Refining the inventory Management for Effective functioning in Agrochemical.

A MID TERM REPORT FO BDM CAPSTONE PROJECT

SUBMITTED BY
NAME: PRIYANKA
ROLL NUMBER: 23ds3000194

IITM Online BS Degree Program
Indian Institute of Technology Madras , Chennai
Tamil Nadu, India, 600036

CONTENTS:

EXECUTIVE SUMMARY:

This report offers examination of and analysis information gathered from **Shri Ganesh Fertilizer,** an Agro chemicals store situated in Jind, Haryana.This entity operates within the domain of **business-to-consumer** transactions, specializing in a diverse array of agrochemical products, ranging from insecticides and fungicides to herbicides and plant nutrients. The essence of this analysis lies in its aim: to analyze the inventory and sales management of agrochemical stores to identify the potential and the area where the improvement is required. The store encounters a significant challenge in effectively managing its inventory, presenting a obstacle to its operational efficiency and profitability.This hurdle manifests in the complexity of inventory control, where the store struggle with complexities such as maintaining optimal stock levels, ensuring timely replenishment of goods, and mitigating the risk of overstocking or stockouts. Additionally the challenge of fulfilling customer demand due to product unavailability adversely impacts the efficiency of the ordering process and customer service standards.

The analysis draws upon available datasets inclusive daily sales and purchase records, as well as profit and loss assessments of primary data taken from the organization,it contains april to june data of year 2023.To enhance inventory management, here we analyze sales data to forecast demand, optimize inventory levels based on product turnover rates, and integrate technology for real-time visibility and automated replenishment, ensuring efficient operations and customer satisfaction. Furthermore, the analysis underscores the essential of more detailed data on sales categories and quantities to address ongoing challenges effectively.This analysis Operates as the essential elements for informed decision-making and strategic planning. It furnishes Ganesh fertilizer with better insights aimed at nurturing growth, enhancing profitability and sustainability.

PROOF OF AUTHENTICITY OF THE DATA:

The data obtained is of primary nature, Representing unstructured information gathered through direct interactions with the business owner. They preserve their data in an unstructured way as bill invoice and carefully update them on a daily basis. After telling my motive to use their data for my project i am able to convince the store head to give me the specific data from their maintained records.Although initially it was an unstructured format, a lots of efforts were made to organize the data where feasible, transferring it to google spreadsheets for further manipulation and analysis. Subsequent analysis was conducted utilizing a combination of Excel and Python tools, a comprehensive analysis happened, aimed at sharp patterns, trends, and insights embedded within the data.

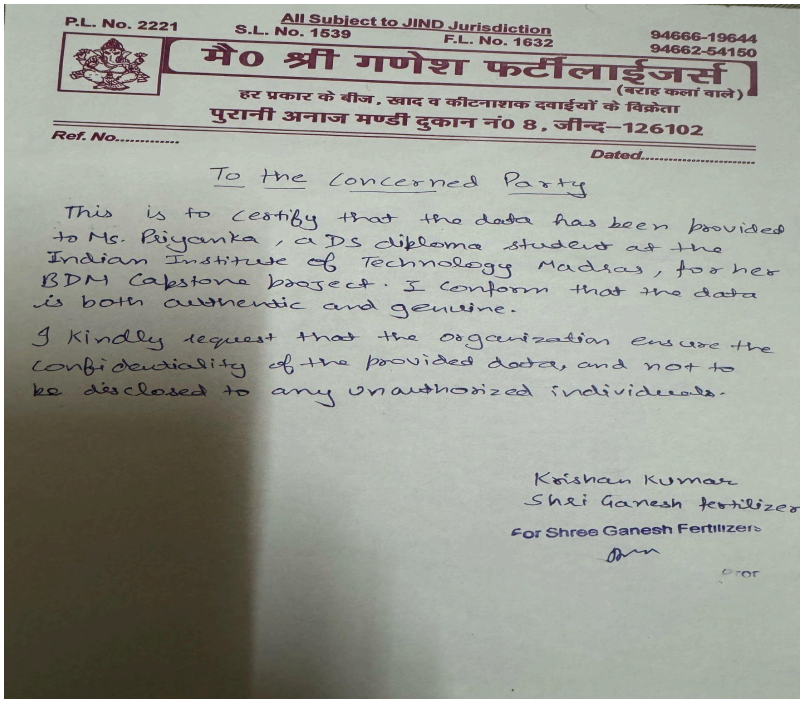
Recorded video with the Mr. Krishan Kumar

