Final Submission of Capstone Project in Business Data Management.

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Title: STATISTICAL ANALYSIS OF CEMENT TRADERS FIRM USING BUSINESS DATA-A CASE STUDY.

1. Executive Summary:

After approval of the mid-term submission and taking account of feedback on the mid-term submission. now I am going to make my final report on the capstone project of business data management for a **local cement firm M.B.D. Traders who is a dealer of ultra tech cement and seller of house building materials.** which is located in Rajgir, a small city in the Nalanda district in Bihar. Basically, it is B2B and B2C cement firm.it is selling more than 10 products. products are cement, sand, concrete, road-building materials, and various type of metal. Most of the products sell to the government construction projects in its local area.

After analysing the firm's data, we found some major problems the firm faced in often are following.

- Transportation charge is so high for a local delivery partner.
- During the monsoon season, the target given by the company ultra tech is not achieved. That makes business incurred.
- To analyse a firm’s overall performance over a given period of data.

Tools that are used for the analysis of business problems are the following types.

- Remove duplicates from the data tab.
- Format as table
- Find and select.
- Short and filter
- Formula tools
- Sum

- Recommendation graph
- VLOOKUP

The graphs and Charts I am going to plot to support the conclusion of the report are the following.

- Volume pareto chart
- Revenue pareto chart
- Profit trendline
- Selling price trendline
- Column chart
- Staked chart.
- Bar chart.
- Pie chart.

The current trend of business is the following types-

- Overall firm has in profit.
- Cement sales has been increased in the year 2022 in the month of Jan-March.
- For heavy-weight product revenue has increased after the month of Oct.
- Yellow sand is the most profit generated among all these products.

2.Detailed Explanation of Analysis Process/Method:

Firstly, to analyse the business performance we need data. Since it is a small business firm that doesn't use any software system like spreadsheets to keep track of the data of the store. They rely solely on custom-made bill invoices to keep track of customers and sales information. Therefore, I need to input all the data. I collect all the data and understand it from the owner in two-three meetings and after that, I put all the data into a spreadsheet. which we can do further analysis of the data. I have collected 1 year of **data (January 2021 – March 2022)** for the store to gain clear insights from the analysis.

Link of spreadsheets data:

https://docs.google.com/spreadsheets/d/1_LGhhECYHbk-2rYdsjRj6YhSTirLcygk/edit?usp=share_link&ouid=117414016020604132374&rtpof=true&sd=true

1st step toward data analysis:

Since the invoice bill is on hardcopy. firstly, we collect all invoice bills from Jan -2021 to March -2022. after that, I put all the data into the spreadsheet. we also

need to clean and sort the data which involves reviewing the data for any human errors, inconsistency or missing values, calculation errors etc. We need to check for any outliers and duplicates. We must correct them to ensure that the data is accurate and provides a high accuracy percentage after analysis.

- First, we make selling data into a table through the format table function in the home tab.

- The Selling datasheet dived into two-part one datasheet is cement sell data and another is heavily weight sell data.it is necessary to divide into two parts for analysing the business problem. Because selling cement and heavy materials are two different ways. one in a bag and another selling by weight basis.

- For checking the missing value in the datasheet, we follow the following procedure.

- First click on the row that you want to check missing value->>> chose the tool find and select from the home tab->>> In find and select click on go to special function >>> After getting a special click on a blank function.

- For checking the duplicate value in the datasheet. we follow the following procedure.

- First go to the data tab >>>select the tool that has removed the duplicate.

2nd step toward data analysis:

For tracing the cement firm problem, we have created columns for weight per bag in MT, sold weight, revenue before tax, taxable amount, actual revenue, and profit for cement sales analysis.

For cement sales analysis we create a formula for calculating weight per bag in MT, sold weight, revenue before tax, taxable amount, actual revenue, and profit in Excel. The formula is the following type.

1 MT or Ton =1000 kg

Weight per bag of cement =50 kg.

(1) **Weight per bag in MT**= (weight per bag in kg/1000).
(2) **Sold weight** = (Weight/bag in MT*number of sold bag)

(3) **Taxable amount** = (rate/bags*number of bags sold) *GST/10).
(4) **Actual revenue** = (rate/bags*number of bags sold) + taxable amount).
(5) **Profit** = (profit per bag*total number of bags sells)

For heavy-weight product sales analysis, we created columns like total royality, revenue before royality, actual revenue and profit amount.

In the invoice time royality is included.

Royality means the amount the construction company charge per MT to the dealer for delivering the product under his company.

