SOLVING PROBLEMS FACED BY RASTOGI MOTORS

Mid-Term submission for BDM capstone Project

Submitted by

Name: ANAY

Roll number: 21f1003985

IITM Online BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 600036

Contents

EXECUTIVE SUMMARY

 3-month sales data and workforce data analysis conducted for the garage. The analysis aimed to address the challenges of inventory management and workforce optimization. The findings and methodologies used are presented in the mid-term submission, proof of originality and metadata is provided.

The descriptive statistics analysis revealed key insights into the garage's sales performance and workforce productivity. By examining sales data, trends, and patterns some significant factors influencing inventory management and workforce optimization were found. To address inventory management, a data-driven approach is used. Utilizing sales data, a demand forecasting model that accurately predicted future sales patterns. This will allow the garage to optimize inventory levels, minimize stockouts, and reduce holding costs. For workforce management, focused on enhancing productivity and efficiency. Through the analysis of workforce data, areas for improvement are identified and also provided recommendations for staff allocation and scheduling. By aligning staffing levels with demand patterns, the garage could optimize labor costs while ensuring excellent customer service.

In conclusion, analysis of 3-month sales data and workforce data provided valuable insights for inventory management and workforce optimization at the garage. The strategies used are data-driven and will lead to improved efficiency, cost reduction, and enhanced customer satisfaction.

PROOF OF ORIGINALITY
OF THE DATA

A photograph of RASTOGI MOTORS situated at KASHMIRI GATE in DELHI.

A screen shot of mail with 3 months of shop data of RASTOGI MOTORS provided by Himanshu Rastogi, son of the owner of RASTOGI MOTORS.
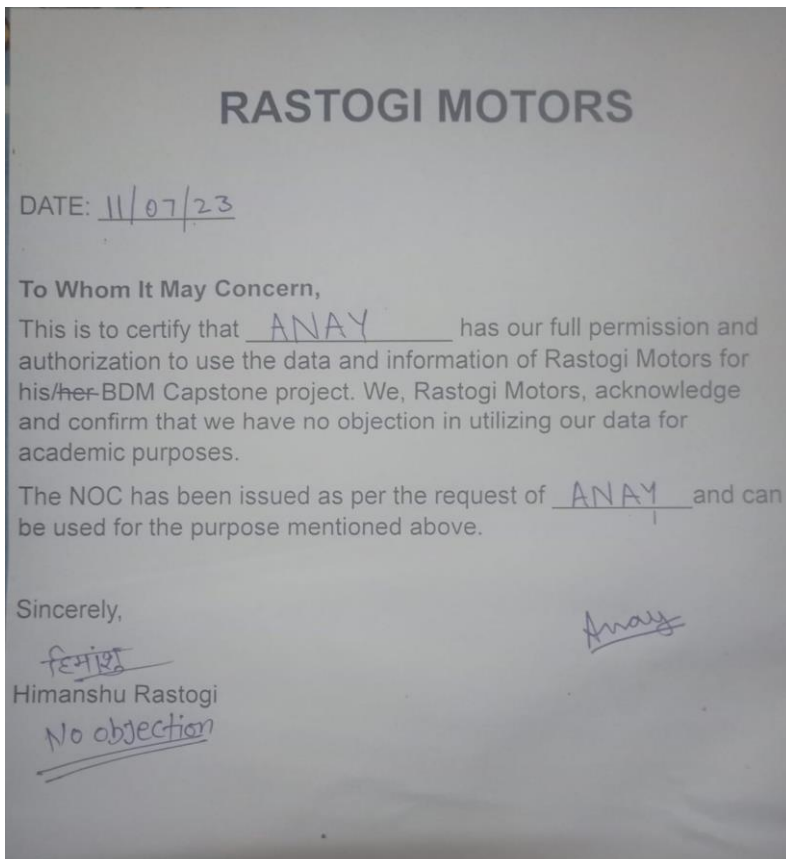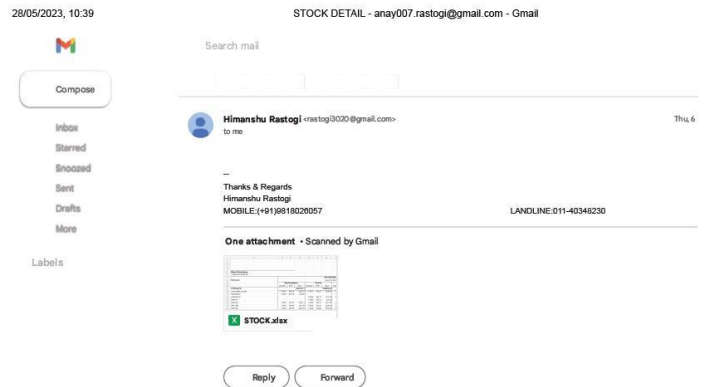
No Objection Certificate signed by Mr. Himanshu Rastogi manager of RASTOGI MOTORS

