) to investigate the effects of different packaging arrangements on consumer behavior, beer consumption, and brewery profitability.

3.8.1 Qualitative Analysis Model Specification

The qualitative analysis gathered feedback from sales personnel via a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The analysis assessed trends in consumer satisfaction and packaging preferences based on:

- Inconveniences due to deposit requirements,
- Environmental perceptions, and
- The appeal of lighter packaging for home consumers.

3.8.2 Multivariate Analysis Model Specification

Multivariate analysis evaluates relationships between packaging arrangements and consumer beer consumption levels (home and out-of-home). The model incorporates independent variables like population size, percentage of returnable packaging, disposable income, and percentage of the younger population.

The multivariate regression model is specified as:

$$HC_i = \alpha_0 + \alpha_1 PO_i + \alpha_2 RGBP_i + \alpha_3 DI_i + \alpha_4 PCC_i + \alpha_5 PY_i + \epsilon_i$$

$$HO_i = \beta_0 + \beta_1 PO_i + \beta_2 RGBP_i + \beta_3 DI_i + \beta_4 PCC_i + \beta_5 PY_i + \mu_i$$

Where:

- HC = Home consumption volume
- HO = Out-of-home consumption volume
- PO = Population size
- RGB = Percentage of returnable packaging
- DI = Disposable income
- PCC = Per capita beer consumption
- PY = Percentage of younger population
- α, β = Regression coefficients
- ϵ, μ = Error terms

This model explores how changes in packaging arrangements (specifically, the percentage of returnable packaging) and economic variables affect home and out-of-home beer consumption levels.

3.8.3 Regression Analysis Model Specification

The **regression analysis** is focused on evaluating the relationship between packaging arrangements and **per capita beer consumption (PCC)**, with packaging arrangements, particularly the proportion of returnable packaging, serving as the key independent variable.

The regression model is specified as:

$$PCC_i = \gamma_0 + \gamma_1 PO_i + \gamma_2 RGBP_i + \gamma_3 DI_i + \gamma_4 PY_i + \nu_i$$

Where:

- PCC = Per capita beer consumption
- PO = Population size
- RGB = Percentage of returnable packaging
- DI = Disposable income
- PY = Percentage of younger population
- Γ = Regression coefficients
- ν = Error term

This model helps determine how packaging types (returnable vs. one-way) and demographic factors influence overall beer consumption on a per capita basis.

3.8.4 Cost, Revenue, and Profit Models

The **cost models** aim to estimate the total operational costs associated with packaging, based on internal Heineken Brewery data. These models are critical for comparing the cost-effectiveness of **returnable** and **one-way packaging** systems.

The cost model is specified as:

$$CRPIC_i = TLTC_i + TSNC_i + TWMC_i + TRTNC_i$$

Where:

- CRPIC = Total packaging-related cost per hectoliter
- TLTC = Total lifetime cost per annum for packaging
- TSNC = Total sanitation cost

- TWMC = Total warehouse management cost
- TRTNC = Total round-trip transport cost for returnable packaging

For **returnable packaging**, the total package requirement is calculated as:

$$TPRQ = \frac{V}{C}$$

Where:

- V = Volume of beer sold
- C = Cycle time of packaging

For **one-way packaging**, the calculation is simplified, as there is no need for cycle time or package return management.

Additionally, the **revenue and profit models** calculate changes in revenue and profit when shifting between returnable packaging and a new proposed packaging mix. These are modeled as follows:

$$\Delta R = p \cdot (v - v_0)$$

$$\Delta C = (c \cdot v) - (c_0 \cdot v_0)$$

$$\Delta P = \Delta R - \Delta C$$

Where:

- ΔR = Change in revenue
- p = Selling price of the product
- v and v_0 = Volumes of beer under the new packaging mix and returnable packaging, respectively
- ΔC = Change in cost

- C and C_o = Unit costs for the new and returnable packaging arrangements, respectively
- ΔP = Net effect on profit

3.9 Data Analysis Methods

The data analysis for this study integrates both qualitative and quantitative approaches, using various statistical tools and models to assess the impact of packaging arrangements on consumer satisfaction, beer consumption levels, and brewery profitability. The analysis is divided into four main parts:

3.9.1 Qualitative Analysis

The qualitative analysis focuses on understanding consumer satisfaction with the returnable packaging arrangement. Feedback was collected using a 5-point Likert scale and analyzed as follows:

- **Data Cleaning:** The initial step involved addressing missing values, outliers, and inconsistencies in the collected data to ensure data integrity.
- **Reliability Testing:** Cronbach's Alpha was employed to test the internal consistency of the responses, ensuring that the questionnaire items reliably measured the same underlying concepts.
- **Descriptive Statistics:** Using SPSS, descriptive statistics such as mean, median, mode, and standard deviation were calculated to summarize the data and provide an overall insight into consumer satisfaction levels.

These steps helped assess consumer feedback on various aspects of the returnable packaging system, including ease of use, environmental benefits, and economic considerations.

3.9.2 Quantitative Analysis - Multivariate Analysis

The multivariate regression analysis was conducted to evaluate the effect of different packaging arrangements on beer consumption levels, both at home and out-of-home. The analysis included the following steps:

- **Model Specification:** The multivariate model was specified to estimate the impact of independent variables (population size, percentage of returnable packaging, disposable income, etc.) on home and out-of-home consumption levels.
- **Model Assumption Tests:** The assumptions underlying the multivariate model were tested, including:
 - **Linearity:** Assessed through scatter plots.
 - **Multicollinearity:** Verified using Variance Inflation Factor (VIF).
 - **Homoscedasticity:** Tested using residual plots.
 - **Independence of Observations:** Ensured through the Durbin-Watson test.
 - **Normality of Residuals:** Examined using Q-Q plots.
- **Model Adequacy Tests:** Tests such as ANOVA and multivariate tests (e.g., Pillai's Trace) were conducted to assess the model fit and overall significance.
- **Parameter Estimation:** Ordinary Least Squares (OLS) estimates, t-tests, and partial correlation analyses were performed to evaluate the significance and strength of each predictor variable in the model.

These steps ensured that the model was robust and reliable for analyzing the relationship between packaging arrangements and beer consumption.

3.9.3 Quantitative Analysis - Regression Analysis

The regression analysis was employed to predict beer per capita consumption levels under different packaging scenarios. The analysis involved the following steps:

- **Model Specification:** A regression model was specified to estimate the relationship between independent variables (population size, percentage of returnable packaging, disposable income, etc.) and per capita beer consumption.
- **Model Assumption Tests:** The following assumption tests were performed:
 - **Linearity:** Evaluated using scatter plots.
 - **Autocorrelation:** Checked using the Durbin-Watson test.
 - **Normality:** Assessed via Q-Q plots.

- **Multicollinearity:** Verified through VIF.
- **Outliers:** Detected using Z-values.
- **Model Adequacy Tests:** The goodness of fit of the model was evaluated using R-squared and F-statistics.
- **Parameter Estimation and Tests:** OLS estimates, t-tests, and partial correlation analyses were applied to assess the significance of the independent variables in the regression model.
- **Prediction:** The regression model and OLS estimator were used to predict Ethiopia's per capita beer consumption under different packaging mix arrangements.

This analysis helped to estimate potential changes in beer consumption due to a shift from the current returnable packaging system to a mixed packaging arrangement.

3.9.4 Cost, Revenue, and Profitability Analysis

The cost-revenue-profit analysis evaluated the financial impact of transitioning to a mixed packaging system. The following considerations were made:

- **Cost Categories:** The model included life-cycle costs, sanitation costs, warehouse management costs, and transport costs associated with both returnable and one-way packaging systems.
- **Revenue Impact:** The change in revenue was modeled based on shifts in product volume under different packaging arrangements.
- **Profitability:** The overall profitability was assessed by calculating the net effect of the packaging transition on costs and revenues. This included changes in operational costs, capacity utilization, and product selling prices.

3.10 Ethical Considerations

- **Confidentiality:** All internal data from Heineken Breweries is handled confidentially and used solely for research purposes.
- **Data Integrity:** Secondary data is obtained from reliable and reputable sources, and internal data is directly sourced from Heineken's systems, ensuring the integrity of the analysis.
- **No Direct Consumer Interaction:** Since no direct consumer surveys were conducted, ethical concerns regarding human subjects are minimized.

Chapter Four: Result and Discussion

4.1 Impact of 100% Returnable Packaging on Consumer Satisfaction

This study collected feedback from 98 sales personnel who served as proxies for beer consumers to evaluate their experiences with Heineken Breweries' 100% returnable packaging system in Ethiopia. This arrangement requires consumers to return bottles after use, involving a deposit requirement and other logistics that could impact consumer satisfaction, particularly for home consumption.

		Statistics				
		Over all negative influence	Deposit requirement challenge	Bottle return obligation Challenge	Bottle weight challenge	Product price challenge
N	Valid	98	98	98	98	98
	Missing	3	3	3	3	3

Table 4.1: Qualitative Missing Report

Reliability Testing

The survey's reliability was assessed using Cronbach's Alpha, achieving a score of 0.708. This indicates an acceptable level of internal consistency, confirming that the survey items effectively measure consumer satisfaction regarding the returnable packaging system.

Descriptive Statistics for Consumer Satisfaction and Convenience

The descriptive analysis, conducted using SPSS version 26, yielded several notable findings regarding consumers' satisfaction with the 100% returnable packaging arrangement. Responses indicated a general dissatisfaction, with specific aspects contributing to lower satisfaction levels.

- **Negative Influence on Home Consumption:** A significant 85.8% of respondents indicated that the returnable packaging system negatively impacts their willingness to consume beer at home. Among these, 34.3% were “Extremely likely” and 19.2% “Very likely” to believe that this arrangement discourages home drinking (See Appendix A, Table A3.1, Figure A3.1).
- **Impact of Deposit Requirement:** The need to pay a deposit before purchase was seen as a major deterrent, with 56.2% of respondents indicating that this policy discourages home consumption. Specifically, 37.8% found it “Extremely likely” and 18.4% “Very likely” to be a factor, while 30.6% felt it had only a moderate effect (See Appendix A, Table A3.2, Figure A3.2).
- **Unwillingness to Return Packages:** Over half of the respondents (52%) found the obligation to return empty bottles inconvenient, with 30.6% “Extremely likely” and 21.4% “Very likely” indicating dissatisfaction. Another 29.6% viewed this as a moderate deterrent (See Appendix A, Table A3.5, Figure A3.5).
- **Price Parity with On-Premise Outlets:** About 50.3% of participants felt that the equal pricing structure between home and on-premise drinking discourages home consumption, with 25.3% indicating it as “Extremely likely” to affect their choices (See Appendix A, Table A3.3, Figure A3.3).
- **Minimal Impact of Bottle Weight:** Only 15.3% of respondents viewed bottle weight as a significant deterrent, with the majority (58.5%) seeing it as having little or no impact on their decision to purchase beer in returnable bottles (See Appendix A, Table A3.4, Figure A3.4).
- **Perceived Environmental Benefits:** Interestingly, only 9.9% of respondents viewed the returnable packaging system as having substantial environmental benefits. A considerable 40.6% of participants did not perceive any strong environmental advantages, which could further contribute to their dissatisfaction (See Appendix A, Table A3.6, Figure A3.6).

Hypothesis Testing and Discussion

Hypothesis: H1: A solely returnable packaging arrangement by Heineken Breweries negatively impacts consumer satisfaction.

The findings from the qualitative analysis do not support H1. The survey responses suggest that the current returnable packaging arrangement is perceived unfavorably by consumers, particularly those purchasing for home use. Key factors include the logistical inconvenience of returning bottles, the additional cost associated with deposits, and the lack of perceived environmental benefits.

The results indicate that introducing a mixed packaging system that includes one-way packaging options could potentially enhance consumer satisfaction. This aligns with the findings of **Feldman et al. (2014)**, who demonstrated that packaging designs with complex return requirements can negatively impact consumer behavior, particularly in home consumption settings. Additionally, **Keller (2016)** emphasized that the convenience of packaging significantly influences consumer satisfaction, especially when return logistics are involved.

Implications for Heineken Breweries and Ethiopian Breweries

The findings suggest that the rigidity of a 100% returnable packaging system imposes burdens on consumers, which may deter them from purchasing beer for home consumption. By adopting a mixed packaging approach, Ethiopian breweries could increase consumer satisfaction, cater to consumer preferences for more convenience, and potentially expand market share. The addition of one-way packaging could attract more consumers to home consumption, as it reduces the logistical and financial barriers associated with returnable systems.

The qualitative analysis highlights that the current returnable packaging arrangement limits consumer satisfaction and may discourage home consumption. A shift towards a mixed packaging arrangement could alleviate these concerns and support greater

consumer satisfaction, aligning with literature that emphasizes the importance of convenience in packaging to enhance consumer engagement and brand loyalty.

4.2 Packaging Arrangement Mix Impact on Home and Out-of-Home Beer Consumption Levels

The multivariate regression analysis aimed to assess the impact of different packaging arrangements (returnable versus one-way packaging) on beer consumption patterns, specifically targeting home and out-of-home consumption levels. This analysis tested **H2: A solely returnable packaging arrangement by Heineken Breweries significantly reduces home consumer beer consumption levels.**

I. Assumption Tests

Data was collected from 28 countries through purposive and random sampling methods (Appendix B, Table B2.4). Before conducting the analysis, the dataset was tested for key assumptions, including normality, multicollinearity, homogeneity, linearity, and homoscedasticity. Results confirmed these assumptions were met (Appendix B, Tables B1.1-B1.4; Figures B1.1-B1.6).