Link:

https://drive.google.com/file/d/1DhUvxsWIcBTh6Ft0MN3vF4FZ1MkIIQsi/view?usp=sharing

In the video, Mr. Krishan Kumar provides insights into the establishment of the store, including its origin date and foundational details. Furthermore, he told us about how he explores the operational complications of sales processes within the warehouse store, explaining on encountered challenges and issues faced by the enterprise.

Here is the approval from the business organization for the use of their data in the project.



P.L. No. 2221 S.L. No. 1539 All Subject to JIND Jurisdiction F.L. No. 1632

94666-19644
94662-54150

मै0 श्री गणेश फर्टीलाईजर्स
(बराह कलां वाले)
हर प्रकार के बीज, खाद व कीटनाशक दवाईयों के विक्रेता
पुरानी अनाज मण्डी दुकान नं0 8, जीन्द–126102

Ref. No.....

Dated.....

To the Concerned Party

This is to certify that the data has been provided to Ms. Priyanka, a DS diploma student at the Indian Institute of Technology Madras, for her BDM Capstone project. I conform that the data is both authentic and genuine.

I Kindly request that the organization ensure the confidentiality of the provided data, and not to be disclosed to any unauthorized individuals.

Krishan Kumar
Shri Ganesh fertilizer
For Shree Ganesh Fertilizers

- **Picture displaying the store including Mr. Krishan Kumar and the semi structured data**

Fig: store owner

fig: store

Fig: my self in store

SHREE GANESH FERTILIZERS-2023-2024	Invoice No.	Dated
Company's GSTIN/U 06AOGPG4794P1ZA	612	28-Jun-2023
	Delivery Note	Mode/Terms of Payment
Buyer		
SANJAY S/O SATBIR KHARK RAMJI	Supplier's Ref.	Other Reference(s)
State Name : Haryana, Code : 06	612	
	Buyer's Order No.	Dated
	Despatch Document No.	Delivery Note Date
	Despatched through	Destination
	Terms of Delivery	

Sl No.	Description of Goods	HSN/SAC	Quantity	Rate	per	Amount
1	S-95-4KG	1209	4.000 KG	87.50	KG	350.00
2	BINOLA CAKE CATTALE FEED (MAKHAN GOLD)		2 BAG	1700.00	BAG	3400.00
3	BAJRA 9444-1.5KG	12092120	1.500 KG	326.67	KG	490.00
4	SURJAN HB BAJRA -1.5KG	1209	3.000 KG	273.33	KG	820.00
	Batch: 3.000 KG					

SHREE GANESH FERTILIZERS-2023-2024	Invoice No.	Dated
Company's GSTIN/U 06AOGPG4794P1ZA	121	7-May-2023
	Delivery Note	Mode/Terms of Payment
Buyer		
NARESH KUMAR GHIMANA	Supplier's Ref.	Other Reference(s)
State Name : Haryana, Code : 06	121	
	Buyer's Order No.	Dated
	Despatch Document No.	Delivery Note Date
	Despatched through	Destination
	Terms of Delivery	

Sl No.	Description of Goods	HSN/SAC	Quantity	Rate	per	Amount
1	SPARTAN PB 1718 T/L IN -4KG	10061010	16.000 KG	175.00	KG	2800.00
	Batch: 16.000 KG					
2	SPARTAN PB 1885 T/L IN-4KG	10061010	12.000 KG	255.00	KG	3060.00
	Batch: 12.000 KG					
3	SPARTAN PB 1847 T/L IN -4KG		16.000 KG	255.00	KG	4080.00

Fig: Unstructured data

METADATA:

Dataset name: BDM dataset

Outline: This dataset enfolds comprehensive transactional information from april to june period of Shri Ganesh Fertilizer.Through detailed processing in Microsoft Excel, and the essential analysis has been done.