METADATA AND DESCRIPTIVE STATISTICS

Three months of sales and workforce data was gathered. This unaltered information contains essential metadata, capable of giving valuable insights without any manipulation or analysis. By using this data, potentially meaningful trends, patterns, and correlations could be found and informed decisions and effective strategies can be made. Fields that have problems are flagged.

- ❑ Garage Name: RASTOGI MOTORS
- ❑ Location: Located at Kashmiri Gate, Central Delhi.
- ❑ Number of Products: Around 130 different products present in garage
- ❑ Garage Owner: Shyam Rastogi is proud owner of Rastogi Motors.
- ❑ Manager: Shop is managed by Himanshu Rastogi(son of Shyam Rastogi)
- ❑ Product Categories: Lubricants and Fluids, Tires and Wheels, Cleaning Supplies, Accessories etc are among other 130 products available.
- ❑ Sales Data Period: Sales data of 3 months is collected for project.
- ❑ Total Sales Revenue: For 3 months total revenue is around Rs 7,25,000.
- ❑ Top-Selling Products: Coolant, Brake Pad and Engine Oil are some top selling products of Rastogi Motors.
- ❑ Average Daily Sales: Daily sales of the garage is around Rs 8040.
- ❑ Average Monthly Sales: Shop sells products worth Rs 2,42,000 monthly.
- ❑ Average Cost of Inventory in shop: Inventory present in the shop holds value around 7,00,000Rs this includes opening balance and the inwards balance(previous remaining stock + newly bought stock).
- ❑ Shop Insurance present or not: Insurance NOT PRESENT.
- ❑ Sales Forecasting: No proper forecasting method is being used.
- ❑ Garage Operating Hours: Roughly around 10AM-7PM (6 days a week)
- ❑ Garage is closed on Mondays for market weekly off.
- ❑ Garage Staff: 2 Permanent workers plus temporary help is hired if required. (According to workload)
- ❑ Future Plans (as per the owner)-According to owner there is very low demand of parts of electric vehicles but he is aware of the fact that it will eventually increase and is planning to adjust the inventory accordingly.

The data indicates overstocking of certain items while understocking others, leading to inefficiencies and potentially affecting customer satisfaction. Improving inventory management practices, such as implementing an inventory tracking system, will help the garage optimize its stock levels and minimize waste.

The analysis of sales, workforce, and inventory management data over the past three months for a garage provides valuable insights to the operations of the business. However, certain challenges in the workforce. The garage has struggled to meet the demands effectively, leading to delays in servicing customers. This workforce issue requires careful attention and strategic planning to ensure the garage can efficiently handle the workload.

INFRENCES FROM 4 MONTHS OF WORKFORCE DATA: -

❑ Workforce mean: Mean of the workforce available in shop is 3.25.
❑ Monthly Average Workforce- Mean of the workforce available in shop is 3.
❑ Workforce Variation: 1) Standard deviation- 0.82   2) Variance-0.68
❑ Total Workforce: 2 permanent workers paid 7000/- month plus the commissions on every task.
❑ Hired help is paid 5000/- month plus the commissions on every task.