II. Model Summary and Regression Results

The model summary and regression coefficients yielded valuable insights into factors influencing both home and out-of-home beer consumption levels:

- **Model Summary**
 - **Home Consumption (HC):** The R-squared value was 0.78, indicating that 78% of the variance in home consumption was explained by variables such as packaging mix, disposable income, and demographic factors (Table 4.3).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Change	Sig. F Change
1	0.88	0.78	0.711	16,044.04	0.551	0.000
a. Predictors: (Constant), Young Population (%), Total Population, Disposal Income, GDP Per Capita, b. Dependent Variable: Home Consumption						

Table 4.3: Multivariate Analysis: Model Summary Home Consumption

- **Out-of-Home Consumption (OHC):** The R-squared value was 0.82, showing that 82% of the variance in out-of-home consumption was accounted for by the same factors (Table 4.4).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	Sig. F Change	Durbin Watson
1	.908 ^a	0.825	0.795	4169.00683	0.825	27.176	0.000	2.2
a. Predictors: (Constant), Young Population (%), Total Population, Disposal Income, GDP Per Capita ,RG b. Dependent Variable: Out Of Home Consumption								

Table 4.4: Multivariate Analysis: Model Summary Out of Home Consumption

ANOVA results (Appendix B, Tables B2.1 and B2.2) confirmed the overall model’s statistical significance for both home and out-of-home consumption.

III. Regression Coefficients and Insights

The regression analysis provided insights into how different factors, particularly packaging types, affect beer consumption levels:

1. Home Consumption Level

- **Positive Predictors:** Disposable income and a higher percentage of the young population were positively associated with home consumption.
- **Negative Predictors:** Population size, per capita income, and the share of returnable packaging negatively influenced home consumption. Notably, the share of returnable packaging showed a significant negative effect on home beer consumption.

2. Out-of-Home Consumption Level

- **Positive Predictors:** Out-of-home consumption was positively associated with disposable income, the young population percentage, and, interestingly, the share of returnable packaging.
- **Non-Significant Impact:** Although returnable packaging had a positive relationship with out-of-home consumption, this effect was not statistically significant.

3. **Partial Correlations** (Appendix B, Table B2.6): The share of returnable packaging demonstrated a moderate, unique negative contribution to home consumption (partial correlation = -0.455) and a slight positive contribution to out-of-home consumption (partial correlation = 0.076).

IV. Hypothesis Testing and Discussion

The results do not support **H2: The impact of the packaging arrangement mix has no significant impact on home and out-of-home beer consumption levels.** Instead, findings suggest that a higher share of returnable packaging significantly reduces home beer consumption, while its effect on out-of-home consumption remains positive but statistically insignificant. This indicates that returnable packaging acts as a barrier to home consumption, likely due to logistical inconveniences such as the requirement to return empty bottles and pay a deposit.

These findings align with research highlighting the role of packaging in shaping consumption habits. For instance, **Wong and Yeh (2019)** emphasize that convenient packaging (e.g., one-way bottles) significantly increases purchase intentions for home use, a preference likely driven by ease and portability. Similarly, **Drescher et al. (2014)** report that consumers perceive one-way packaging as more convenient, which in turn encourages at-home consumption. The current study's results suggest that shifting to a mixed packaging strategy—incorporating both returnable and one-way options—could enhance home consumption rates, catering to consumers who prioritize convenience.

V. Implications for Heineken Breweries

For Heineken, introducing a one-way packaging option could serve as a strategic move to increase home beer consumption and maximize unused production capacity. Since home consumption could be significantly boosted by offering more convenient packaging, Heineken may want to target these consumers through focused marketing on the benefits of one-way packaging for at-home use. For out-of-home consumption, additional partnerships with bars and restaurants could bolster sales, leveraging the strengths of returnable packaging in environments where recycling logistics are more manageable.

4.3 Packaging Arrangement Choice and Per Capita Beer Consumption

The multiple regression analysis aimed to explore the impact of packaging arrangements—specifically, the share of returnable packaging—on per capita beer consumption while accounting for demographic and economic factors (population size, young population percentage, per capita income, and disposable income). The hypothesis tested was:

H3: Transitioning from a solely returnable packaging arrangement to a mixed arrangement (returnable and one-way packaging) significantly increases beer consumption levels.

Assumption Test Results

The dataset included information from 28 countries, with assumptions verified and confirmed (see Appendix C). Independence of errors, multicollinearity, linearity, normality, and homoscedasticity tests were performed, confirming that the model was appropriate for multiple regression.

Model Adequacy

With an R^2 value of 0.952, the model explains 95.2% of the variance in per capita beer consumption, indicating a highly reliable model fit (Table 4.5).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	Sig. F Change	Durbin-Watson
1	.976 ^a	0.952	0.942	6.13015	0.952	95.798	0.000	1.856

a. Predictors: (Constant), Young Population (%), Total Population, Disposal Income, GDP Per Capita, RGB (%). b. Dependent Variable: Per Capita Consumption

Table 4.5 : Regression: Model Summary

The ANOVA result (F-statistic = 95.798, $p < 0.05$) confirms that the independent variables significantly predict per capita consumption (Table 4.6).

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17999.864	5	3599.973	95.798	.000 ^b
	Residual	901.890	24	37.579		
	Total	18901.753	29			

a. Predictors: (Constant), Young Population (%), Total Population, Disposal Income, GDP Per Capita, RGB (%). b. Dependent Variable: Per Capita Consumption

Table 4.6 : Regression: ANOVA

Parameter Estimates and Test Results

The regression coefficient for the percentage of returnable packaging (PRGB) is -121.533 ($p < 0.001$), revealing a significant negative relationship with per capita beer consumption. This suggests that as the proportion of returnable packaging increases, beer consumption tends to decrease. Other variables (population size, young population percentage, per capita income, and disposable income) were positively related to beer consumption, though their effects were not statistically significant.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
		B	Std. Error				
1	(Constant)	92.848	19.751		4.701	0.000	
	Total Population	1.588E-05	0.000	0.040	0.872	0.392	1.081
	RGB (%)	-121.533	7.099	-0.937	-17.120	0.000	1.508
	Disposal Income	0.000	0.003	-0.003	-0.054	0.958	1.241
	GDP Per Capita	6.456E-06	0.000	0.007	0.136	0.893	1.457
	Young Population (%)	0.361	0.286	0.064	1.264	0.218	1.291

a. Dependent Variable: Per Capita Consumption

Table 4.7 : Regression: Coefficient Estimate and Test

Forecasting and Implications

Forecasting scenarios for Ethiopia, with fixed demographic and economic variables, illustrate the potential impact of reducing returnable packaging on per capita beer consumption. For instance:

- Reducing the returnable packaging share to 65% and introducing 35% one-way packaging could increase consumption from 12-13 liters to 16 liters per capita.
- A further shift to 60% returnable and 40% one-way packaging could boost consumption to 22.10 liters.

These results support **H3**, indicating that a reduction in returnable packaging positively impacts beer consumption, particularly in home settings.

Strategic Insights

This study's findings underscore the potential of mixed packaging arrangements for increasing beer consumption. The significant negative impact of returnable packaging on consumption suggests that logistical challenges, limited accessibility, and convenience factors associated with returnable packaging may discourage consumption. Shifting to a mixed packaging system, incorporating more one-way packaging, could help breweries,

especially in Ethiopia, capture untapped consumer segments who prioritize convenience in home consumption.

Additionally, similar research aligns with these findings. Thompson and Kessler (2019) highlighted that one-way packaging increases home consumption by enhancing consumer convenience. Chung et al. (2020) also showed that consumers are more likely to favor products with easier-to-use packaging, reinforcing that a transition to mixed packaging could drive market growth.

4.4 Cost, Revenue, Profitability, and Packaging Arrangement Mix

4.4.1 Packaging arrangement mix impact on cost of production

In analyzing the cost implications of adopting a 100% returnable packaging arrangement at Heineken Breweries, this section evaluates two key factors based on the established conceptual framework:

- **Operational Changes:** Assessing how packaging arrangements influence critical cost factors, including lifetime package costs, transportation, sanitation, and warehousing.
- **Production Volume Changes:** Understanding the effects on unit production costs related to variations in product demand and capacity utilization.

Hypothesis H4: A solely returnable packaging arrangement by Heineken Breweries results in a lower net unit product cost due to reusability.

i. Operational Cost Impact

The operational cost analysis compares three packaging strategies: 100% returnable, one-way, and a mixed arrangement. The findings reveal significant insights:

- **100% Returnable Packaging:** Operational costs stand at ETB 1,472 per hectoliter (HL). The reusability feature significantly lowers lifetime packaging

costs, although there are increased logistics costs related to warehousing, transport, and sanitation.

- **One-Way Packaging:** Operational costs are higher, at ETB 2,474 per HL, attributed to the lack of reuse opportunities and increased production costs per unit.
- **Mixed Packaging (60% Returnable, 40% One-Way):** This arrangement presents projected operational costs of ETB 1,872.80 per HL, which, while providing some advantages over one-way packaging, remains higher than the costs associated with 100% returnable packaging.

These results illustrate that while certain operational costs may escalate with a returnable packaging system, the total operational cost per HL is notably lower compared to both one-way and mixed arrangements. Key components analyzed—lifetime packaging cost, transportation, warehousing, and sanitation—each contribute to this outcome.

Lifetime Packaging Cost Advantage: The analysis highlights a pronounced advantage for the 100% returnable system, showing a lifetime packaging cost of ETB 616.14 per HL, significantly lower than the ETB 2,045.45 per HL for one-way packaging. This disparity primarily stems from the reusability of returnable bottles, allowing the brewery to amortize packaging costs over multiple uses. Supporting literature, such as Drescher et al. (2014) and Wong & Yeh (2019), confirms that the reusability factor in returnable systems substantially offsets initial production costs, ultimately rendering it a more economical choice over the product's lifecycle. For Heineken, the reduced frequency of new bottle production leads to lower material costs and minimizes waste, aligning with both cost-saving and sustainability goals.

Increased Operational Costs in Specific Areas: Despite the evident lifetime packaging cost benefits, certain operational areas exhibit higher expenses under a returnable packaging model:

- **Transportation:** The need to transport empty bottles back to the brewery introduces additional logistical demands, increasing fuel and labor costs. Studies

by Felzensztein et al. (2020) emphasize that transportation constitutes a significant cost driver for reusable packaging systems, particularly in expansive markets where collection logistics can be complex. Nonetheless, the overall transportation expenses are offset by the savings in lifetime packaging costs, maintaining the cost-efficiency of returnable systems.

- **Warehouse Management:** Managing both full and empty bottles necessitates more storage space, thereby elevating warehouse management costs. The brewery must allocate sufficient resources to store empty bottles awaiting cleaning—a requirement absent in one-way packaging scenarios. Research by Chen et al. (2016) underlines that complex inventory arrangements lead to increased warehousing costs. In returnable packaging, these expenses arise from maintaining dual inventories of full and empty containers. However, despite these added demands, the net operational cost remains lower due to the significant lifetime packaging cost reductions.
- **Sanitation:** The cleaning and sanitation of returnable bottles before reuse incur additional operational costs. Jang et al. (2017) indicate that sanitation costs are inherent to reusable models but contribute positively to environmental sustainability by reducing waste and promoting longevity. For Heineken, this involves costs related to water, cleaning agents, and energy needed to uphold hygiene standards. While sanitation costs are higher with returnable packaging, they are justified by the long-term financial benefits associated with reduced needs for new bottles.

These findings indicate that a 100% returnable approach yields a net operational cost savings of ETB 400.80 per HL compared to the mixed arrangement. This result aligns with earlier studies (Drescher et al., 2014; Wong & Yeh, 2019), reinforcing the notion that reusability factors in returnable systems significantly offset initial production costs and yield long-term cost advantages. Furthermore, while logistics-related costs are elevated in returnable systems (Felzensztein et al., 2020), the overall lower unit packaging cost provides a net financial benefit.

ii. Volume-Driven Capacity Utilization Impact

Regression analysis reveals that packaging arrangements considerably impact production volume, subsequently influencing capacity utilization rates. Specifically, a mixed packaging arrangement (60% returnable and 40% one-way) is projected to elevate production volume from 3.1 million HL to 5.67 million HL, approaching the brewery's full production capacity. This increase facilitates a 4.3% reduction in unit production costs by distributing fixed costs over a greater output (Anderson & Foster, 2018).

The analysis suggests that a 100% returnable system may restrict the brewery's capacity to meet heightened consumer demand due to logistical constraints, while a mixed packaging approach permits greater production volumes and optimized capacity utilization, thereby reducing unit costs. This finding substantiates the hypothesis that a mixed packaging strategy can confer a strategic advantage by effectively balancing consumer preferences with operational efficiency.

Summary of Unit Product Cost Impact

Integrating findings from both analyses, we derive an adjusted unit cost equation to compare cost efficiency between the 100% returnable packaging arrangement (denoted by C) and the mixed packaging arrangement (denoted by C'), consisting of 60% returnable and 40% one-way packaging.

Adjusted Unit Cost Equation under Mixed Packaging Arrangement

The net unit product cost under the mixed packaging arrangement (C') is formulated as follows:

$$C' = 0.957 \times C + 401 \text{ ETB/HLC'}$$

Net Change in Unit Product Cost

To quantify the difference in net unit product costs between the two arrangements, we calculate:

$$\Delta C = 0.043 \times C - 401 \text{ ETB/HL}$$

This equation indicates that:

- The change in unit product cost (ΔC) between the 100% returnable and mixed packaging arrangements is directly influenced by a factor of 4.3% of the initial cost (C) under the 100% returnable system, offset by ETB 401/HL.
- **Interpretation:** The negative term, ETB 401/HL, represents a fixed cost increase for the mixed arrangement, rendering it more expensive per unit than the 100% returnable model, even with some operational efficiencies achieved through one-way packaging.