Link:https://docs.google.com/spreadsheets/d/1zJQWg2wrsmzeHZ7yipmLUKe_SgQAGZNE0t93ipq86KY/edit?usp=sharing

The schema includes the following key details:

- **Date:**The specific date when each transaction occurred.
- **Day:**The day of each transaction
- **Week:**The specific week during which the transaction took place.
- **Month:**The month of each transaction
- **Customer name:** Identification of the purchasing customer
- **Category:** The specific fertilizer product being sold
- **Company:**The name of the company involved in the transaction

- **Location:**Geographic information about the customer's location.
- **Package segment:**Classification of the product packaging
- **Original cost:**The cost at which the company obtains the product
- **Retail price per unit:**The price at which the product was sold to customers
- **Volume:**The number of units of the product sold in each transaction
- **Way of payment:**The method used by the customer to complete the transaction.

Time frame: The dataset of transaction data spanning a three-month period, specifically from 1 April 2023, to 30 June 2023. This time frame includes a detailed account of transactions conducted across these dates, providing a detailed summary of activities within the specified duration.

SCHEMA:

	DATE	DAY	WEEK	MONTH	JSTOMER NAM	CATEGORY	COMPANY	LOCATION	CKAGE SEGM	RIGINAL CO	AIL PRICE/ U	VOLUME	Y OF PAYME
2	1-Apr-2023	Saturday	Week 1	April	Mohan	UREA CFCL	IFFCO	Jind	1.5 ltr	260.5	266.50	30	UPI
3	1-Apr-2023	Saturday	Week 1	April	Mohan	DAP NFL	IFFCO	Jind	500 ml	1345	1350	16	UPI
4	1-Apr-2023	Saturday	Week 1	April	Mohan	NASA	TROPICAL AGRO	Jind	1 kg	187	220	90	UPI
5	1-Apr-2023	Saturday	Week 1	April	Sanjay	RIFIT PLUS	TROPICAL AGRO	Jind	600 ml	289	340	5	UPI
6	1-Apr-2023	Saturday	Week 1	April	Sanjay	TAGSUL	TROPICAL AGRO	Jind	1 kg	215	250	4	UPI
7	1-Apr-2023	Saturday	Week 1	April	Sanjay	REVIVE	TROPICAL AGRO	Jind	500 gm	180.6	210	1	UPI
8	1-Apr-2023	Saturday	Week 1	April	Sanjay	PARAM	HERANBA	Jind	500 ml	272	320	1	UPI
9	1-Apr-2023	Saturday	Week 1	April	Ramakant	FIDA	HERANBA	Ramrai	40 gm	221	260	2	CASH

This structured schema is essential in supporting various critical business analysis and strategic decision-making processes. By analyzing purchasing and selling rates alongside sales volumes, the company can optimize pricing strategies and implement effective discount schemes to enhance sales and profitability and detailed tracking of quantities sold allows for maintaining optimal inventory levels, preventing both overstocking and stockouts.Further more we can analyze geographic trends and customer demographics from their company can customize its marketing strategies to specific regions or customer groups.

DESCRIPTIVE STATISTICS:

The process contains systematic arrangement of relavent elements within a dataset, including statistical measures. This aims to furnish a breif and purposeful portrayal of the dataset's characteristics. These statistical analyses serve as pivotal tools in insighting the typical variance and distribution patterns within the data, thereby furnishing invaluable insights crucial for informed business decision-making and strategic planning initiatives.

