**Project Synopsis**

**INDEX**

|  |  |  |
| --- | --- | --- |
| **Sr.no** | **Particulars** | **Page. No** |
| **1** | **Executive Summary** | **2** |
| **2** | **Objectives and Scope** | **2** |
| **3** | **Methodology** | **3** |
| **4** | **Preliminary Findings & Expected Results** | **4** |
| **5** | **Declaration** | **5** |

**1**

**Title:**

Optimizing Supply Quantity in Instant Noodles Warehouses: A Data-Driven Approach for Demand-Supply Alignment and Cost Reduction

**Executive Summary:**

In the fast-paced consumer goods industry, companies are striving to streamline their supply chains to meet consumer needs and reduce costs. This study focuses on a specific company that recently entered the instant noodles market and is facing challenges with inventory management across its warehouses. There are instances of stockouts when demand exceeds supply and excess inventory when demand is low.

The aim of this research is to create a data-driven model to optimize inventory levels in each warehouse nationwide. By analysing historical data, the model will identify demand patterns and determine the optimal quantity of product to allocate to each warehouse. This will help the company align supply with demand and reduce inventory costs.

By focusing on this specialized niche of supply chain management and inventory optimization within the FMCG industry, the research seeks to provide valuable insights for companies operating in the instant noodles market, ultimately enhancing operational efficiency and minimizing cost losses.

**Objectives and Scope:**

* + **Objective 1: Optimize Supply Quantity**: The primary goal is to develop a data-driven model to optimize the supply quantity in each warehouse of the FMCG company's instant noodles business. This aims to synchronize supply with demand and mitigate inventory cost losses.
  + **Objective 2: Enhance Operational Efficiency**: The focus is on enhancing operational efficiency by analysing historical data to discern demand and supply patterns. This analysis will facilitate proactive decision-making and resource allocation.
    - **Significance of the Project**: This research holds significant importance for the FMCG company as it addresses the critical issue of inventory cost losses arising from discrepancies between demand and supply in the instant noodles business. By optimizing supply quantities across warehouses, the company stands to improve cost-effectiveness, enhance customer satisfaction through improved product availability, and streamline its supply chain operations.

**Differentiation from Pre-existing Solutions**: The project's solution sets itself apart by employing advanced data analytics techniques to accurately tailor supply quantities

2

to specific warehouse demands. Through the integration of historical data analysis and predictive modelling, the proposed solution promises a more precise and proactive approach to inventory management. This ensures optimal stock levels and minimizes cost inefficiencies associated with inventory imbalances.

**Methodology:**

The research will adopt a descriptive and exploratory approach to comprehend the existing demand-supply disparity in the FMCG company's instant noodles business. The following steps will be undertaken:

**Data Collection:**

* **Secondary Data:** Historical sales, inventory, and demand data will be extracted from the company's databases.
* **Primary Data:** Surveys and interviews with supply chain and warehouse managers will be conducted to grasp challenges and potential solutions for the demand-supply mismatch.

**Data Cleaning and Preprocessing:**

* Techniques like handling missing values, outlier removal, and data normalization will be employed to ensure data quality.

**Exploratory Data Analysis (EDA):**

* Descriptive statistics, correlation analysis, and visualization methods will be utilized to uncover patterns and trends in the data.

**Inventory Optimization Model:**

* A model leveraging historical data will be crafted to determine the optimal shipment weight to each warehouse, considering factors like lead times, demand patterns, and inventory costs.

**Demand Pattern Analysis:**

* Analysis of demand patterns across different regions will inform advertising strategies and enhance demand forecasting.

**Machine Learning Algorithms:**

* Supervised learning algorithms (e.g., linear regression, decision trees, random forests) will forecast future demand and optimize inventory levels.
* Unsupervised learning algorithms (e.g., clustering, association rule mining) will identify data patterns and relationships.

3

**Model Tuning and Business Implication:**

* Ensemble modelling and other tuning measures will enhance model accuracy and reliability.
* The business implications of the optimized model will be interpreted and presented to the company's management for decision-making.

Through this methodology, the research aims to offer a holistic solution to the demand-supply mismatch in the FMCG company's instant noodles business, ultimately leading to cost savings and enhanced operational efficiency.

**Preliminary Findings & Expected Results:**

Current models addressing supply chain optimization typically integrate data analytics, machine learning algorithms, and optimization techniques to tackle similar challenges. These models prioritize factors such as historical data analysis, demand forecasting, inventory management, and supply chain design to optimize supply quantities and minimize costs.

**Expected Results from the Proposed Model:**

1. **Improved Demand-Supply Alignment:** The model is anticipated to align supply quantities more accurately with demand patterns, thereby reducing instances of excess inventory or stockouts.
2. **Cost Reduction:** Optimizing supply quantities in each warehouse should lead to a decrease in inventory costs associated with demand-supply imbalances.
3. **Operational Efficiency:** The model is expected to enhance operational efficiency by streamlining inventory management processes and ensuring optimal stock levels across warehouses.
4. **Enhanced Decision-Making:** Through data-driven insights, the model will empower management to make informed decisions regarding supply chain operations and resource allocation.
5. **Increased Customer Satisfaction:** Improved product availability resulting from optimized supply quantities is likely to enhance customer satisfaction and foster loyalty.

By leveraging historical data, demand patterns, and supply chain constraints, the model is poised to offer a tailored solution addressing the specific challenges encountered by the FMCG company. This is anticipated to result in a more efficient and cost-effective supply chain operation within the instant noodles business.

4

* **DECLARATION**I, Amit, certify that this project is my own work, based on my personal study and/or research and that I have acknowledged all material and sources used in its preparation, whether they be books, articles, reports, lecture notes, and any other kind of document, electronic or personal communication. I also certify that this project has not previously been submitted for assessment in any academic capacity, and that I have not copied in part or whole or otherwise plagiarized the work of other persons. I confirm that I have identified and declared all possible conflicts that I may have.

5