Validation Using Selling Price Constraint

The average selling price of beer is ETB 30 per 330ml bottle, equivalent to ETB 9,090 per HL. Given that the brewery has maintained profitability under the 100% returnable packaging arrangement, we assert that:

$$C < 9,090 \text{ ETB/HL}$$

By inserting this into the change in unit cost equation, we confirm that while C remains less than the average selling price (ETB 9,090/HL), the net unit product cost under a 100% returnable arrangement remains lower than that of the mixed packaging arrangement.

The combined analysis of operational and volume-driven factors supports Hypothesis H4, indicating that the 100% returnable arrangement results in lower unit product costs compared to mixed arrangements. Although mixed packaging can enhance production efficiency, the operational savings associated with the 100% returnable system—

spanning packaging lifecycle, sanitation, and warehousing—outweigh the benefits derived from economies of scale. These findings are consistent with prior research on operational cost savings and packaging efficiency (Lindh et al., 2016; Chen et al., 2016)

4.4.2 Packaging Arrangement Impact on Revenue and Profitability of Brewery

i. Revenue Analysis Results

The qualitative analysis (Sections 4.1 and 4.2) reveals that the 100% returnable packaging arrangement negatively impacts home consumers due to limitations in flexibility and convenience. This finding is reinforced by the regression analysis (Section 4.3), which indicates that packaging arrangements significantly affect product consumption volume. Specifically, a mixed packaging approach of 60% returnable and 40% one-way is projected to increase production volume from 3.1 million hectoliters (HL) to 5.67 million HL.

Calculating the change in revenue (ΔR) between the mixed packaging arrangement and the 100% returnable arrangement, given the average selling price of beer ($P = 9,090$ ETB/HL), we find:

$$\Delta R = P \times (V' - V) = 9,090 \text{ ETB/HL} \times (5.67 \text{ mln HL} - 3.1 \text{ mln HL}) = 23,376.3 \text{ mln}$$

This substantial increase in revenue confirms that the mixed packaging arrangement significantly enhances the brewery's financial performance, while the exclusive use of 100% returnable packaging severely constrains revenue generation.

ii. Profit Analysis Results

Based on the cost analysis (Section 4.4.1) and volume impact results (Section 4.3), the change in total cost (ΔC) when transitioning from a 100% returnable to a mixed packaging arrangement can be expressed as:

$$\Delta \text{ Total Cost (mln ETB)} = (C' \times V') - (C \times V) = 2,32619 \times C + 2,2736.68 \text{ ETB}$$

The change in profit (Δ Profit) is derived from the difference between the change in revenue and total cost:

$$\Delta \text{ Profit (mln ETB)} = \Delta R - \Delta \text{ Total Cost} = 23,376.3 - (2,32619 \times C + 2,273.68)$$

Notably, the change in profit consistently remains positive, considering that the brewery operating under a 100% returnable packaging arrangement, with an average selling price of 9,090 ETB/HL, maintains a profit margin of at least 0.03% (indicating a unit product cost of 9,065 ETB/HL).

These results support Hypothesis H5, indicating that the 100% returnable packaging practice adversely affects the profitability of Heineken Breweries. The profit analysis highlights that the exclusive reliance on a returnable packaging model limits production volume, constrains revenue growth, and diminishes overall profitability due to reduced economies of scale.

Literature on packaging economics reinforces these findings, suggesting that mixed packaging models can better accommodate diverse consumer demands while optimizing production capacity, ultimately leading to improved financial outcomes for breweries. Additionally, the correlation between production and sales volume aligns with established principles of economies of scale, wherein increased output levels effectively lower the fixed cost per unit.

Chapter Five: Summary, Conclusion, and Recommendations

5.1 Summary and Conclusion

This chapter summarizes the key findings of the research on the impact of the 100% returnable packaging arrangement at Heineken Breweries Ethiopia. It concludes with insights drawn from the analysis and offers recommendations for transitioning to a mixed packaging model, highlighting implications for consumer satisfaction, consumption patterns, cost, revenue, and profitability.

The analysis conducted throughout the study revealed significant insights into the effects of Heineken Breweries' current packaging strategy. The exclusive use of returnable packaging has been shown to negatively impact consumer satisfaction, as qualitative feedback indicated a lack of flexibility and convenience in packaging options, particularly for consumers engaging in both home and out-of-home consumption. This dissatisfaction has resulted in distinct consumption patterns, with consumers expressing a clear preference for mixed packaging options that cater to their varying needs.

Furthermore, the regression analysis indicated that adopting a mixed packaging approach, consisting of 60% returnable and 40% one-way packaging, could potentially boost total consumption volume from 3.1 million hectoliters (HL) to 5.67 million HL, thereby maximizing market reach and aligning with consumer expectations. The cost analysis highlighted that the exclusive reliance on returnable packaging limits production volume, which in turn constrains economies of scale, leading to higher per-unit costs that adversely affect profitability. Transitioning to a mixed packaging model is projected to yield significant revenue increases, estimated at 23,376.3 million ETB, thereby underscoring the economic advantages of diversifying packaging strategies. Ultimately, the analysis confirmed that the current 100% returnable packaging system undermines profitability, suggesting that a shift to a mixed packaging model could enhance profit margins by optimizing production and addressing consumer preferences more effectively.

The findings of this study lead to important conclusions regarding the impact of the current packaging arrangement at Heineken Breweries. It is evident that the exclusive use

of returnable packaging negatively affects consumer satisfaction and consumption levels, particularly across different consumption contexts. The evidence strongly supports the need for a mixed packaging strategy that not only meets consumer preferences but also contributes to improved revenue and profitability for the brewery. Transitioning to this approach is not only beneficial for aligning the brewery's offerings with market demands but is also economically viable, allowing for increased production volume and revenue generation while reducing costs associated with the current packaging system. Moreover, the conclusions align with existing literature on packaging economics, which emphasizes the necessity of adopting mixed packaging arrangements to maximize market performance and consumer engagement.

5.2 Recommendations

Based on these conclusions, several recommendations are made for Heineken Breweries. First, the brewery should implement a mixed packaging strategy, incorporating both returnable and one-way packaging, to enhance consumer satisfaction and accommodate the diverse consumption patterns observed in the analysis. This transition will align the brewery's product offerings with consumer preferences and market trends.

Additionally, Heineken should establish mechanisms for ongoing consumer engagement, enabling the collection of feedback to continuously assess packaging preferences. This proactive approach can guide future packaging strategies and product offerings, ensuring they remain relevant to consumers' evolving needs.

Moreover, it is crucial for the brewery to focus on optimizing cost management during the packaging transition by exploring efficient supply chain practices and materials that reduce overall expenses without compromising product quality.

For further research, it is recommended to investigate packaging innovations that prioritize sustainability while meeting consumer demands. Future studies could also broaden the scope to include a wider range of breweries and geographical contexts, validating the findings and enhancing their generalizability. Conducting longitudinal

studies may provide deeper insights into changing consumer preferences over time, allowing the brewery to adapt its packaging strategies accordingly.

This study acknowledges limitations related to its specific context within Heineken Breweries and the Ethiopian market. Future research should aim to expand on these findings by considering diverse breweries and packaging strategies, exploring the impact of broader economic factors on consumer behavior, and employing various methodologies to enhance the robustness of the research.

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Appendices

I. Appendix A: Qualitative Supplementary Tables and Figures

List of Tables in Appendix A

- Table A1: Questioner List

1. To what extent do you believe the current returnable packaging arrangement negatively influences home consumers?.
2. How likely do you think consumers are unable to consume beer at home due to the money deposit required for packaging?
 - what extent do you believe consumers are unwilling to consume beer at home because of the obligation to return the package to the seller after use?
3. To what extent do you believe consumers are discouraged from consuming beer at home due to the price level of the beer being equal to that of on-premise outlets?
4. How likely do you think the weight of the bottle, if it were handy and less weight, would attract beer consumers while consuming beer at home?
5. How likely do you think challenges with the existing returnable packaging arrangement significantly affect the level of home beer consumption?
6. To what extent do you believe consumers have strong feelings about the positive environmental effects of the returnable packaging arrangement?

- Table A2. Questioner Survey response

QA	QB	QC	QD	QE	QF	QG
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5	5	4	1	4	5	1
5	4	2	3	4	4	4
4	5	5	3	3	5	2
5	2	3	2	2	2	2
5	4	4	1	4	4	4
4	5	4	2	5	5	2
4	4	5	5	4	4	1
5	4	5	1	4	4	1
5	5	3	1	4	5	2
4	5	3	2	3	5	2
4	3	2	3	2	5	2
5	5	4	3	4	5	4
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4	5	4	3	5	5	1
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3	3	5	1	3	4	1
3	3	3	4	4	4	3
4	5	3	4	2	3	1
2	5	4	2	3	5	1
3	5	2	3	5	3	3

- **Table A3: Questioner Frequency Table**

Table A3.1: Packaging over all Home Consumer influence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all Likely	2	2.0	2.0	2.0
	Slightly Likely	11	11.1	11.2	13.3
	Moderate	32	32.3	32.7	45.9
	Very Likely	19	19.2	19.4	65.3
	Strongly Likely	34	34.3	34.7	100.0
	Total	98	99.0	100.0	
Missing	System	1	1.0		
Total		99	100.0		

Table A3.2: Packaging Deposited Requirement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all Likely	2	2.0	2.0	2.0
	Slightly Likely	11	11.1	11.2	13.3
	Moderate	30	30.3	30.6	43.9
	Very Likely	18	18.2	18.4	62.2
	Strongly Likely	37	37.4	37.8	100.0
	Total	98	99.0	100.0	
Missing	System	1	1.0		
Total		99	100.0		

- Table A3.3: Packaging Price Parity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all Likely	1	1.0	1.0	1.0
	Slightly Likely	17	17.2	17.3	18.4
	Moderate	30	30.3	30.6	49.0
	Very Likely	25	25.3	25.5	74.5
	Strongly Likely	25	25.3	25.5	100.0
	Total	98	99.0	100.0	
Missing	System	1	1.0		
Total		99	100.0		

- Table A3.4: Packaging Easiness to handle

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all Likely	24.1	24.3	24.3	24.4
	Slightly Likely	34	34.1	34.1	58.5
	Moderate	25.4	25.6	25.6	84.1
	Very Likely	8.1	8.2	8.2	92.2
	Strongly Likely	7.6	7.8	7.8	100.0
	Total	98	99.0	100.0	
Missing	System	1	1.0		
Total		99	100.0		

- Table A3.5: Packaging Obligation to Return

		Frequency	Percent	Valid Percent	Cumulative Percent
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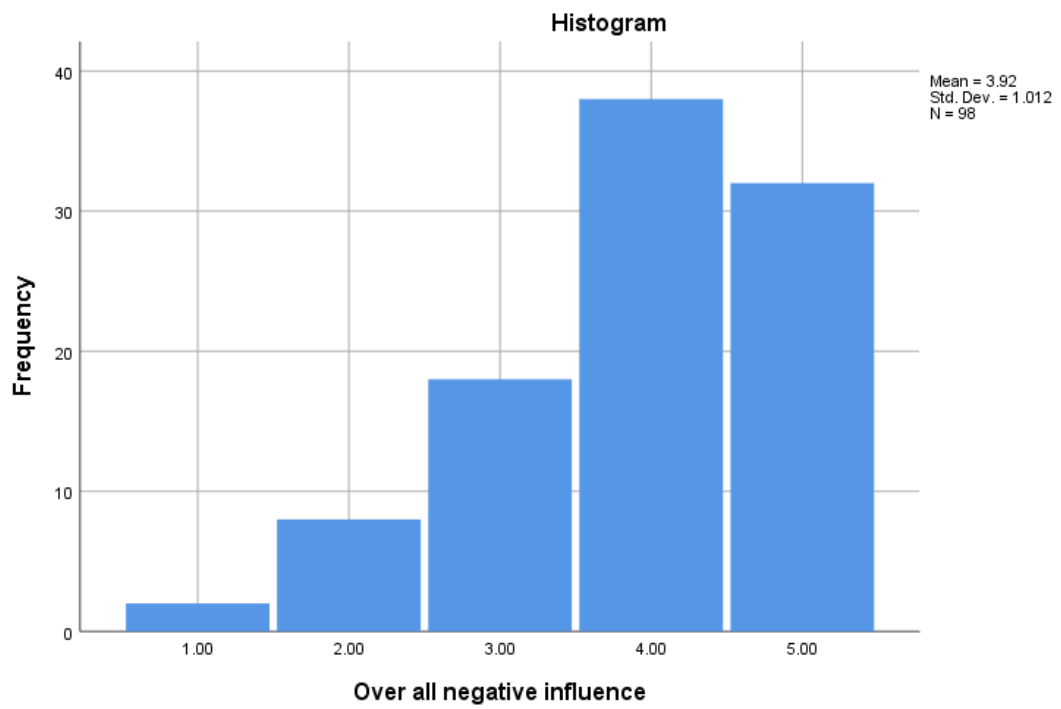
Valid	Not at all Likely	4	4.0	4.1	4.1
	Slightly Likely	14	14.1	14.3	18.4
	Moderate	29	29.3	29.6	48.0
	Very Likely	21	21.2	21.4	69.4
	Strongly Likely	30	30.3	30.6	100.0
	Total	98	99.0	100.0	
Missing	System	1	1.0		
/*Total6633		99	100.0		