(1) **Taxable amount** = (rate/MT quantity*total sell quantity in MT) + (royalty/MT*total sell quantity) *tax/100
(2) **Revenue** = (rate /MT * total sell quantity in MT) +royality/MT*total sells Quantity in MT)+taxable amount.
(3) **Profit through heavy weight material = (**profit /MT*total Quantity sold in MT).

3rd step towards the data analysis process:

1st major problem that cements traders faced is high-value transportation charges.

- To handle this issue, we need to know which delivery place sold to the highest volume sell for the firm and the distance b/w delivery address to shop godown.

- For doing these things first I am going to make a pivot table of cement sell data.

- In the pivot table we need to create two columns one is the supply place in a row and the second to sum of sold weight in the sigma function of pivot table fields.

- Through the pivot table analysis now we are going to draw a volume Pareto chart. For doing this we select the value of the column supply place and sold quantity. After the selection of these value fields, we make a copy of the value through the keywords function (ctrl +c). after copying now we paste the data in different places through the keywords function (ctrl+v) in the same sheet.

- After paste we are going to sort the paste table according to the highest to lower sum of sell quantity weight.

- For sorting the table we take help from the sort and find function from the home tab and select the column value name which you want to short.

- Now we make other columns that name the cumulative sum of sold Quantity. for doing this we just add the previous value of the sell quantity weight to the next value of the sell quantity weight value through the Excel function formula.

- For making a volume Pareto chart we make one another column's percentage contribution. For doing percentage contribution we can do this through the following formula in Excel.
  % contribution = (cumulative sum of sold weight /total sum of sold weight *100).

- Now we draw a volume chart for selecting the three columns one is place supply, the sum of quantity sold and % contribution. To draw the chart we can take help from the Insert tab in Excel. After we click on recommend chart and select the volume Pareto chart.
- Volume Pareto chart will be shown in the results and finding section.

- Through the volume Pareto chart, we will find which place going to more quantity of cement and calculate the distance between the shop's godown to the delivery address and their delivery charge.

2nd major problem business firm face is some months of the year target sales given by the company is not achieved.

- For tracing out this problem first we create a pivot table through a pivotable analyser.
- For creating the pivot table we need two columns one is the month of the year and the second is the total sales weight for every month respectively.
- Do creating these tables first we drag the year in a row and second sold quantity in the sigma function as a sum of sold weight in pivot fields.

- After that we select the table and paste the table as in value in another place of the same sheet through the help of keyword functions.
- Now we create another column's target selling weight in the new table.
- For putting in the target value in the target sell weight we use the **VLOOKUP** function from another data sheet name **target set by the company**.
- Now we can select the table and go to in insert tab.
- In the insert tab click on the recommended chart and select the stack bar chart.
- After creating the stacked bar chart now, we trace the problem.

3rd major problem is to analyse the firm's overall performance over a given period of data.

For this we created a revenue Pareto, the trend line of revenue overall of the year, the selling price trend over the year, a volume Pareto chart, a volume demand trend overall the year, a profit-wise stack chart, a product profit-wise graph etc. one by one I am going to explain the details of these charts.

For heavily weight product analysis to knowing about how many products are responsible to contribute 80 percent of revenue by just 20 percent of the total product.

To determine this, it would help the cement firm know which type of product should be sold for the most revenue generation and which are the most revenue-generating products.

- For analysing 80:20 we need to create a revenue Pareto chart .to do this first we make a pivot table through the pivot table analyser.

- In the pivot table first we select the type of product in the row function and we select the revenue in the sigma function as the sum of revenue in pivot table fields.

- After that we select the table and paste the table as in value in another place of the same sheet through the help of keyword functions.

- In the table we make another two columns one name is cumulative revenue and the second is percentage contribution to revenue

- In the cumulative revenue sum column, we fill the value by using the formula (current revenue +previous revenue) in Excel

- In the percentage contribution column we fill the value by using the formula in Excel (cumulative revenue /total sum cumulative revenue*100)
- For drawing the revenue Pareto chart we select the three columns one is type of products, sum of revenue and % contribution to revenue

- Revenue Pareto chart gives an insight which identifies the mentioned problem.

Cement firms want to be comparing between revenue Pareto chart versus the volume Pareto chart for heavy-weight products.

For creating volume Pareto charts, we follow the following procedure.

- For analysing 80:20 we need to create a volume Pareto chart .to do this first we make a pivot table through the pivot table analyser.

- In the pivot table first, we select the type of product in the row function we select the total sold weight quantity in the sigma function as the sum of sold weight in pivot table fields.

- After that we select the table and paste the table as in value in another place of the same sheet through the help of keyword functions.

- In the table we add two columns cumulative volume sold and percentage contribution to sold quantity.

- In the cumulative volume sum column, we fill the value by using the formula (current Weight sold quantity + previous weight sold quantity) in Excel.