MONTH	NO. Of Hired Help	Total Workers	Total Wages
August 2022	0	2	14,000
September 2022	1	3	19,000
October 2022	2	4	24,000
November 2022	2	4	24,000

Workforce Composition: The percentage of permanent workers compared to the total workforce.

❑ AUGUST,2022---------100%   ❑ SEPTEMBER,2022—66.67%
❑ OCTOBER,2022-------50%   ❑ NOVEMBER,2022-----50%

The company has two permanent workers who are always there, providing stability. They can also hire more help when needed. Workers are motivated by commissions to perform well. This helps the garage to adapt to changes and encourages to be productive. On average, the company has 3.25 workers, with a monthly average of 3. There is some variation in the workforce, indicated by a standard deviation and variance.

ANALYSIS PROCESS/METHOD

<u>Stockout Analysis:</u> To analyse the causes of stockouts, such as delayed orders or inaccurate forecasting conditional formatting will be used to know the reasons and impact.

1) Closing balance column will be analyzed for identifying the stockout occurrences.
2) A formula to identify stockouts- if the closing balance reaches zero it indicates a stockout. "**<u>IF (E2 <= 1, "Stockout")"</u>**.
3) Analyzing the causes of stockouts-Data sorting and filtering to group and analyze the stockouts based on their causes.
4) Conditional formatting to highlight stockouts-Conditional formatting will be used to visually highlight the stockouts.

<u>Inventory Replenishment</u>: An inventory management system will be created that tracks stock levels and generates reorder points based on demand forecasts, as well as calculates safety stock levels: -

1. Calculate the Average Monthly Demand To calculate the average monthly demand. **<u>(Formula used: = (Closing Balance - Opening Balance + Inwards – Outwards) / 3)</u>**
2. Reorder Point Calculation: -The reorder point is the inventory level at which a new order should be placed to replenish stock.
   (Formula used=Average Monthly Demand * Lead Time)
3. Safety Stock Level Calculation: -The safety stock level is an additional buffer of inventory maintained to account for uncertain demand and lead time variability.
   (Formula used =MAX (0, Average Monthly Demand * (Lead Time - 1) - (Closing Balance – Reorder Point))
   This formula ensures that enough extra stock is available to cover any unexpected fluctuations in demand or lead time.

This approach will enable garage to achieve effective inventory planning, reducing the likelihood of stockouts, minimizing excess inventory, and optimizing the balance between inventory costs and customer service levels. This will improve operational efficiency but also enhances customer satisfaction by ensuring that products are consistently available, leading to stronger customer relationships and business success.

OPTIMIZING WORKFORCE: To optimize the workforce management and maximize output while minimizing the number of workers, the data is analyzed and inferences will be drawn from it.

1) Calculating the total cost and total tasks for each staff.
2) Total cost for each month by summing the Permanent Staff Cost and Hired Staff Cost.
3) Total tasks for each month by multiplying the average tasks per day by the number of working days in that month.
4) Calculated the average tasks per worker for each month by dividing the total tasks by the total number of staff members (permanent and hired).
5) Calculated the cost per task for each month by dividing the Total Cost by the Total Tasks.
6) Identify the months with the highest average tasks per worker and the lowest cost per task. These months represent the most efficient utilization of the workforce.
7) Evaluate the months with lower efficiency and identify any potential causes (e.g., high workforce availability, low demand etc.).
8) Based on these observations, adjustments to the workforce allocation will be made and scheduling to optimize productivity while minimizing costs.
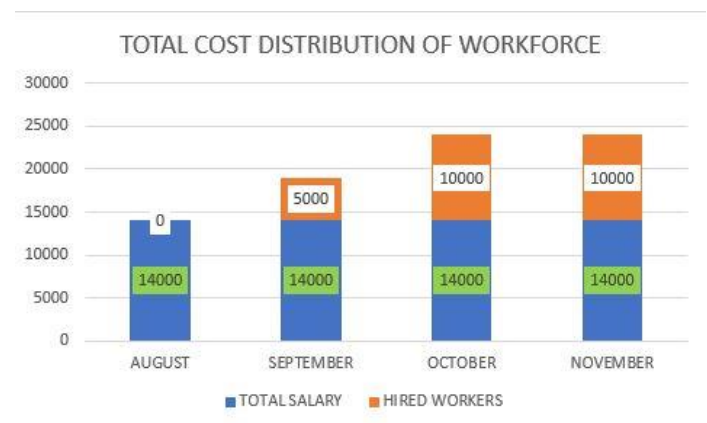
This approach will provide garage with valuable insights into staff costs, productivity, and efficiency, enabling data-driven decisions to optimize workforce allocation. By calculating total costs and tasks for each staff member and analyzing monthly trends, garage will track cost variations, and understand workload patterns. Evaluating the average tasks per worker and cost per task helps identify efficient resource utilization and cost-effectiveness. Furthermore, by identifying months with lower efficiency and determining potential causes, necessary adjustments to improve productivity and minimize costs would be done. The approach assists in financial planning and budgeting by providing a clear overview of monthly costs. The garage can use this information to forecast future expenses accurately, set realistic budget targets, and make informed financial decisions.