- Table A3.6: Packaging Environment

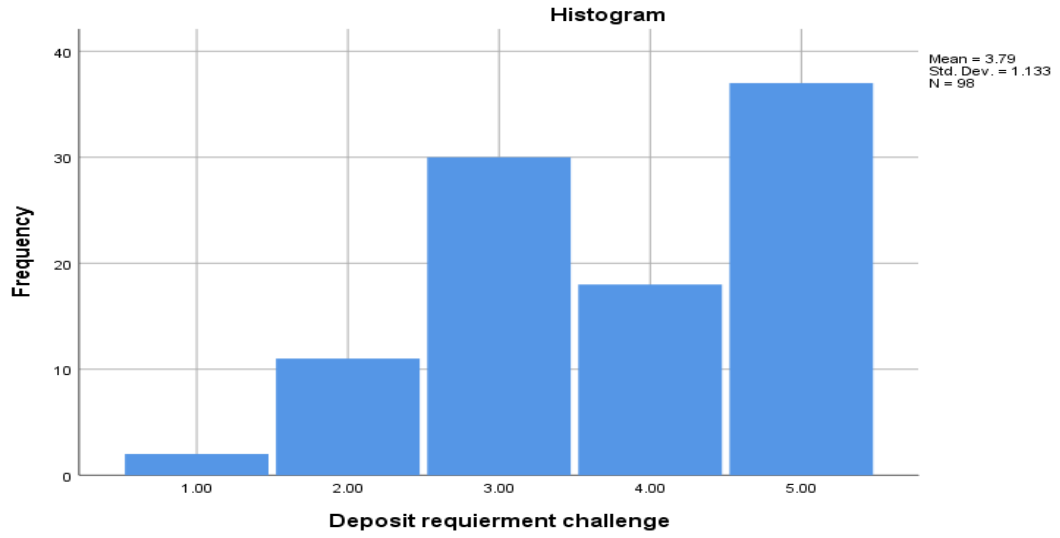
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all Likely	15	15.1	15.1	15.1
	Slightly Likely	30	30.5	30.5	45.6
	Moderate	44	44.4	34.4	90.1
	Very Likely	9	9.9	9.9	100.0
	Strongly Likely				
	Total	98	99.0	100.0	100.0
Missing	System	1	1.0		
Total		99	100.0		

List of Figures in Appendix A

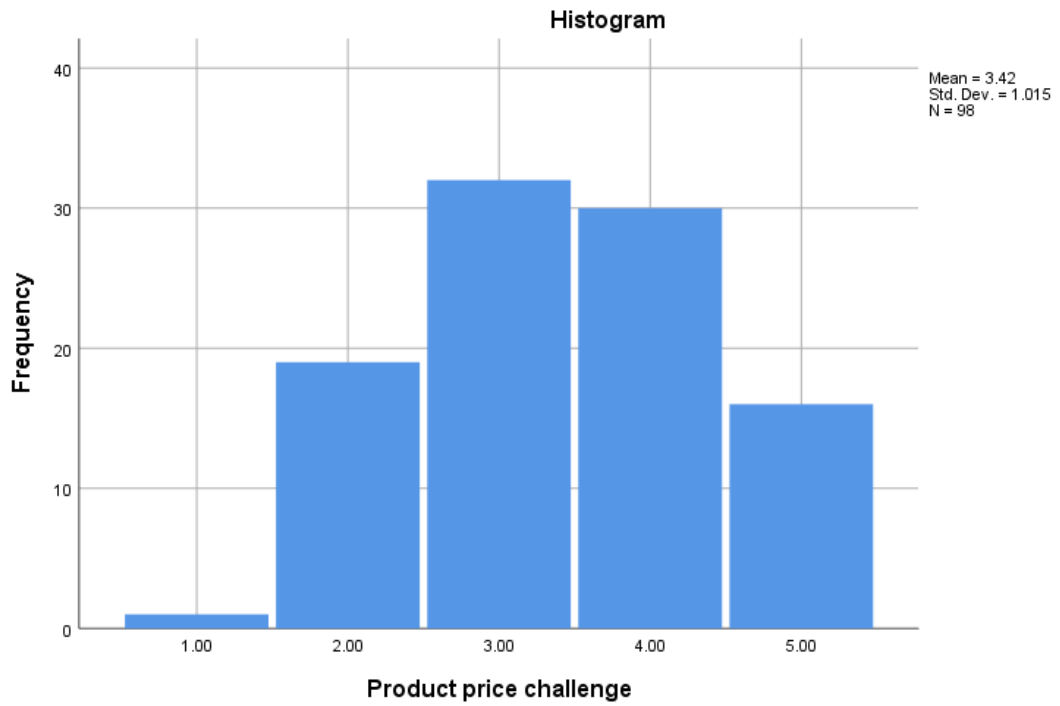
- Figure A1: Packaging over all Home Consumer influence



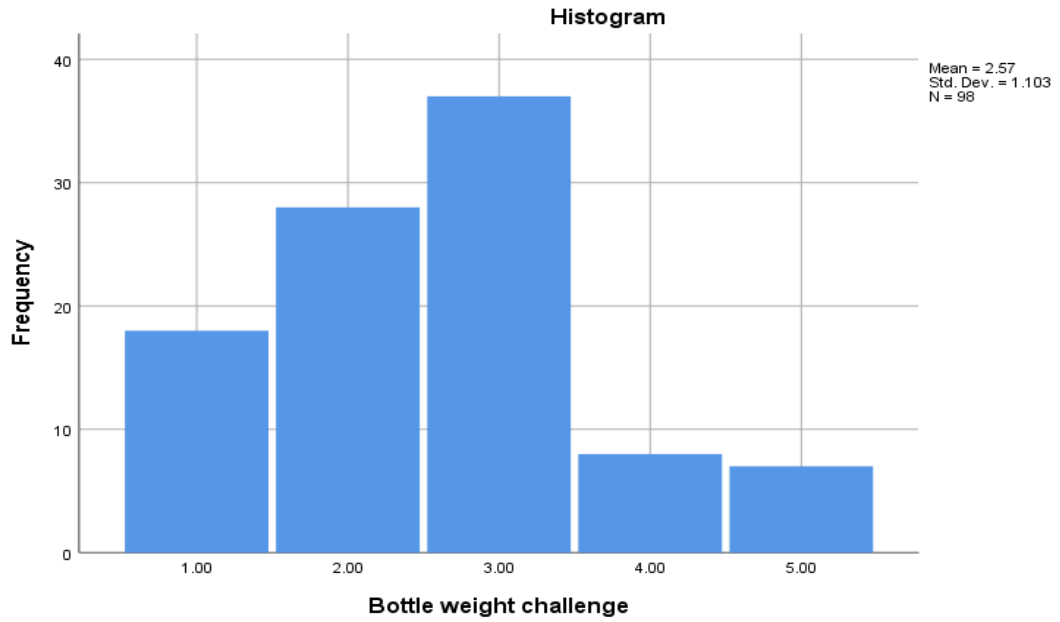
- Figure A2: Packaging Deposited Requirement



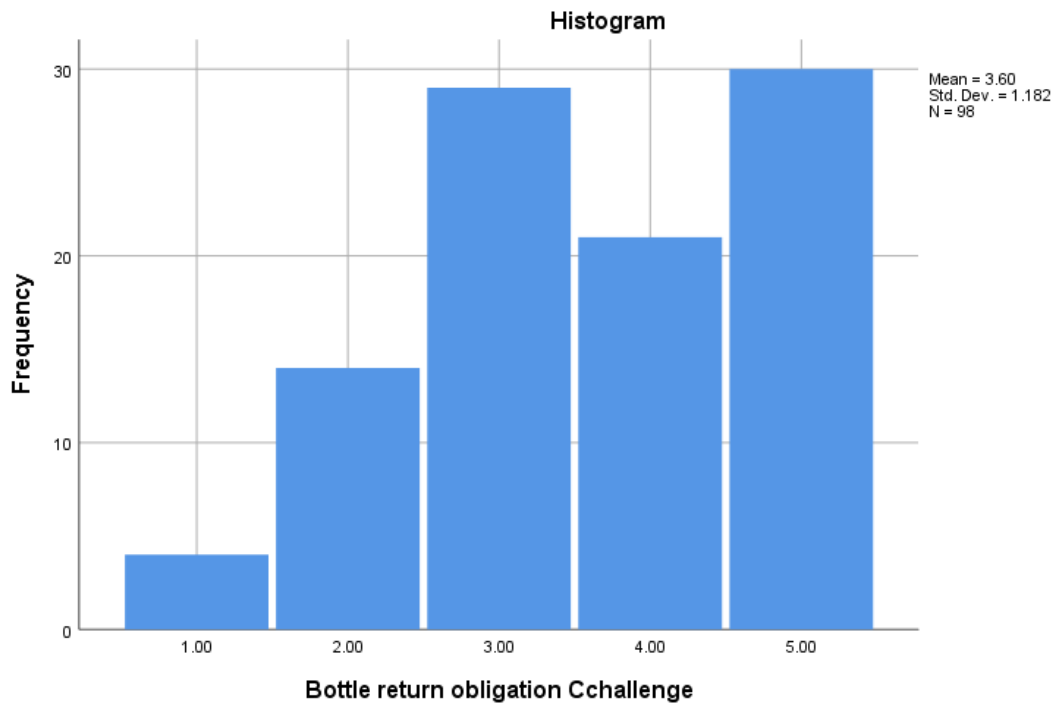
- Figure A3: Packaging Price Parity



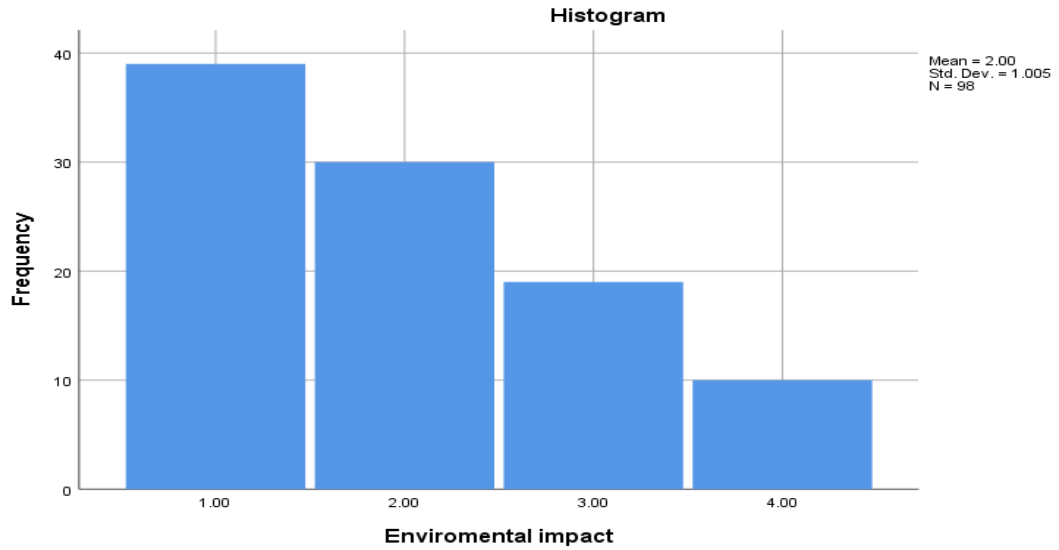
- Figure A4: Packaging Easiness to handle



- Figure A5: Packaging Return Obligation



- Figure A6: Packaging over Environment



II. Appendix B: Quantitative Multivariate Supplementary Tables and Figures

List of Tables in Appendix B

- Table B1: Multivariate Assumption Tests
 - Table B1.1: Multivariate Normality Test

	<u>Kolmogorov-Smirnov^a</u>			<u>Shapiro-Wilk</u>		
	<u>Statistic</u>	<u>df</u>	<u>Sig.</u>	<u>Statistic</u>	<u>df</u>	<u>Sig.</u>
Out Of Home Consumption	0.276	27	0	0.618	27	0
Home Consumption	0.303	27	0	0.552	27	0

Table 4.1 : Normality test

- Table B1.2: Multivariate Multicollinearity Test for Home Consumption

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error				Beta	Tolerance
1	(Constant)	59719.133	49217.178		1.213	0.239		
	Total Population	-0.018	0.053	-0.074	-0.339	0.738	0.938	1.066
	Disposal Income	-2.583	9.098	-0.066	-0.284	0.779	0.839	1.192
	GDP Per Capita	-0.041	0.128	-0.077	-0.320	0.753	0.783	1.277
	Young Population (%)	-767.817	791.872	-0.225	-0.970	0.344	0.835	1.197
a. Dependent Variable: Home Consumption								

- Table B1.3: Multivariate Multicollinearity Test for Out-of-Home Consumption Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error				Beta	Tolerance
1	(Constant)	-4181.326	12057.671		-0.347	0.732		
	Total Population	0.116	0.013	0.812	9.022	0.000	0.938	1.066
	Disposal Income	-1.353	2.229	-0.058	-0.607	0.550	0.839	1.192

GDP Per Capita	0.086	0.031	0.269	2.735	0.122	0.783	1.277
Young Population (%)	28.334	193.998	0.014	0.146	0.085	0.835	1.197

a. Dependent Variable: Out Of Home Consumption

- Table B1.4: Multivariate Tests for Homogeneity

Multivariate Tests^a The HOMOGENEITY s

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	0.482	8.361 ^b	2.000	18.000	0.003
	Wilks' Lambda	0.518	8.361 ^b	2.000	18.000	0.003
	Hotelling's Trace	0.929	8.361 ^b	2.000	18.000	0.003
	Roy's Largest Root	0.929	8.361 ^b	2.000	18.000	0.003
Totalpop	Pillai's Trace	0.013	.114 ^b	2.000	18.000	0.893
	Wilks' Lambda	0.987	.114 ^b	2.000	18.000	0.893
	Hotelling's Trace	0.013	.114 ^b	2.000	18.000	0.893
	Roy's Largest	0.013	.114 ^b	2.000	18.000	0.893