1. **Original price:**
    - **Count**: The dataset comprises 915 entries.
    - **Mean**: The average original price is approximately 485.87.
    - **Standard Deviation**: indicating the variation or dispersion of the original price data points around the mean. Its approximately 531.71
    - **Minimum**: The lowest recorded purchase rate is 10

- **25th Percentile**: The value below which 25% of the original price fall is approximately 186.67
- **Median (50th Percentile)**: The median original rate which is the middle value when the data is ordered, is approximately 277.66
- **75th Percentile**: The value below which 75% of the original price fall is approximately 620.50
- **Maximum**: The highest recorded original price is 2890

2. **Retail price:**
   - **Count**: The dataset comprises 915 entries.
   - **Mean**: The average retail price is approximately 553.93
   - **Standard Deviation**: indicating the variation or dispersion of the retail price data points around the mean. Its approximately 613.42
   - **Minimum**: The lowest recorded retail price is 15
   - **25th Percentile**: The value below which 25% of the retail price fall is 220
   - **Median (50th Percentile)**: The median retail price which is the middle value when the data is ordered, is 320
   - **75th Percentile**: The value below which 75% of the retail price fall is 730
   - **Maximum**: The highest recorded retail price is 34003
3. **Volume:**
   - **Count**: The dataset comprises 915 entries.
   - **Mean**: The average retail price is approximately 7.14
   - **Standard Deviation**: indicating the variation or dispersion of the retail price data points around the mean. Its approximately 12.81
   - **Minimum**: The lowest recorded retail price is 1
   - **25th Percentile**: The value below which 25% of the retail price fall is 2
   - **Median (50th Percentile)**: The median retail price which is the middle value when the data is ordered, is 4
   - **75th Percentile**: The value below which 75% of the retail price fall is 8
   - **Maximum**: The highest recorded retail price is 187
4. **Total:**
   - **Count**: The dataset comprises 915 entries.
   - **Mean**: The average retail price is approximately 3040.61
   - **Standard Deviation**: indicating the variation or dispersion of the retail price data points around the mean. It's approximately 4953.19
   - **Minimum**: The lowest recorded retail price is 15
   - **25th Percentile**: The value below which 25% of the retail price fall is 590
   - **Median (50th Percentile)**: The median retail price which is the middle value when the data is ordered, is 1400
   - **75th Percentile**: The value below which 75% of the retail price fall is 3168
   - **Maximum**: The highest recorded retail price is 41850

5. **Daily return:**
   - **Count**: The dataset comprises 915 entries.
   - **Mean**: The average retail price is approximately 344.53
   - **Standard Deviation**: indicating the variation or dispersion of the retail price data points around the mean. It's approximately 657.87
   - **Minimum**: The lowest recorded retail price is 20
   - **25th Percentile**: The value below which 25% of the retail price fall is 64
   - **Median (50th Percentile)**: The median retail price which is the middle value when the data is ordered, is approximately 149.24
   - **75th Percentile**: The value below which 75% of the retail price fall is 340
   - **Maximum**: The highest recorded retail price 10895

	ORIGINAL COST	RETAIL PRICE/ UNIT	VOLUME	TOTAL	DAILY RETURNS
count	915.000000	915.000000	915.000000	915.000000	915.000000
mean	485.877114	553.939060	7.147541	3040.617825	344.535865
std	531.712665	613.419767	12.812444	4953.190280	657.872347
min	10.000000	15.000000	1.000000	15.000000	-20.000000
25%	186.670000	220.000000	2.000000	590.000000	64.000000
50%	277.669500	320.000000	4.000000	1400.000000	149.240000
75%	620.500000	730.000000	8.000000	3168.000000	340.000000
max	2890.000000	3400.000000	187.000000	41850.000000	10895.000000

Fig: Descriptive Statistics

IN-DEPTH DESCRIPTION AND ANALYSIS PROCESS:

