PROJECT PROPOSAL

AN ANALYSIS OF A CORRUGATED BOX MANUFACTURING FIRM

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INDUSTRY BACKGROUND

Corrugated boxes are made by assembling three layers of corrugated cardboard sheets. These sheets help to trap air between them, acting as a cushion to preserve the contents of the box.

Corrugated boxes provide several advantages over other types of packing, including strength, lightweight, flexibility, high durability, and aesthetic appeal, furthermore, these boxes are environmentally friendly because they are made without the use of any toxic chemicals and can be readily recycled.

Corrugated boxes are widely utilized in the packaging of food and beverages, chemicals, glassware and ceramics, paper, electronics, textiles, personal care and household products.

The rise of numerous end use sectors has led to an increase in the demand for corrugated boxes on a global scale. Additionally, the e-commerce industry is growing swiftly as a result of the benefits of online shopping, including free shipping options, easy return policies, and hassle-free delivery.

The worldwide corrugated boxes market is now being driven by the burgeoning trend of customized packaging as well as the advent of product-specific corrugated boxes that protect objects from mechanical stress.

ORGANIZATION BACKGROUND

Deluxe Manufacturing Agency, a small manufacturing company based in Kolkata, is mainly engaged in the production of **corrugated boxes, cores, rolls** and **corrugated board**. In addition to making the above items, the firm is also involved in the spindle and reel business. Corrugated boxes will belong to the segment of packaging solutions.

The company buys raw materials from the market only after accepting orders from the respective firms which then undergoes through various processing stages to get transformed into the desirable products. The stages of manufacturing Corrugated Rolls & Sheet, Corrugated Carton Boxes and Cores are shown in the diagram below.
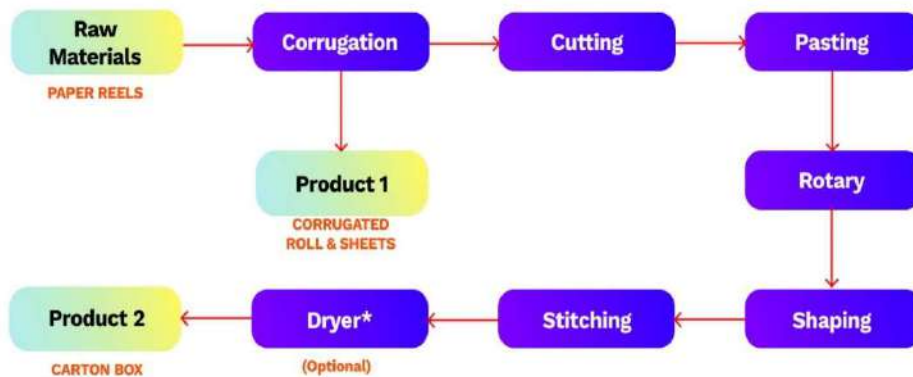
Steps for manufacturing of i)Corrugated Rolls & Sheets and ii)Carton Boxes
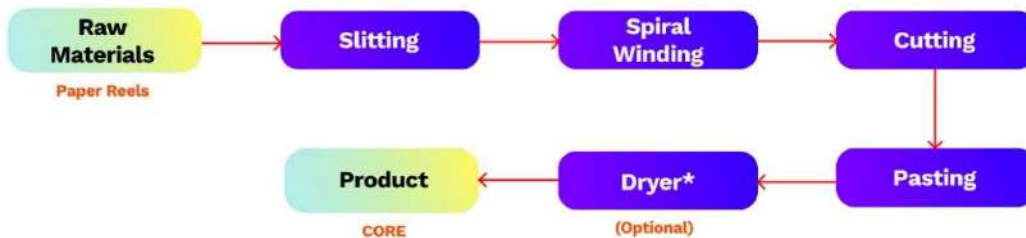
Steps for manufacturing of Core

BUSINESS PROBLEMS

- **High manufacturing costs and low profits** as forced to operate under the "**going rate pricing**" strategy
- The firm wants to **identify important clients and important products** sold in the company
- **Labour centric processes** involved which is time consuming

OBJECTIVES

- To look for potential **under-utilization of assets** (machines)
- To look for **seasonality/trends** in sales
- To help identify **important customers**
- To help identify **top revenue generating products/sub-products**
- To assist the firm to take data driven decisions to **maximize profits**

STEPS

REQUIRED DATA

Sales data which includes (but not limited to)
- **date** of sales
- **name** of the company purchasing
- name of the sold **product**
- **category** of the sold product (Reel/Roll/Corrugated Carton box etc.)
- **quantity** of the sold product along with unit of the quantity purchased
- **unit rate/price** of the type of the sold product

Purchase data which includes (but not limited to)
- **date** of purchase
- **seller** name
- **quantity** purchased along with unit of the quantity purchased
- **unit rate/price** of the type of the purchased product

- credited amount

Asset (Machine) data which includes (but not limited to)
- Capacity of the machine (Volumes per day)
- Utilization of the machine (Volumes per day)

Sales data is required to identify best revenue generating companies/the important customers and the best performing products in terms of revenue generation and sales.

Seasonality/trends can be figured out by analyzing the sales data.

Purchase data is required to find out the profit margin.

Machine data is required to look for potential under-utilization of the machines and act on it by finding more business opportunity with potential customers.

Constraints: Financial Data and Inventory Data is not available to me due to some privacy concerns.

METHODS

- **Pareto analysis** should be done in order to find the top revenue generating companies.
- **Scatterplots** of the products with respect to volume and sales should be done in order to identify the most important product in terms of sales and revenue.
- **Time series analysis** must be done for each product across each financial year to look for potential trends and to act on them
- Further **exploratory data analysis** must be done using various tools and techniques to look out for insights and answer a business problem

TOOLS
- **Python** and other scripting tools may be used for data pre-processing/cleansing in order to transform the data and make it ready for analysis
- **Python/Excel/Tableau** can be used to perform data analysis in order to address the business problems
- **Python/Excel/Tableau** can be used for exploratory data analysis and building visualisations for effectively communicating the findings to the firm

EXPECTED TIMELINE

Data gathering and cleansing is expected to take about 7-14 days given that the firm will give access to three years data (FY 19-21) and the data will be in an uncleaned format (a fair portion of the data might even be stored physically in invoice books/registers).

Analyzing the data, communicating the results with the firm and giving recommendations to the firm is expected to take about 2-3 days.

01 Data Gathering
7 Days

02 Data Cleansing
7 Days

03 Data Analysis
2-3 Days

04 Communicating Results
1 Day

EXPECTED OUTCOMES

- Successfully identifying **important companies** contributing to the majority of the revenue generation of the firm (The most important firms)
- Successfully identifying the most **important products** manufactured by the company in terms of sales and volume
- Act on the **seasonality of the data** and look for ways to increase business opportunity
- Finding **whether machines are under-utilized** and acting on it (if under-utilized) by **finding more business opportunity** with the frequent customers
- Coming up with an efficient way to **lower the manufacturing costs** and **increase profit margins** (upon discussing with firm and after analysing the data)