	Root					
percapitaincome	Pillai's Trace	0.012	.113 ^b	2.000	18.000	0.894
	Wilks' Lambda	0.988	.113 ^b	2.000	18.000	0.894
	Hotelling's Trace	0.013	.113 ^b	2.000	18.000	0.894
	Roy's Largest Root	0.013	.113 ^b	2.000	18.000	0.894
youngpop	Pillai's Trace	0.483	8.400 ^b	2.000	18.000	0.003
	Wilks' Lambda	0.517	8.400 ^b	2.000	18.000	0.003
	Hotelling's Trace	0.933	8.400 ^b	2.000	18.000	0.003
	Roy's Largest Root	0.933	8.400 ^b	2.000	18.000	0.003
Disposalincome	Pillai's Trace	0.240	2.849 ^b	2.000	18.000	0.084
	Wilks' Lambda	0.760	2.849 ^b	2.000	18.000	0.084
	Hotelling's Trace	0.317	2.849 ^b	2.000	18.000	0.084
	Roy's Largest Root	0.317	2.849 ^b	2.000	18.000	0.084
rgbpcnt	Pillai's Trace	0.186	2.062 ^b	2.000	18.000	0.156
	Wilks' Lambda	0.814	2.062 ^b	2.000	18.000	0.156
	Hotelling's Trace	0.229	2.062 ^b	2.000	18.000	0.156
	Roy's Largest Root	0.229	2.062 ^b	2.000	18.000	0.156

a. Design: Intercept + Totalpop + percapitaincome + youngpop + Disposalincome + rgbpcnt , b. Exact statistic

Table B2: Multivariate Analysis Results

- Table B2.1: Multivariate Analysis - ANOVA for Home Consumption

ANOVA Home Consumption

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	567,458,735	4	141864683.655	0.551	.700 ^b
	Residual	5,148,224,626	20	257411231.297		
	Total	5,715,683,361	24			
a. Dependent Variable: Home Consumption b. Predictors: (Constant), Young Population (%), Total Population, Disposal Income, GDP Per Capita						

- Table B2.2: Multivariate Analysis - ANOVA for Out-of-Home Consumption

ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1889320838.797	4	472330209.699	27.176	.000
	Residual	399754213.430	23	17380617.975		
	Total	2289075052.227	27			

a. Dependent Variable: Out Of Home Consumption , b. Predictors: (Constant), Young Population (%), Total Population, Disposal Income, GDP Per Capita

- Table B2.3: Multivariate Analysis - Coefficient Estimates and Tests

Parameter Estimates

Dependent Variable		B	Std. Error	t	Sig.
Home Consumption	Totalpop	-0.014	0.020	-0.685	0.500
	Disposalincome	4.962	1.916	2.590	0.017
	percapitaincome	-0.014	0.024	-0.571	0.574
	rgbpcent	-5850.973	2598.412	-2.252	0.035
	youngpop	78.870	32.147	2.453	0.023
Out of Home Consumption	Totalpop	-0.108	0.128	-0.846	0.407
	Disposalincome	5.088	12.164	0.418	0.680
	percapitaincome	-0.100	0.151	-0.663	0.515
	rgbpcent	17709.029	16497.666	1.073	0.295
	youngpop	16.181	204.107	0.079	0.938

a. Computed using alpha = .05

- Table B2.4: Multivariate Raw Data

-

GDP Per Capita	Disposal Incom	Home price	out of home price	RGB percenta ge	Per capita beer consumption
65099.8	824.3	0.1176 47059	0.056603 774	0.25	75.84
52084.7	241.15	0.3333 33333	0.090833 333	0.69	28.27
49926.8	295.77	0.3636 36364	0.154588 235	0.48	60.95
13974.4	52.49	1	0.364666 667	0.94	1.71
259	2.47	0.3772	0.314529 915	0.9	6.07
1759.6	18.16	0.5714 28571	0.333714 286	0.38	71.25
55522.4	1160.4	0.2658	0.084745	0.6	43.41

		22785	763		
18570.4	42.02	0.397	0.165	0.73	27.78
67790.1	173.06	0.41	0.056909 091	0.48	60.95
5356.2	3.51	0.2326 53061	0.130434 783	0.74	22.76
40886.3	1483.82	0.2972 97297	0.093023 256	0.62	41.03
8820.3	6.15	0.3562	0.207253 886	0.33	75.15
6675	18.09	0.3755 19905	0.137440 758	0.76	28.41
20867.3	148.98	0.3416 66667	0.111363 636	0.65	37.33
2099.3	86.63	0.4285 71429	0.232	0.8	9.46
516.6	10.71	0.7630 02681	0.474654 378	0.9	6.07
645.2	10.71	0.5650 9299	0.258064 516	0.91	5.31
57025	432.88	0.3809 52381	0.065573 77	0.51	64.21
108729. 2	187.88	0.1258 75	0.0455	0.58	49.03
3498.5	307	0.5217 3913	0.444444 444	0.77	20.11
15786.8	1082.14	0.4907 40741	0.28	0.61	53.13
966.2	9.86	0.5954 82546	0.420138 889	0.79	14.86
9537.7	43.4	0.3333 33333	0.266233 766	0.47	61.18
6766.5	257.37	0.3529 41176	0.333333 333	0.64	57.82
29674.5	807.28	0.4516 12903	0.154320 988	0.22	87.37

3354.4	46.14	0.332	0.295180 723	0.84	6.63
6910	270.15	0.2241 37931	0.178571 429	0.73	27.78
46125.3	105.85	0.2608 69565	0.093567 251	0.45	65.55
76329.6	105.85	0.2482 85322	0.095338 983	0.45	65.55
1456.9	10.38	0.9981 9576	0.7875	0.75	19.04

- Table B2.5: Multivariate Tests of Between-Subjects Effects

Tests of Between-Subjects Effects

Source		Type I Sum of Squares	df	Mean Square	F	Sig.
Model	Out Of Home Consumption	276774270.390 ^a	5	55354854.078	8.658	0.000
	Home Consumption	977685392.852 ^b	5	195537078.570	2.210	0.094
Totalpop	Out Of Home Consumption	107480772.100	1	107480772.100	16.811	0.001
	Home Consumption	282877100.608	1	282877100.608	3.197	0.089
Disposalincome	Out Of Home Consumption	129856187.116	1	129856187.116	20.311	0.000

	Home Consumption	26092309.751	1	26092309.751	0.295	0.593
percapitaincome	Out Of Home Consumption	1902688.771	1	1902688.771	0.298	0.591
	Home Consumption	82645551.699	1	82645551.699	0.934	0.345
rgbpcnt	Out Of Home Consumption	1443911.515	1	1443911.515	0.226	0.640
	Home Consumption	586032115.219	1	586032115.219	6.623	0.018
youngpop	Out Of Home Consumption	36090710.888	1	36090710.888	5.645	0.028
	Home Consumption	38315.575	1	38315.575	0.000	0.984
Error	Out Of Home Consumption	127868294.110	20	6393414.705		
	Home Consumption	##### ##	20	88478799.127		
Total	Out Of Home Consumption	404642564.500	25			
	Home Consumption	##### ##	25			

a. R Squared = .684 (Adjusted R Squared = .605) , b. R Squared = .569 (Adjusted R Squared = .455)

• Table B2.6: Multivariate Tests of Partial Correlation

Source		Type I Sum of Squares	d f	Mean Square	F	Si g.	Parti al Eta Squ ared
Model	Out Of Home Consumption	271572345.219 ^a	5	54314469.044	8.577	0.000	0.661
	Home Consumption	2445421829.841 ^b	5	489084365.968	1.916	0.132	0.303
Totalpop	Out Of Home Consumption	95141868.671	1	95141868.671	15.024	0.001	0.406
	Home Consumption	406977872.298	1	406977872.298	1.594	0.220	0.068
Disposalin come	Out Of Home Consumption	134329204.343	1	134329204.343	21.211	0.000	0.491
	Home	146017.01	1	146017.0	0.0	0.	0.00

	Consumption	9		19	01	98 1	0
percapitaincome	Out Of Home Consumption	3950930.734	1	3950930.734	0.624	0.438	0.028
	Home Consumption	175728823.940	1	175728823.940	0.688	0.416	0.030
rgbpcnt	Out Of Home Consumption	31639.062	1	31639.062	0.005	0.944	0.000
	Home Consumption	1860964630.724	1	##### #####	7.290	0.013	0.249
youngpop	Out Of Home Consumption	38118702.409	1	38118702.409	6.019	0.023	0.215
	Home Consumption	1604485.859	1	1604485.859	0.006	0.938	0.000
Error	Out Of Home Consumption	139322699.321	2 2	6332849.969			
	Home Consumption	5616308837.799	2 2	255286765.355			
Total	Out Of Home Consumption	410895044.540	2 7				
	Home Consumption	8061730667.640	2 7				

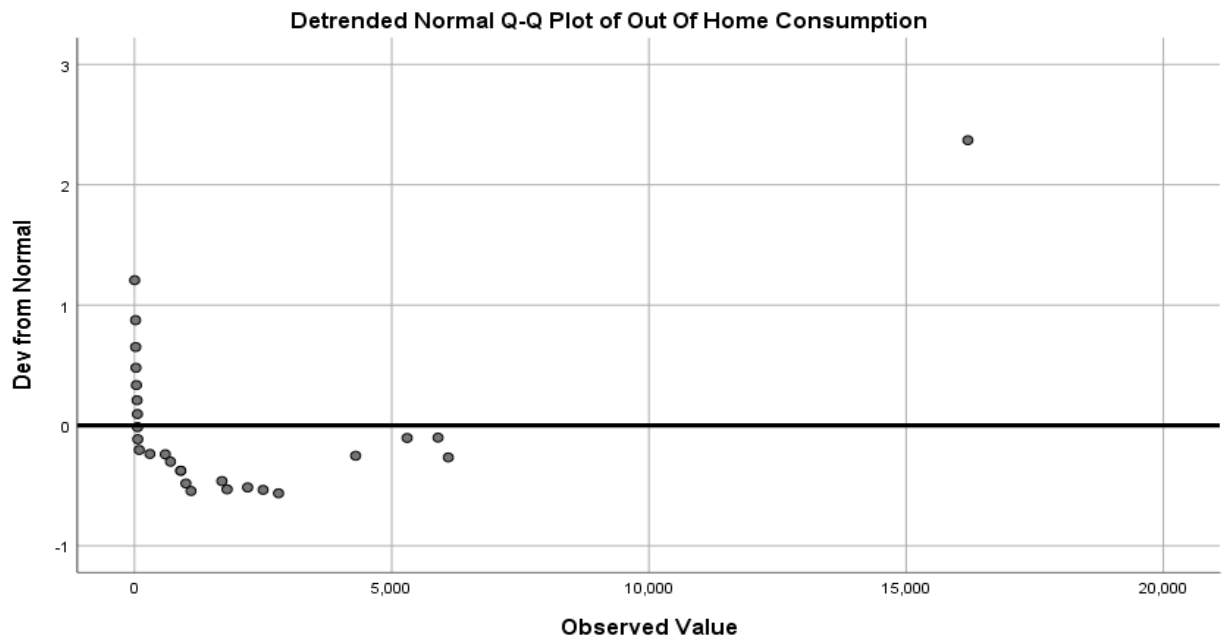
a. R Squared = .661 (Adjusted R Squared = .584)

b. R Squared = .303 (Adjusted R Squared = .145)