Over the period organizing the data, significant alterations were made to the raw dataset to extract crucial insights regarding the financial and operational aspects of the store. Among the notable transformations add some new columns.The Total column was engineered to compute the comprehensive price of each product by combining its Retail price with the volume of items sold. This calculation aimed to provide a holistic view of the financial value associated with each transaction, enabling a detailed examination of revenue generation patterns within the store; supplementary columns such as Day, Month, and week were seamlessly integrated into the dataset. These additional dimensions were strategically incorporated to facilitate a detailed exploration of customer engagement, demand patterns, sales trends, and profitability metrics across various temporal and product-related contexts. In contrast, the introduction of the Daily return column aimed to offer explicit insights into the daily profitability of the store. This metric was crafted by subtracting the original price from the retail price and then multiplying the result by the volume of products sold. By encapsulating profit margins within each

transaction, this column served as a crucial tool for acute trends in profitability and guiding decision-making processes regarding fluctuations in profit margins over time. Similarly, the inclusion of the Company column enriched the dataset with pertinent information regarding the parent companies of the products sold. This contextual layer enabled a comprehensive analysis.In essence, accurate incorporation of these transformative columns and dimensions, the dataset was refined to provide a comprehensive foundation for sharp insights into the financial performance, operational efficiency, and market dynamics of the store.

	DATE	DAY	WEEK	MONTH	TOMER N	ATEGOR	COMPANY	LOCATION	CKAGE SEGM	RIGINAL CO	AIL PRICE/ U	VOLUME	Y OF PAYMI	TOTAL	AILY RETURN
2	1-Apr-2023	Saturday	Week 1	April	Mohan	UREA CFC	IFFCO	Jind	1.5 ltr	260.5	266.50	30	UPI	7995	180
3	1-Apr-2023	Saturday	Week 1	April	Mohan	DAP NFL	IFFCO	Jind	500 ml	1345	1350	16	UPI	21600	80
4	1-Apr-2023	Saturday	Week 1	April	Mohan	NASA	OPICAL AGF	Jind	1 kg	187	220	90	UPI	19800	2970
5	1-Apr-2023	Saturday	Week 1	April	Sanjay	RIFIT PLU	OPICAL AGF	Jind	600 ml	289	340	5	UPI	1700	255
6	1-Apr-2023	Saturday	Week 1	April	Sanjay	TAGSUL	OPICAL AGF	Jind	1 kg	215	250	4	UPI	1000	140
7	1-Apr-2023	Saturday	Week 1	April	Sanjay	REVIVE	OPICAL AGF	Jind	500 gm	180.6	210	1	UPI	210	29.4
8	1-Apr-2023	Saturday	Week 1	April	Sanjay	PARAM	HERANBA	Jind	500 ml	272	320	1	UPI	320	48
9	1-Apr-2023	Saturday	Week 1	April	Ramakant	FIDA	HERANBA	Ramrai	40 gm	221	260	2	CASH	520	78

Fig: Processed Data

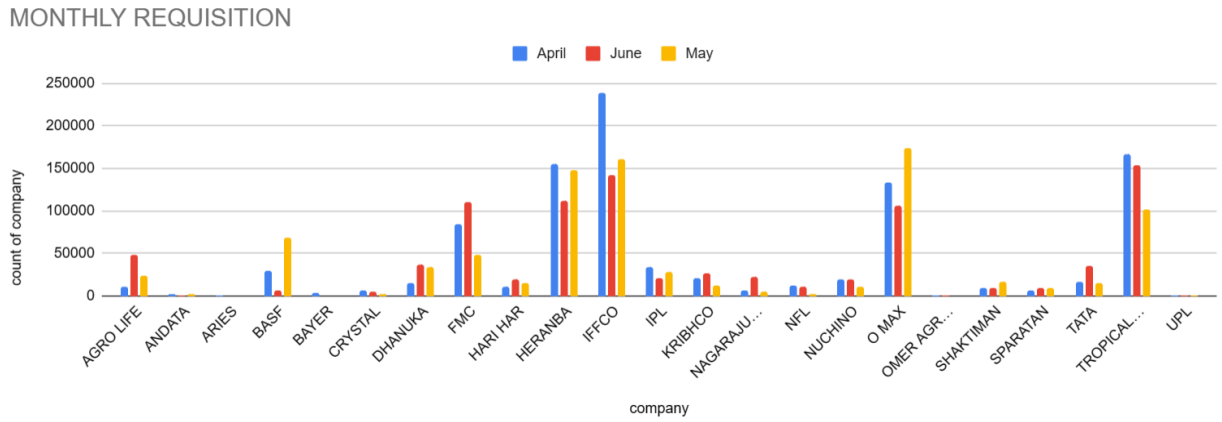
The analysis procedure involved the following steps