ITEMS	Quantity(0)	Rate(0)	Value(0)	Quantity(1)	Rate(1)	Value(1)	Quantity(2)	Rate(2)	Value(2)	Quantity(3)	Rate(3)	Value(3)	STOCKOUT OR N
SHOCKER	3	3500	10500	0	0	0	1	3600	3600	2	3650	7300	OK
BEARING PULLEY LD	5	570	2850	13	750	9750	15	825	12375	3	900	2700	OK
CLUTCH BEARING	2	2200	4400	0	0	0	0	0	0	2	2050	4100	OK
CLUTCH SETS	1	2100	2100	0	0	0	0	0	0		2000	2000	Stockout
ENGINE MOUNTING	4	3050	12200	1	3125	3125	5	3290	16450	0	3190	0	Stockout
ENGINE OIL	8	625	5000	3	650	1950	8	725	5800	3	775	2325	OK
FUEL FILTER	4	2200	8800	3	2300	6900	5	2450	12250	2	2100	4200	OK
OIL FILTER	1	278	278	0	0	0	1	230	230		278	0	Stockout
SPRAY LUB.	5	215	1075	7	157	1099	10	220	2200	2	221	442	OK
SUSPENSION KIT	5	1061	5305	2	1070	2140	5	1120	5600	2	1075	2150	OK
A C COMPRESSER	0	0	0	4	1250	5000	4	2790	11160		3350	0	Stockout
A.C FILTER	2	771	1542	8	685	5480	5	890	4350	5	690	3450	OK
AIR COMPRESSOR	1	1300	1300	5	1250	6250	1	1350	1350	5	1300	6500	OK
AIRMATIC SUSPENSION	1	2865	2865	0	0	0	0	0	0	2	2865	2865	Stockout
ALTENATOR ASSY	2	1449	2898	1	1390	1390	0	0	0	3	1390	4170	OK
ARM BUSH LOWER	1	1280	1280	1	1250	1250	0	0	0	2	1250	2500	OK
ARM BUSH UPPER	12	350	4200	5	325	1625	15	350	5250	2	774	1548	OK
ASSY FR HUB	4	761	3044	8	835	6680	12	900	10800		872	0	Stockout
ATF FILTER	0	0	0	7	670	4690	4	771	3084	3	670	2010	OK
AUTO TRANS-FLUID	6	359	2154	0	0	0	4	900	3600	2	359	718	OK
AUX WATER TANK	0	0	0	7	435	3045	7	450	3150		661	0	Stockout
BALL JOINT	1	1130	1130	5	1225	6125	4	1325	5300	2	1150	2300	OK
BALL SOCKET	3	296	888	8	348	2784	11	243	2733		326	0	Stockout
BEARING	1	480	480	6	530	3180	5	890	4450	2	530	1060	OK
BEARING PULLEY LD	1	488	488	0	0	0	0	0	0		488	488	Stockout
BELT	2	626	1252	2	600	1200	4	1050	4200		613	0	Stockout
BELT TENSIONER LD	2	900	1800	8	1225	9800	2	1900	3800	8	1150	9200	OK
BELT TIMING	3	1560	4680	9	1500	13500	9	1590	14310	3	1550	4650	OK
BLUE COOLANT	1	76	76	9	85	765	7	97	679	3	85	255	OK
BOOT	14	340	4760	2	436	872	11	652	7172	5	392	1960	OK
BOOT & BUFFER KIT	4	1150	4600	4	1200	4800	4	1350	5400	4	1250	5000	OK
BRAKE DISC	6	1280	7680	0	0	0	5	1450	7250	1	1250	1250	Stockout
BRAKE OIL	4	53	212	0	0	0	3	73	219	1	53	53	Stockout
BRAKE PAD	4	900	3600	3	1050	3150	5	1100	5500	2	1100	2200	OK
BRAKE SHOE KIT	5	429	2145	0	0	0	4	440	1760	1	429	429	Stockout
BUSH	0	0	0	6	1360	8160	4	1450	5800	2	1400	2800	OK
BUSH KIT	3	750	2250	0	0	0	3	850	2550		2350	0	Stockout
CABIN FILTER	2	450	900	6	560	3360	6	1200	7200	2	560	1120	OK
CASE MOBIL	2	565	1130	4	665	2660	5	700	3500		700	700	Stockout
CHAIN SUB ASSY	5	305	1525	6	350	2100	11	470	5170		425	0	Stockout
CLUTCH CABLE	4	640	2560	10	605	6050	14	850	11900		611	0	Stockout