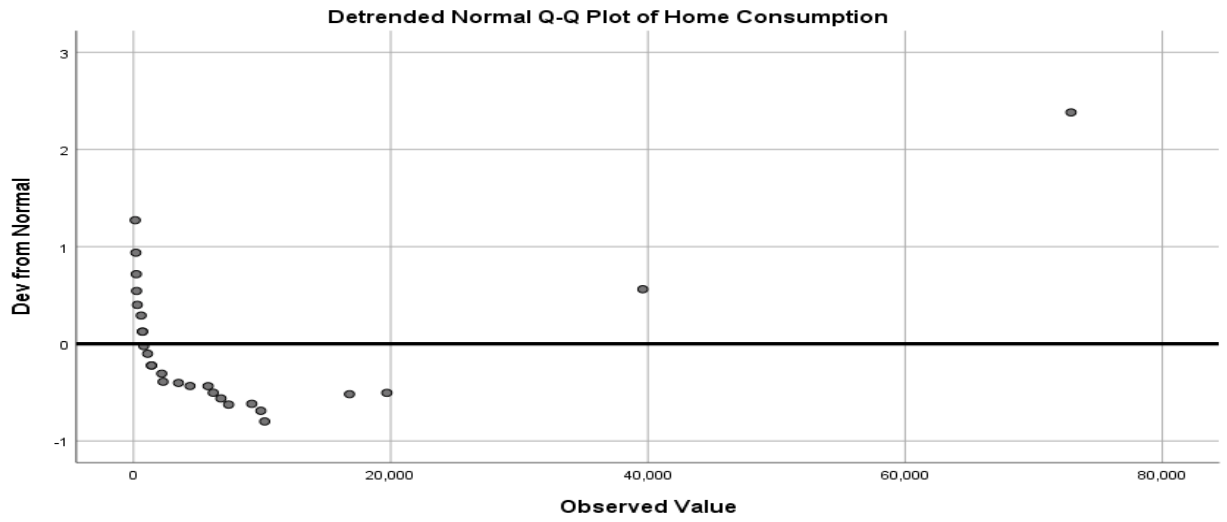
List of Figures in Appendix B

Figure B1: Multivariate Assumption Test

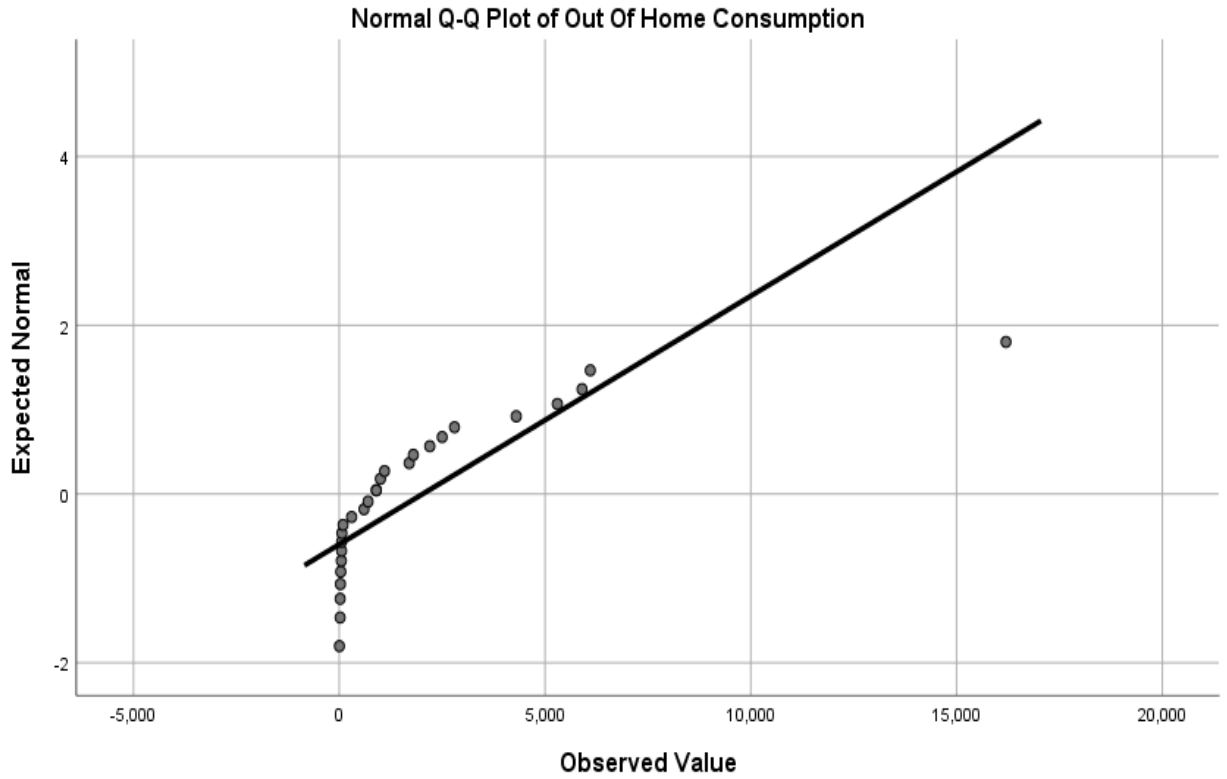
- Figure B1.1: Multivariate : Linearity plot : Out of Home Consumption



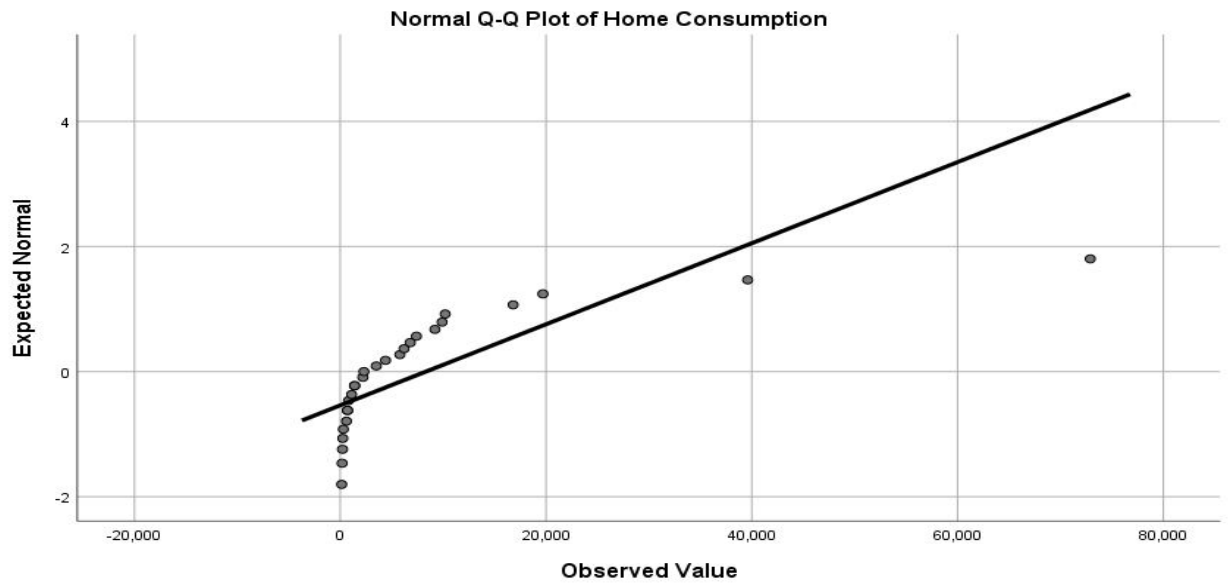
- Figure B1.2: Multivariate: Linearity plot : Home Consumption



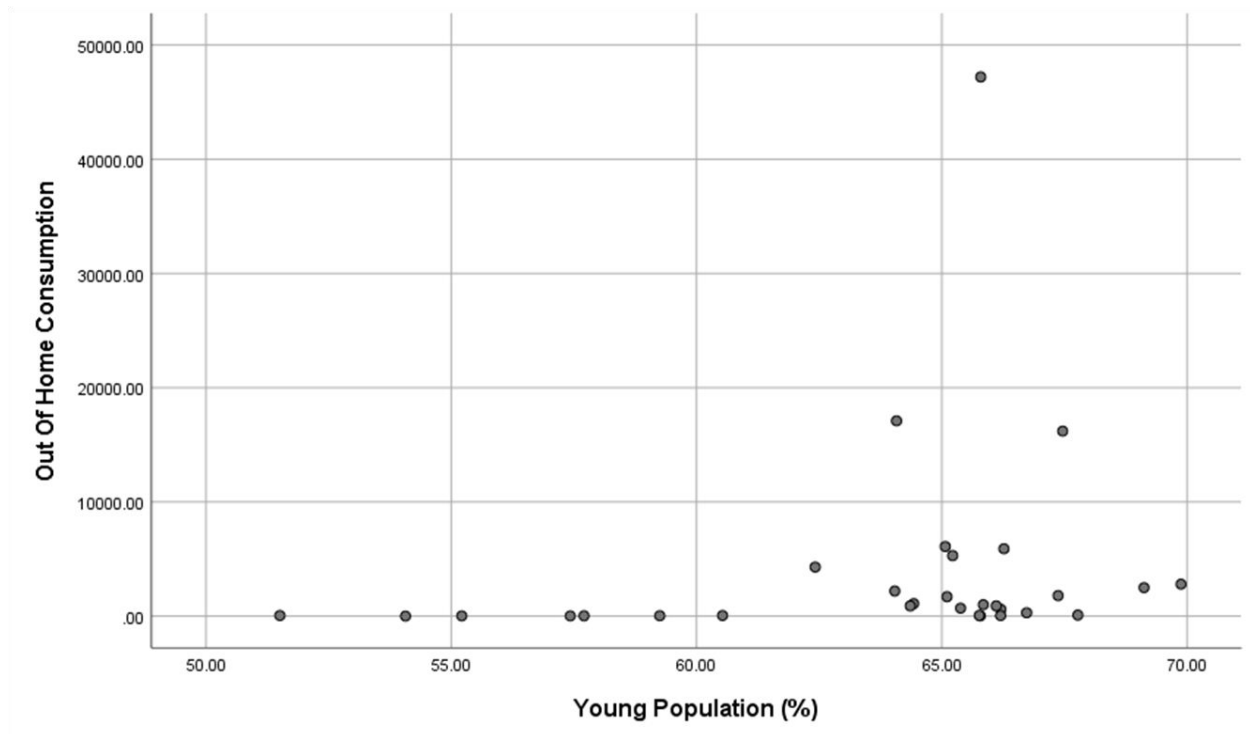
- Figure B1.3: Multivariate: Normality Out of Home Consumption



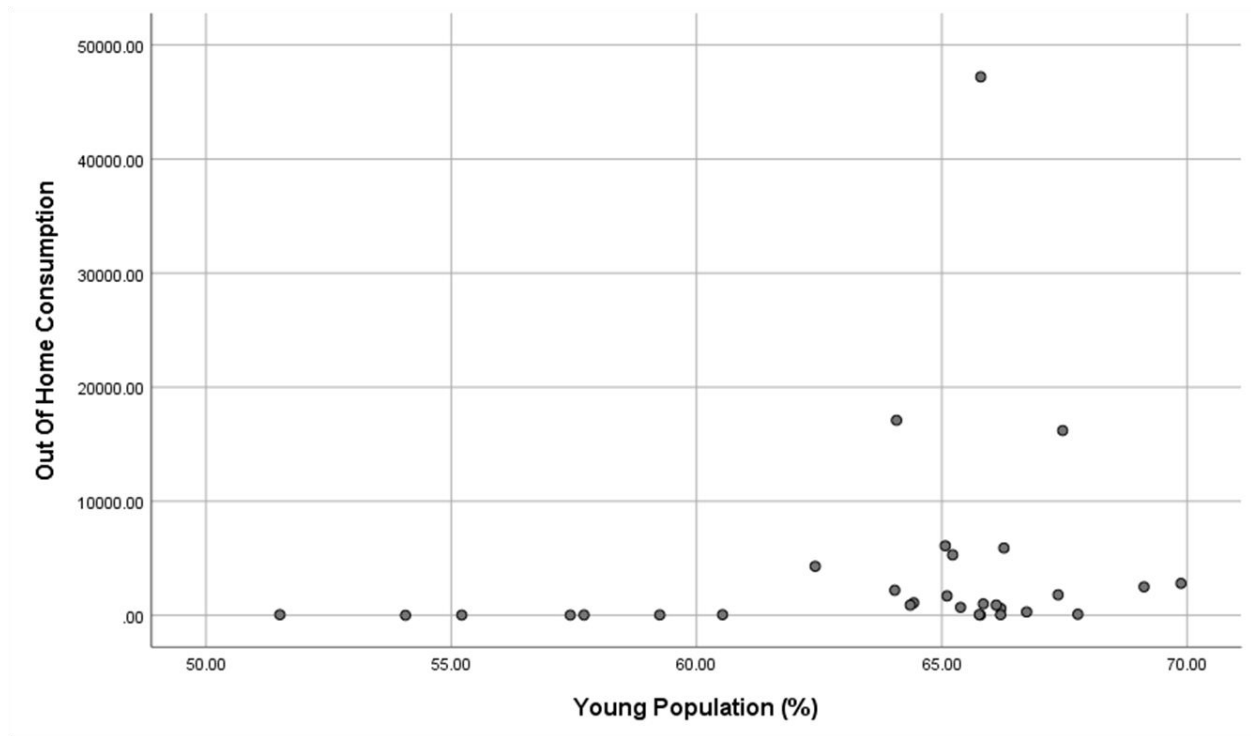
- Figure B1.4: Multivariate: Normality Home Consumption



- Figure B1.5 : Multivariate: Homoscedasticity Home Consumption



- Figure B1.6 :Multivariate: Homoscedasticity Out of Home



III. Appendix C: Quantitative Regression Analysis Supplementary Table and Figures

List Of Tables

- Table C.1: Regression Residuals Statistics

Table C1: Regression Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.1091	91.2878	39.8003	24.91355	30
Residual	-10.87350	17.92336	0.00000	5.57671	30
Std. Predicted Value	-1.513	2.067	0.000	1.000	30
Std. Residual	-1.774	2.924	0.000	0.910	30

a. Dependent Variable: Per Capita Consumption

- Table C.2: Regression Co linearity Diagnostics'

Table C2: Regression Collinearity Diagnostics³

Model		Eigenvalue	Condition Index	Proportions						
				(Constant)	Total Population	RGB (%)	Disposal Income	GDP Per Capita	Young Population (%)	
	1	4.262	1.000	0.00	0.02	0.00	0.02	0.01	0.00	
	2	0.743	2.394	0.00	0.18	0.02	0.21	0.06	0.00	
	3	0.562	2.753	0.00	0.79	0.00	0.22	0.05	0.00	
	4	0.391	3.301	0.00	0.01	0.00	0.48	0.60	0.00	
	5	0.039	10.438	0.01	0.00	0.82	0.06	0.27	0.02	
	6	0.002	49.283	0.99	0.00	0.16	0.01	0.00	0.99	

Dependent Variable:

• Table C.3 : Regression Raw Data

	Total pop	Youth pop	Muslim Pop	GDP Per Capita	Disposal Income	RGB percentage	Per capita beer consumption
Australia	25979	65.22081498	3	65099.8	824.3	0.25	75.84
Austria	9043	67.37057584	7	52084.7	241.15	0.69	28.27
Belgium	11669	65.10597642	6	49926.8	295.77	0.48	60.95

Bulgaria	64 65	66.7 294 203	12	1397 4.4	52.49	0.94	1.71
Burundi	12 89 0	51.5 076 372 1	2	259	2.47	0.9	6.07
Cambodia	16 76 8	65.3 826 236 1	2	1759. 6	18.16	0.38	71.25
Canada	38 93 0	66.2 661 526 3	5	5552 2.4	1160. 4	0.6	43.41
Croatia	38 54	66.2 022 169 7	2	1857 0.4	42.02	0.73	27.78
Denmark	59 03	64.4 274 617 4	8	6779 0.1	173.0 6	0.48	60.95
Fiji	93 0	65.7 845 282 5	6	5356. 2	3.51	0.74	22.76
France	67 93 6	62.4 192 118 6	8	4088 6.3	1483. 82	0.62	41.03
Gabon	23 89	60.5 304 217 3	8	8820. 3	6.15	0.33	75.15
Georgia	37 13	65.7 648 392 7	10	6675	18.09	0.76	28.41
Greece	10 56	64.0 414	1	2086 7.3	148.9 8	0.65	37.33

