

Hackathon Case Study

Title: Optimizing Beverage Sales and Inventory Management Using Data Analytics

About the Beverage Industry and Its Segments

The beverage industry is a vast and dynamic sector that includes the production, distribution, and marketing of drinks. It caters to consumer preferences based on factors such as health trends, convenience, and premiumization.

Major Segments of the Beverage Industry

The beverage industry is broadly divided into three major segments: alcoholic beverages, non-alcoholic beverages, and hot beverages. Alcoholic beverages include drinks that contain ethanol and are typically classified based on their fermentation or distillation process. This segment holds a significant share of the global beverage market, accounting for approximately 25-30% of the industry's total revenue. Beer dominates the category, followed by spirits and wine. The target market for alcoholic beverages primarily consists of adults aged 18 and above (or 21+ in some regions), with consumption patterns influenced by factors such as culture, social occasions, disposable income, and lifestyle preferences.

Non-alcoholic beverages account for the largest share, approximately 50-55% of the total beverage industry, driven by increasing health consciousness and demand for functional drinks. This segment includes carbonated soft drinks, juices, bottled water, ready-to-drink beverages, and functional health drinks. Historically, carbonated soft drinks dominated this category, but due to shifting consumer preferences, healthier alternatives such as bottled water, plant-based drinks, and sports beverages have experienced strong growth. The target market varies widely—carbonated drinks appeal to teenagers and young adults, juices and dairy-based drinks cater to families and children, while functional beverages target health-conscious consumers, athletes, and fitness enthusiasts.

Hot beverages, including tea, coffee, and hot chocolate-based drinks, represent approximately 15-20% of the global beverage market. Coffee holds the largest share within this category, driven by its widespread consumption in North America, Europe, and parts of Asia. Tea is also a major player, especially in China, India, and the UK, where it is deeply ingrained in cultural traditions. The target market for hot beverages includes working professionals, students, and older adults who seek either the stimulating effects of caffeine or the health benefits associated with herbal and specialty teas.

The beverage industry continues to evolve, driven by changing consumer preferences, innovation, and trends toward health-conscious and sustainable products. Companies are increasingly investing in low-sugar, organic, and plant-based options to cater to the growing demand for wellness-focused beverages.

Trends in the Beverage Industry

The beverage industry is witnessing significant transformations driven by evolving consumer preferences and technological advancements. A key trend is the growing focus on health and wellness, with increasing demand for low-sugar, organic, and functional beverages that offer added health benefits, such as probiotics, vitamins, and plant-based ingredients. Consumers are also becoming more environmentally conscious, leading to a rise in sustainability and eco-friendly packaging, with companies shifting toward recyclable, biodegradable, and reusable materials to reduce their environmental impact.

Another emerging trend is premiumization and craft drinks, as consumers seek high-quality, artisanal products such as craft beer, specialty coffee, and premium juices. Alongside this, the rise of plant-based and dairy alternatives has gained momentum, with growing popularity of almond, oat, and soy-based milk catering to lactose-intolerant and vegan consumers. Additionally, the industry is embracing personalization and tech integration, leveraging AI-driven product customization and smart vending machines to offer tailored beverage options based on individual preferences. These trends highlight the industry's shift toward innovation, sustainability, and consumer-driven experiences, shaping the future of the global beverage market.

Here we are majorly focusing on the non-alcoholic beverage industry.

Overview: In this case study, participants will analyze sales data from a beverage distribution network to derive actionable insights for improving business operations. The dataset includes information about store locations, product categories, vendor details, sales figures, and inventory levels. The objective is to develop data-driven strategies to enhance sales performance, optimize inventory management, and improve pricing strategies.

Business Context: A leading beverage distributor wants to improve its operational efficiency and profitability by leveraging data analytics. The company faces several challenges:

1. Understanding customer preferences across different store locations.
2. Optimizing inventory levels to reduce overstocking and stockouts.
3. Analyzing pricing strategies and their impact on revenue.
4. Identifying seasonal trends to adjust supply and marketing strategies accordingly.
5. Reducing operational inefficiencies and waste in distribution and storage.

The company seeks data-driven solutions to address these challenges and is looking for innovative approaches to gain a competitive advantage in the market.

Case Study Objectives: Participants are expected to:

1. **Analyze Sales Performance:** Identify trends in beverage sales across different store locations and product categories.
2. **Inventory Management:** Develop strategies to optimize inventory management.
3. **Market Trends & Demand Fluctuations:** Analyze the influence of market trends and shifting consumer demand on beverage sales.

Hackathon Challenge: Participants must develop a data-driven strategy that answers the key analytical questions and provides actionable insights to optimize beverage sales and distribution. The solution should be scalable, applicable in real-world business operations, and provide measurable benefits to the beverage industry.

Evaluation Criteria:

1. **Depth of Analysis** – Quality and accuracy of insights derived from the dataset.

2. **Predictive Accuracy** – Effectiveness of prediction of models.
3. **Practicality of Recommendations** – Feasibility and business impact of proposed solutions.
4. **Visualization Effectiveness** – Clarity and informativeness of visual representations.
5. **Innovation in Approach** – Creativity and originality in problem-solving methodologies.

Points to Ponder:

Generic Case Inquiry:

- What business objectives can be achieved from the analysis of the beverage sales data?
- What analytical techniques could be deployed to derive meaningful insights from the dataset?
- How can the learnings from an initial data analysis be applied across the entire database to optimize sales and inventory management?
- Where does this analysis fit within the overall analytics lifecycle of a business intelligence project?

Specific Case Inquiry:

- What factors influence customer preferences for certain beverages across different regions and demographics?
- Identify any data quality issues within the dataset and recommend appropriate data cleaning techniques.
- What are the key metrics deployed to assess the accuracy and reliability of the dataset for predictive modelling?
- Can we forecast beverage sales trends for the next five years based on historical data?
- Can machine learning models be used to predict the success of a new product launch in the beverage industry?
- What pricing strategies can be implemented to maximize revenue without affecting consumer demand?
- How do promotional campaigns impact sales, and what metrics should be used to measure their effectiveness?
- Are there any correlations between sustainability initiatives (such as eco-friendly packaging) and sales growth?
- What external factors (weather, economic conditions, health trends) influence beverage sales the most?