- **Data organization and Structuring:** This initial phase involves the meticulous arrangement of raw data, typically provided in Excel format. The data undergoes thorough inspection to identify data types, inconsistencies, and areas where additional columns can enhance information richness.
- **Statistical Analysis and Summary:** The dataset is loaded into a suitable data analysis tool, such as Python. Comprehensive statistics summaries are computed for key attributes, offering insights into central tendencies.
- **Income and Revenue Fluctuations:** The data is segmented and compared to identify trends and patterns across different categories. Trend analysis helps in understanding seasonal variations and forecasting future sales trends. Visualization techniques like charts and graphs are used to make the data easier to interpret. Overall, sales analysis is a crucial process for businesses to understand their performance, identify growth opportunities, and improve profitability.
- **Earnings and Need:** Analyzing both profit and demand entails calculating the profit margins for each product, achieved by subtracting costs from net sales, thereby enabling a comprehensive evaluation of profitability within diverse product categories. This assessment extends to individual products, where profit margins are computed to determine their relative profitability.An in-depth analysis of product distribution patterns contributes to a detailed understanding of demand dynamics, aiding in the identification of trends and insights crucial for strategic decision-making.

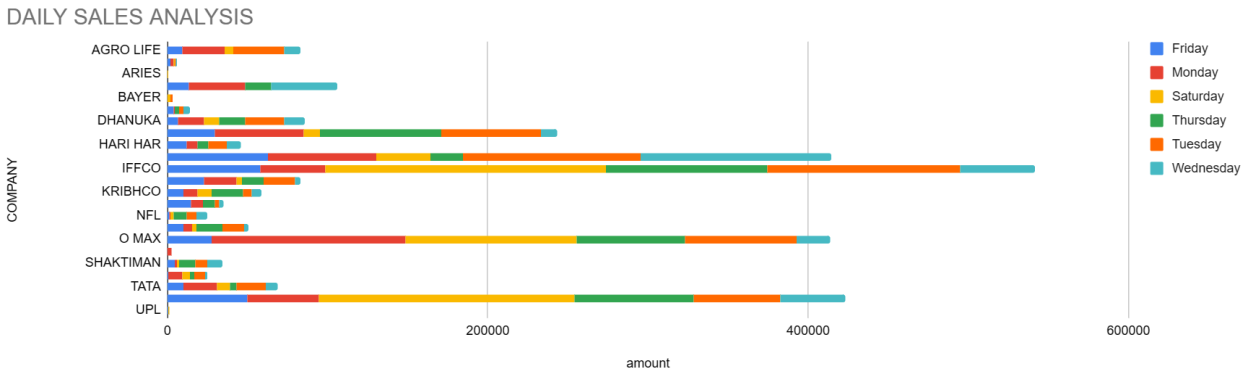
- **Presentation, Analysis, and Suggestions:**In the domain of Presentation, Analysis, and Suggestions, a diverse array of graphical representations is deployed to illustrate various facets of the analysis. Through the utilization of line charts, bar plots, pie charts, and scatter plots, distinct aspects of the data are visually portrayed, facilitating a comprehensive understanding of trends and patterns.This methodical approach not only ensures the extraction of meaningful insights from the dataset but also empowers stakeholders to make informed decisions that align with overarching business objectives.