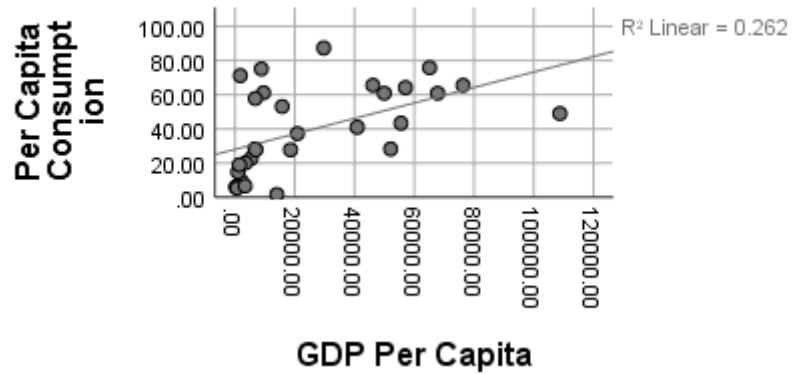
	7	158 9					
Kenya	54 02 7	59.2 513 265 5	11	2099. 3	86.63	0.8	9.46
Madagascar	29 61 2	57.4 264 276 8	1	516.6	10.71	0.9	6.07
Malawi	20 40 5	54.0 678 655 3	12	645.2	10.71	0.91	5.31
Netherlands	17 70 3	65.0 705 728 4	7	5702 5	432.8 8	0.51	64.21
Norway	54 57	65.8 454 086 5	4	1087 29.2	187.8 8	0.58	49.03
Philippines	11 55 59	64.3 573 605 3	5	3498. 5	307	0.77	20.11
Russia		69.1 218 123 9	11	1578 6.8	1082. 14	0.61	53.13
Rwanda	13 77 7	57.7 064 529 7	11	966.2	9.86	0.79	14.86
Serbia	67 60	67.7 729 333 7	2	9537. 7	43.4	0.47	61.18
South Africa	59 89 4	66.1 092 002	2	6766. 5	257.3 7	0.64	57.82

		7					
Spain	47 61 5	67.4 642 892 1	1	2967 4.5	807.2 8	0.22	87.37
Sri Lanka		66.1 989 776 3	8	3354. 4	46.14	0.84	6.63
Thailand	71 69 7	69.8 761 489 9	4	6910	270.1 5	0.73	27.78
United Kingdom	66 97 1	64.0 770 085 6	5	4612 5.3	105.8 5	0.45	65.55
United States	33 32 88	65.7 934 727 8	2	7632 9.6	105.8 5	0.45	65.55
Zambia	20 01 8	55.2 146 959 8	2	1456. 9	10.38	0.75	19.04

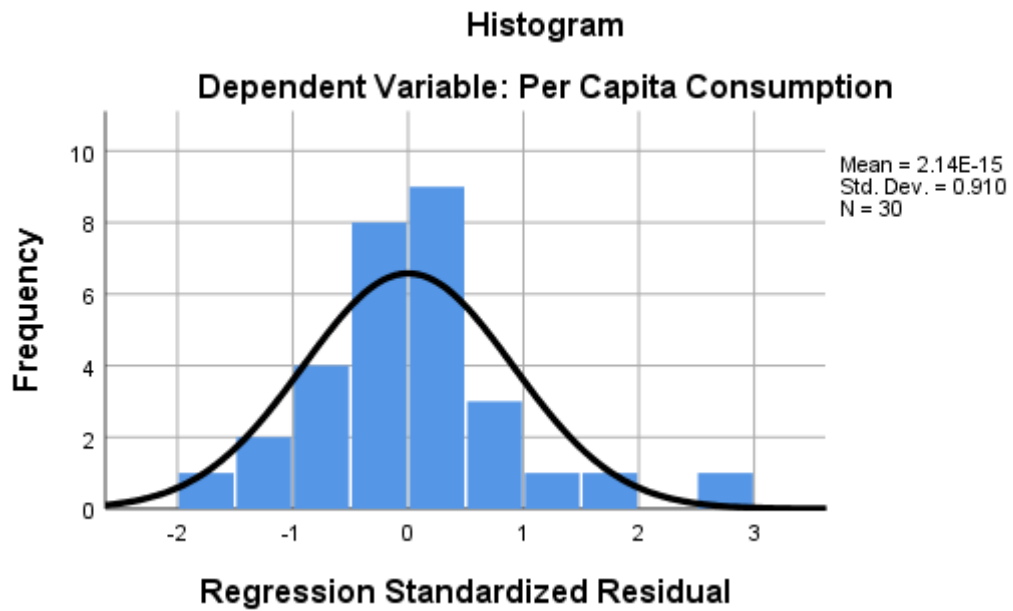
List of Figures

- Figure C.1:Regression Linearity Scatter Plot

Simple Scatter with Fit Line of Per Capita Consumption by GDP Per Capita

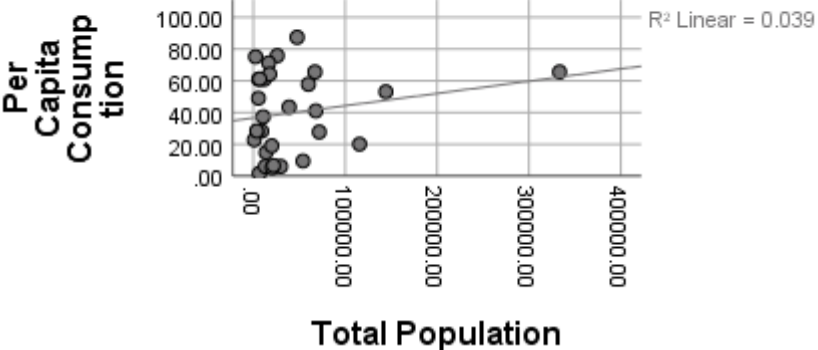


- Figure C.2: Regression Normality Histogram



- Figure C.3 : Regression Residual plots

Simple Scatter with Fit Line of Per Capita Consumption by Total Population



IV. Appendix D: Quantitative Cost/Revenue/Profitability Supplementary Table and Figures

List of Tables

- Table D1 : Cost Standard Consumption

Cons. Item Unit price LE	Cons. Item Unit price AP	Standard Quantity per hl	Standard Cost per hl LE	Standard Cost per hl AP	Account ID	LCC Description	Standard Cost per hl LE	Standard Cost per hl AP
0.15416	0.15416	307.5758	47.42	47.42	31001	HararPackaging - Glass Returnable Bottles	47.42	47.42
0.12209	0.12209	307.5758	37.55	37.55	31001	HararPackaging - Glass Returnable Bottles	37.55	37.55
0.13402	0.13402	307.5758	41.22	41.22	31001	HararPackaging - Glass Returnable Bottles	41.22	41.22
0.1485	0.1485	307.5758	45.67	45.67	31001	HararPackaging - Glass Returnable Bottles	45.67	45.67
0.04827	0.04827	307.5758	14.85	14.85	31001	HararPackaging - Glass Returnable Bottles	14.85	14.85
0.1178	0.1178	307.5758	36.23	36.23	31001	HararPackaging - Glass Returnable Bottles	36.23	36.23
0.06392	0.06392	307.5758	19.66	19.66	31001	HararPackaging - Glass Returnable Bottles	19.66	19.66
0.08008	0.08008	307.5758	24.63	24.63	31001	HararPackaging - Glass Returnable Bottles	24.63	24.63
0.09212	0.09212	307.5758	28.33	28.33	31001	HararPackaging - Glass Returnable Bottles	28.33	28.33
0.05505	0.05505	307.5758	16.93	16.93	31001	HararPackaging - Glass Returnable Bottles	16.93	16.93
0.12872	0.12872	307.5758	39.59	39.59	31001	HararPackaging - Glass Returnable Bottles	39.59	39.59
0.06786	0.06786	307.5758	20.87	20.87	31001	HararPackaging - Glass Returnable Bottles	20.87	20.87
0.08082	0.08082	307.5758	24.86	24.86	31001	HararPackaging - Glass Returnable Bottles	24.86	24.86
148.13805	148.13805	0.0075	1.11	1.11	31001	HararPackaging - Glass Returnable Bottles	1.11	1.11
148.13805	148.13805	0.0075	1.11	1.11	31001	HararPackaging - Glass Returnable Bottles	1.11	1.11
148.13805	148.13805	0.0075	1.11	1.11	31001	HararPackaging - Glass Returnable Bottles	1.11	1.11
148.13805	148.13805	0.0075	1.11	1.11	31001	HararPackaging - Glass Returnable Bottles	1.11	1.11
3.82244	3.82244	3.3345	12.75	12.75	31001	HararPackaging returnable Kegs	12.75	12.75
3.82244	3.82244	3.3345	12.75	12.75	31001	HararPackaging returnable Kegs	12.75	12.75
3.24478	3.24478	3.37	10.93	10.93	31001	BedelePackaging returnable Kegs	10.93	10.93
0.07387	0.07387	202.00	14.92	14.92	31001	BedelePackaging - Glass Returnable Bottles	14.92	14.92
0.03701	0.03701	202.00	7.48	7.48	31001	BedelePackaging - Glass Returnable Bottles	7.48	7.48
0.25293	0.25293	202.00	51.09	51.09	31001	BedelePackaging - Glass Returnable Bottles	51.09	51.09
0.25293	0.25293	303.06	76.65	76.65	31001	BedelePackaging - Glass Returnable Bottles	76.65	76.65
0.05822	0.05822	303.06	17.64	17.64	31001	BedelePackaging - Glass Returnable Bottles	17.64	17.64
0.05107	0.05107	303.06	15.48	15.48	31001	BedelePackaging - Glass Returnable Bottles	15.48	15.48
0.1253	0.1253	303.06	37.97	37.97	31001	BedelePackaging - Glass Returnable Bottles	37.97	37.97
0.06428	0.06428	303.06	19.48	19.48	31001	BedelePackaging - Glass Returnable Bottles	19.48	19.48
0.17265	0.17265	303.06	52.32	52.32	31001	BedelePackaging - Glass Returnable Bottles	52.32	52.32
0.12	0.12	303.06	36.37	36.37	31001	BedelePackaging - Glass Returnable Bottles	36.37	36.37
0	0	303.06	-	-	31001	BedelePackaging - Glass Returnable Bottles	-	-
0.05	0.05	303.06	15.15	15.15	31001	BedelePackaging - Glass Returnable Bottles	15.15	15.15
0.11208	0.11208	303.06	33.97	33.97	31001	BedelePackaging - Glass Returnable Bottles	33.97	33.97
0.17265	0.17265	202.00	34.88	34.88	31001	BedelePackaging - Glass Returnable Bottles	34.88	34.88
0.14314	0.14314	202.00	28.91	28.91	31001	BedelePackaging - Glass Returnable Bottles	28.91	28.91
0.06942	0.06942	202.00	14.02	14.02	31001	BedelePackaging - Glass Returnable Bottles	14.02	14.02
0.1394	0.1394	202.00	28.16	28.16	31001	BedelePackaging - Glass Returnable Bottles	28.16	28.16
144.38112	144.38112	0.04380	6.32	6.32	31001	BedelePackaging - Glass Returnable Bottles	6.32	6.32
144.38112	144.38112	0.06640	9.59	9.59	31001	BedelePackaging - Glass Returnable Bottles	9.59	9.59
144.38112	144.38112	0.06640	9.59	9.59	31001	BedelePackaging - Glass Returnable Bottles	9.59	9.59
144.38112	144.38112	0.06640	9.59	9.59	31001	BedelePackaging - Glass Returnable Bottles	9.59	9.59
144.38112	144.38112	0.06640	9.59	9.59	31001	BedelePackaging - Glass Returnable Bottles	9.59	9.59
144.38112	144.38112	0.04380	6.32	6.32	31001	BedelePackaging - Glass Returnable Bottles	6.32	6.32
0.17265	0.17265	303.06	52.32	52.32	31001	BedelePackaging - Glass Returnable Bottles	52.32	52.32
0.13218	0.13218	303.06	40.06	40.06	31001	BedelePackaging - Glass Returnable Bottles	40.06	40.06
0.06034	0.06034	303.06	18.29	18.29	31001	BedelePackaging - Glass Returnable Bottles	18.29	18.29
0.06248	0.06248	303.06	18.94	18.94	31001	BedelePackaging - Glass Returnable Bottles	18.94	18.94
2.51645	2.51645	3.500	8.81	8.81	31001	KilintoPackaging returnable Kegs	8.81	8.81
1.7385	1.7385	3.500	6.08	6.08	31001	KilintoPackaging returnable Kegs	6.08	6.08
1.57778	1.57778	3.500	5.52	5.52	31001	KilintoPackaging returnable Kegs	5.52	5.52
91.29575	91.29575	0.065	5.93	5.93	31001	KilintoPackaging - Glass Returnable Bottles	5.93	5.93
91.29575	91.29575	0.043	3.92	3.92	31001	KilintoPackaging - Glass Returnable Bottles	3.92	3.92
91.29575	91.29575	0.065	5.93	5.93	31001	KilintoPackaging - Glass Returnable Bottles	5.93	5.93
91.29575	91.29575	0.043	3.92	3.92	31001	KilintoPackaging - Glass Returnable Bottles	3.92	3.92
91.29575	91.29575	0.065	5.93	5.93	31001	KilintoPackaging - Glass Returnable Bottles	5.93	5.93
91.29575	91.29575	0.065	5.93	5.93	31001	KilintoPackaging - Glass Returnable Bottles	5.93	5.93
91.29575	91.29575	0.065	5.93	5.93	31001	KilintoPackaging - Glass Returnable Bottles	5.93	5.93
0	0	12.652	-	-	31001	KilintoPackaging - Glass Returnable Bottles	-	-
0.14506	0.14506	312.121	45.28	45.28	31001	KilintoPackaging - Glass Returnable Bottles	45.28	45.28
0.14003	0.14003	312.121	43.71	43.71	31001	KilintoPackaging - Glass Returnable Bottles	43.71	43.71
0.14083	0.14083	312.121	43.96	43.96	31001	KilintoPackaging - Glass Returnable Bottles	43.96	43.96
0.06136	0.06136	312.121	19.15	19.15	31001	KilintoPackaging - Glass Returnable Bottles	19.15	19.15
0.16921	0.16921	312.121	52.81	52.81	31001	KilintoPackaging - Glass Returnable Bottles	52.81	52.81
0.20799	0.20799	312.121	64.92	64.92	31001	KilintoPackaging - Glass Returnable Bottles	64.92	64.92
0.15196	0.15196	312.121	47.43	47.43	31001	KilintoPackaging - Glass Returnable Bottles	47.43	47.43
0.16921	0.16921	206.000	34.86	34.86	31001	KilintoPackaging - Glass Returnable Bottles	34.86	34.86
0.09079	0.09079	309.091	28.06	28.06	31001	KilintoPackaging - Glass Returnable Bottles	28.06	28.06
0.34437	0.34437	309.091	106.44	106.44	31001	KilintoPackaging - Glass Returnable Bottles	106.44	106.44
0.10394	0.10394	309.091	32.13	32.13	31001	KilintoPackaging - Glass Returnable Bottles	32.13	32.13
0.08055	0.08055	309.091	24.90	24.90	31001	KilintoPackaging - Glass Returnable Bottles	24.90	24.90
0.07603	0.07603	204.000	15.51	15.51	31001	KilintoPackaging - Glass Returnable Bottles	15.51	15.51
0.09345	0.09345	309.091	28.88	28.88	31001	KilintoPackaging - Glass Returnable Bottles	28.88	28.88
0.05746	0.05746	309.091	17.76	17.76	31001	KilintoPackaging - Glass Returnable Bottles	17.76	17.76
0.04935	0.04935	309.091	15.25	15.25	31001	KilintoPackaging - Glass Returnable Bottles	15.25	15.25
0.06767	0.06767	204.000	13.80	13.80	31001	KilintoPackaging - Glass Returnable Bottles	13.80	13.80
0.14083	0.14083	206.000	29.01	29.01	31001	KilintoPackaging - Glass Returnable Bottles	29.01	29.01
0.05428	0.05428	309.091	16.78	16.78	31001	KilintoPackaging - Glass Returnable Bottles	16.78	16.78
0.09264	0.09264	309.091	28.63	28.63	31001	KilintoPackaging - Glass Returnable Bottles	28.63	28.63
0.05056	0.05056	309.091	15.63	15.63	31001	KilintoPackaging - Glass Returnable Bottles	15.63	15.63
0.09	0.09	309.091	27.82	27.82	31001	KilintoPackaging - Glass Returnable Bottles	27.82	27.82
0.11997	0.11997	204.000	24.47	24.47	31001	KilintoPackaging - Glass Returnable Bottles	24.47	24.47
0.09345	0.09345	309.091	28.88	28.88	31001	KilintoPackaging - Glass Returnable Bottles	28.88	28.88
0.04941	0.04941	309.091	15.27	15.27	31001	KilintoPackaging - Glass Returnable Bottles	15.27	15.27
0.04535	0.04535	309.091	14.02	14.02	31001	KilintoPackaging - Glass Returnable Bottles	14.02	14.02
0.06234	0.06234	204.000	12.72	12.72	31001	KilintoPackaging - Glass Returnable Bottles	12.72	12.72
0.08206	0.08206	309.091	25.36	25.36	31001	KilintoPackaging - Glass Returnable Bottles	25.36	25.36
0.14506	0.14506	312.121	45.28	45.28	31001	KilintoPackaging - Glass Returnable Bottles	45.28	45.28
91.29575	91.29575	0.065	5.93	5.93	31001	KilintoPackaging - Glass Returnable Bottles	5.93	5.93
0.04974	0.04974	309.091	15.37	15.37	31001	KilintoPackaging - Glass Returnable Bottles	15.37	15.37
0.06144	0.06144	309.091	18.99	18.99	31001	KilintoPackaging - Glass Returnable Bottles	18.99	18.99
0.04941	0.04941	204.000	10.08	10.08	31001	KilintoPackaging - Glass Returnable Bottles	10.08	10.08
0.24533	0.24533	309.091	75.83	75.83	31001	KilintoPackaging - Glass Returnable Bottles	75.83	75.83