Conditional formatting of the closing balance was done to visually show the stockouts. After that formula("IF (E2 <= 1, "Stockout")".) was used to calculate the stockouts and is demonstrated with percentages.

PERCENTAGE OF STOCKOUTS IN CLOSING BALANCE

44% — 56%

OK · STOCKOUT

WORKFORCE COMPOSITION

AUGUST · SEPTEMBER · OCTOBER · NOVEMBER

PERMANENT Workers · HIRED WORKERS

TOTAL COST DISTRIBUTION OF WORKFORCE

	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER
HIRED WORKERS	0	5000	10000	10000
TOTAL SALARY	14000	14000	14000	14000
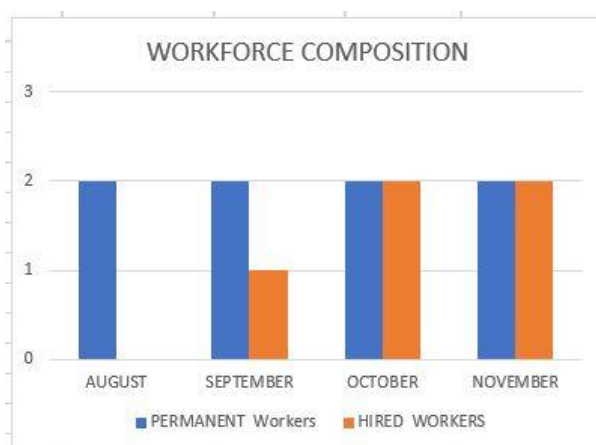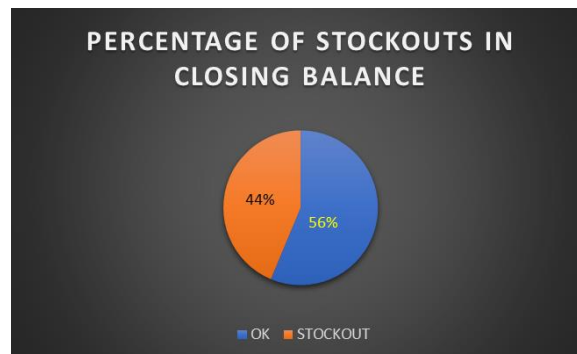
To tackle with workforce problem comparisons between the permanent and hired workforce for different months is done. Number of each and the wages given to them is compared in the above charts.

Further analysis and findings will be done to tackle with inventory and workforce problems.

END OF REPORT