RESULTS AND FINDINGS:

Monthly requisition: The monthly requisition data from April to June represents the demand for goods or services during that specific three-month period. This graph provides insights into the consumption patterns, requirements, and trends within the organization or specific departments over the spring months. Analyzing this data can reveal seasonal variations, changes in demand trends.

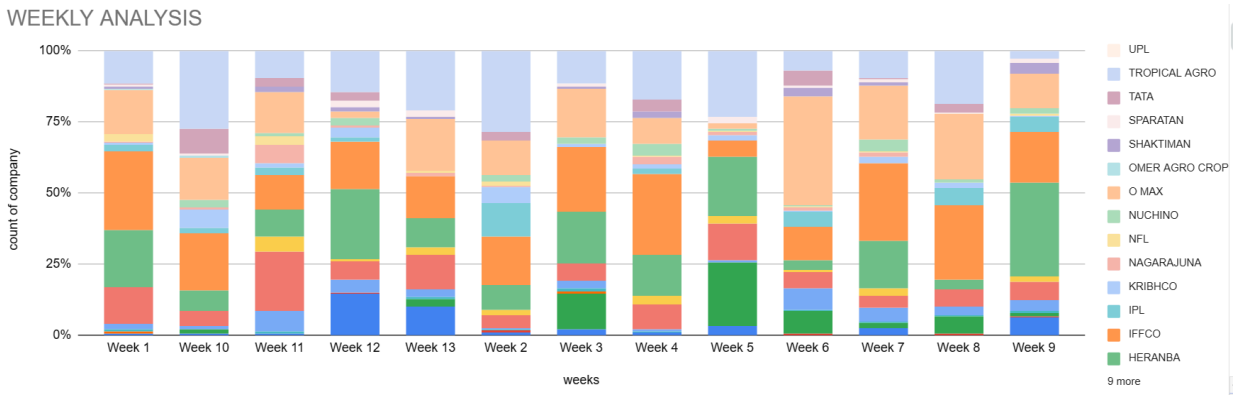


Weekday demand assessment: The given data represent the weekday vs demand analysis from this we can depict that weekday wise sales here the x-axis represents the amount whereas y-axis represent the company name, analyzing trends and patterns through descriptive and comparative methods.