• Table D2: RPM Estimation Model

Facts and Figures		Comment	Kilinto	
			RP Type:	33cl XLN Kilinto
Days of sales per week	# of days of sales in peak month per week		6	
Monthly volume in HL during peak current year 2013	Monthly volume in HL during this year's peak, f.e. 100.000		Volume	peak / average
Monthly volume in HL during peak next year 2014	Monthly volume in HL during next year's peak, f.e. 100.000		85,000	#DIV/0!
Monthly volume in HL during peak year after next year 2015	Monthly volume in HL during year's peak after next year, f.e. 100.000		#REF!	1.02
Reallocated from other RP (hl) for next year	Extra demand for a RP by reallocating another SKU to this pack type. For instance use this bottle for Amstel 25cl		0	#REF!
Bottles per HL	Number of bottles per HL		303	
Production current year in HL	Production		0	
Production next year in HL	Production		1,000,000	
Sales current year in HL	Sales		0	
Sales next year in HL	Sales		1,000,000	
Sales year after next year in HL	Sales		#REF!	
Possession start current year	Possession on the 1st of the 1st month of the financial year+ investments current year		1	
Performance				
Current Year				
Site Loss	% of produced items		1.0%	
Market Loss	% of sold items		2.0%	
Total Losses current year (in items)				
	Estimated loss in items during current year		0	
	Estimated loss % compared to possession start current year		0%	
Next Year				
Site Loss	% of produced items		1.0%	
Market Loss	% of sold items		2.0%	
Total Losses next year (in items)				
	Estimated loss in items during next year		#REF!	
	Estimated loss % compared to possession start current year		n.a.	
Measured circulation time				
Assumed brewery stock empty	Time from filling until returning to brewery in # of calendar days		#REF!	
Assumed brewery stock full	Minimal stock of empty RP required during peak in # of days of sales		4.0	
	Minimal stock of full RP required during the peak in # of days of sales		5.0	
Assumed total rotation				
	In calendar days		35	
New assumptions Kilinto: dys				
	Sales further into country:		7.0	
	Increase agents stock:		5.0	
	Increase outlet stocks:		3.0	
RPM Investment				
Possession start current year	units		1	
Losses current year	units		0	
Possession start next year				
	units		1	
RPM required in peak next year				
	Peak HL x # bottles per HL x (assumed total rotation / normal rotation (31 days)) in units		29,081,134	
Losses next year				
	units		#REF!	
Gross requirement next year				
			#REF!	
Bottles / Kegs				
Net required investment {units}	units		#REF!	
Replacement Price (price per unit in €)	Eur to 3 decimal places		#REF!	
Net investment plan				
	Eur		#REF!	
Crates				
Net required investment {units}	units		#REF!	
Replacement Price (price per unit in €)	Eur to 3 decimal places		#REF!	
Net investment plan				
	Eur		#REF!	

- Table D3: RPM Purchase Cost Record

RPM	2021		2022		2023	
33cl XLN	0.27	6.94	0.27	7.55	0.28	8.53
50cl XLN	0.36	9.50	0.36	10.10	0.37	11.21
33cl Heineken	0.266	6.97	0.27	7.57	0.29	8.64
Kegs 30L	85.77	2,245.36	85.89	2,414.45	86.28	2,594.53
Crate 33cl XLN	5.45	142.79	5.51	154.82	5.57	167.49
Crate 50cl XLN	6.95	181.91	7.02	197.23	7.10	213.38
Crate 33cl Heineken	5.60	146.70	5.66	159.06	5.72	172.07

Table D4: RPM Cycle time & Breakage Record

Table D4: Core RPM Estimation		RPM Investment Model																					
Phase and Figures		Kilowatt		Tilman		Kilowatt		Tilman		Kilowatt		Tilman		Kilowatt		Tilman		Kilowatt		Tilman			
		RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type	RP Type		
		Volume	Peak / Average	Volume	Peak / Average	Volume	Peak / Average	Volume	Peak / Average	Volume	Peak / Average	Volume	Peak / Average	Volume	Peak / Average	Volume	Peak / Average	Volume	Peak / Average	Volume	Peak / Average		
Days of sales per week	47 days of sales in peak month per week	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Monthly volume in HL during peak current year 2013	Monthly volume in HL during this year's peak, i.e. 100,000	40,000		40,000		0		40,000		30,630	1.31	15,100	0.82	28,196	1.28	7,128	3.81	1,613	0.50	3,000	2.23	4,230	2.77
Monthly volume in HL during peak next year 2014	Monthly volume in HL during next year's peak, i.e. 100,000	85,000	1.02	6,000	3.13	22,000	3.77	31,000	1.16	15,000	1.26	28,931	1.16	6,619	1.27	5,947	1.02	4,742	1.66	4,801	2.19		
Monthly volume in HL during peak year after next year 2015	Monthly volume in HL during year's peak after next year, i.e. 100,000	98,332	1.12	3,336	1.53	16,128	1.17	33,500	1.15	6,000	1.13	26,500	2.49	6,500	1.77	9,000	1.05	4,000	2.10	0	0	0	0
Reallocated from other RP (H) for next year	Rate demand for a RP by reallocation another RP to the peak type. For reference, see the table for Annual Size	0		0		0		0		0		0		0		0		0		0		0	
Bottles per HL	Number of bottles per HL	303		200		3		303		3		303		200		200		200		3		3	
Production current year in HL	Production	1,000,000		23,000		70,000		331,678		321,000		143,000		274,899		21,032		4,288		16,884		16,200	
Production next year in HL	Production	0		0		0		326,488		90,303		270,000		22,418		1,806		16,086		16,306		16,306	
Sales current year in HL	Sales	1,000,000		23,000		70,000		331,000		349,897		145,000		340,000		62,697		68,975		34,303		25,391	
Sales next year in HL	Sales	1,052,497		30,893		105,443		349,897		90,303		270,000		44,107		127,849		103,000		22,649		26,442	
Sales year after next year in HL	Sales	1,052,497		30,893		105,443		349,897		90,303		270,000		44,107		127,849		103,000		22,649		26,442	
Possession start current year	Possession on the last day for month of the financial year - investment current year	1		1		1		9,979,629		23,976		10,309,006		2,989,002		2,132,261		7,879		7,879		102	
Performance																							
Current Year	if not provided items	1.0%	1.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
Site Loss	if not provided items	2.0%	2.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
Market Loss	if not provided items	2.0%	2.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
Total Capacity current year (in items)	Estimated loss, % compared to production after current year	8%	8%	8%	8%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	
Next Year	if not provided items	1.0%	1.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
Site Loss	if not provided items	2.0%	2.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
Market Loss	if not provided items	2.0%	2.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
Total Capacity next year (in items)	Estimated loss, % compared to production after current year	8%	8%	8%	8%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	
Measured circulation time	Time from being until returning to brewery in # of calendar days	25.0		42.0		10.0		30.0		7.0		22.0		41.0		41.0		13.0		9.0		9.0	
Assumed brewery stock empty	Minimal stock of empty RP required during peak in # of calendar days	4.0		4.0		2.0		4.0		2.0		4.0		4.0		4.0		2.0		2.0		2.0	
Assumed brewery stock full	Maximal stock of full RP required during the peak in # of calendar days	7.0		4.0		7.0		4.0		7.0		4.0		4.0		4.0		7.0		7.0		7.0	
Assumed total rotation	in calendar days	33		47		24		28		14		27		48		38		19		17		17	
RPM Investment																							
Possession start current year	Losses current year	1		1		1		9,979,629		23,976		10,309,006		2,989,002		2,132,261		7,879		7,879		102	
Possession start next year	Losses next year	1		1		1		8,451,129		23,300		9,161,498		2,492,100		2,120,921		7,769		7,767			
RPM required in peak next year	Peak RL, # of bottles per HL, 1 assumed base rotation / 47 days (11 days) in unit	20,081,134		1,820,452		57,305		7,474,747		23,233		7,581,538		1,850,052		1,263,371		7,819		8,289		289	
RPM required next year	Peak RL, # of bottles per HL, 1 assumed base rotation / 47 days (11 days) in unit	6,960,959		190,000		467		1,479,291		903		1,363,690		188,091		268,319		209		111			
Crack requirement next year		98,172,043		1,684,452		57,861		6,493,538		24,106		6,493,538		2,138,143		1,481,688		8,046		8,403			
Net required investment (units)		91,532,387		2,020,000		57,800		463,719		987		236,200		348,987		489,233		277		103			
Replacement Price (per unit in €)		0.205		0.207		0.207		0.205		0.205		0.205		0.205		0.205		0.205		0.205		0.205	
Net investment plan		12,158,222		655,264		6,469,347		113,889		83,619		0		0		26,190		62,888		62,888			
Crack		3,147,177		131,250		25,113		25,113		10,675		-17,106		-17,106		-38,462							
Replacement Price (per unit in €)		0.510		0.709		0.245		0.245		0.709		0.245		0.245		0.245		0.245		0.245		0.245	
Net investment plan		11,848,594		745,245		6,444,234		121,978		0		0		0		0		0		0			
Checklist																							
Capacity plan improvements included:	yes/no																						
Best Practices executed:	yes/no																						
Model attached to the Fund Application:	yes/no																						