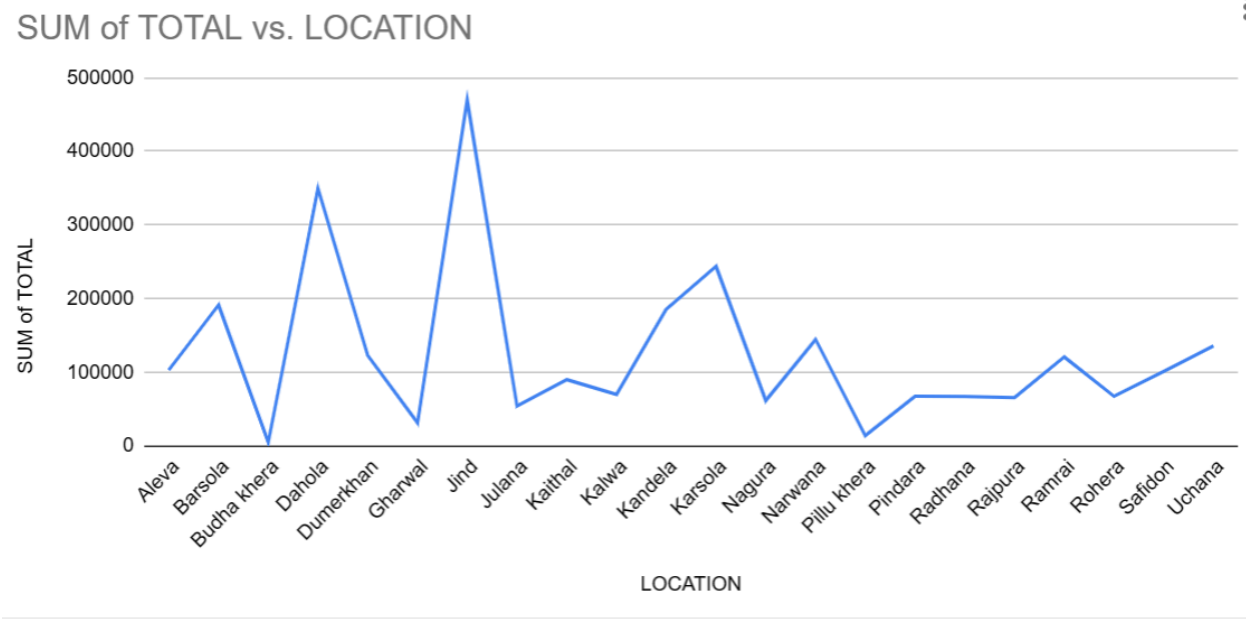


Weekly analysis: A bar graph provides a visual representation of sales performance over time. Each bar represents the sales volume for a specific week, facilitating comparison between weeks. Trends such as consistent growth,

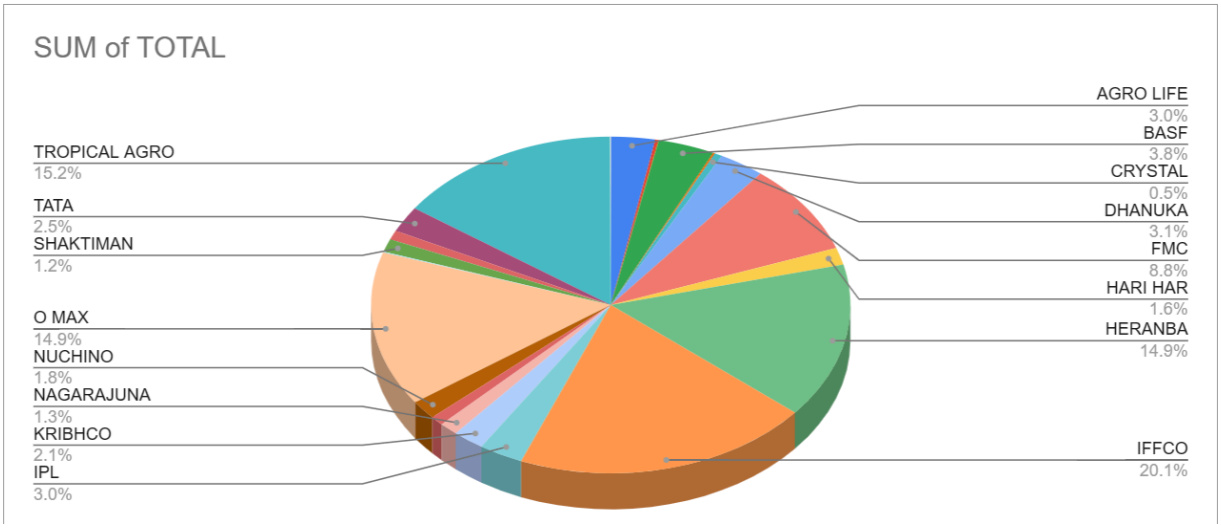
seasonal fluctuations, or irregular patterns become apparent. Through this analysis, businesses gain insights into sales trends, enabling informed decision-making, resource allocation.



Location wise sales: A line graph displaying weekly sales trends over time enables the identification of recurring patterns, spikes, or declines. By observing these trends, businesses can discern peak sales areas where the sales are high and work on those areas where the sales are a bit less.



Organizational sales: This chart illustrates the profit distribution across various companies, expressed as percentages. The chart reveals that certain companies exhibit significantly higher profit distribution compared to others. This suggests that these companies not only have higher demand but also enjoy greater profit margins.This approach supports better resource allocation and maximizes profitability.



Monthly trend: The monthly sales trend chart illustrates sales performance and highlights the overall trajectory.It reveals that sales peaked in April and subsequently declined in may and june . This pattern is influenced by various factors, including seasonal demand, events, festivals, and other considerations. Understanding these trends enables the business to adjust inventory strategies effectively,