- In the percentage contribution column, we fill the value by using the formula in Excel (cumulative current weight sold /total sum cumulative volume quantity sold*100)

- For drawing the revenue Pareto chart, we select the three-column type of product, sum of quantity sold % contribution to revenue

- Volume Pareto chart gives the insight which identifies the mentioned problem.

3rd thing to analyse the company performance we want to know about is the total sell volume of heavy material trendline over the year 2021.

For creating a product sales trendline chart we follow the following procedure/step.

- First, we need to make a pivot table through a pivot table analyser.

- In the pivot table, we need to create two columns one is the month of the year in a row and the second to sum of sold weight in the sigma function of pivot table fields.

- After that, we select the table and paste the table as in value in another place of the same sheet through the help of keyword functions

- Now we select the pasted table and go to the insert tab in Excel. In the insert tab, we click on recommended chart tools. The chart is drawn.

- The graph will be shown in the results and finding section.

4th things to analyse the company's performance we want to know about which of the heavy materials products generate the highest profit.

- To do this we again create a pivot table through the pivot table analyser.

- In the pivot table, we created two columns one is a type of product in the row and the second is the profit in sigma function of pivot table fields.

- After that, we select the table and paste the table as in value in another place of the same sheet with the help of keyword functions.

- Now we select the new table and go to the insert tab in Excel. In the insert tab, we click on recommended chart tools. The chart is drawn.

- Now we can see which product generates the highest profit for heavyweight sold products. The chart will be mentioned in the results and findings section.

To analyse the performance of cement-sold products.

We want to know about that how the price of cement per bag effect on demand for cement.

For tracing this problem first, we have gone to create a selling price trendline per bag over the year 2021.

- For creating a selling price trendline now again we formed a pivot table through a pivot analyser.
- In pivot table creating two columns one is the month of the year in a row and the second is the price of per bag in sigma function as the average price.
- Now select the table and copy and paste it to another place in the same datasheet.
- Now we select the pasted table and go to the insert tab in excel. In the insert tab, we click on recommended chart tools. Chart is drawn.
- For creating the demand price trendline overall the year same process as we did for the selling price trendline.
- After the creation of the two charts, we can get insight from this. I will mention the insight in the section of results and finding section.

2.Results and Findings

For cement sales analysis results and findings.

For analysing the 1st problem that I have mentioned in the section on details analysis of the process. Let's see the graph first.

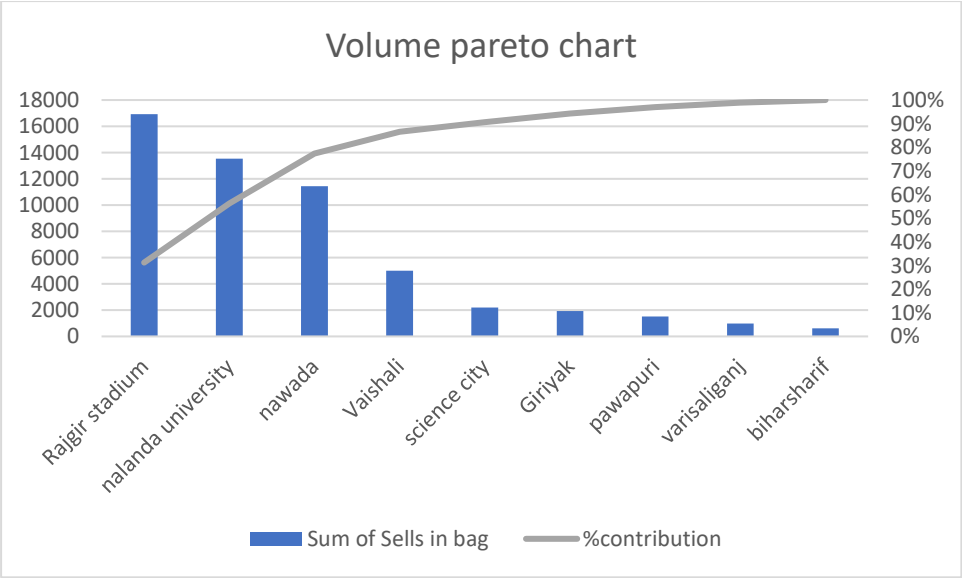


Chart 1.1

Volume Pareto clearly shows that 80 % of cement sold in the major three place Rajgir Stadium, Nalanda University and Nawada. But the store/godown is situated at Varisaliganj (city of nawada district) which is 30 km from rajgir,50 km from Nalanda and 15 km from nawada.

For analysing the 2nd major problem business firm faced is some months of the year target sales given by the company are not achieved.

To identify the month of the year 2021, we created a stacked bar chart. Let us see.

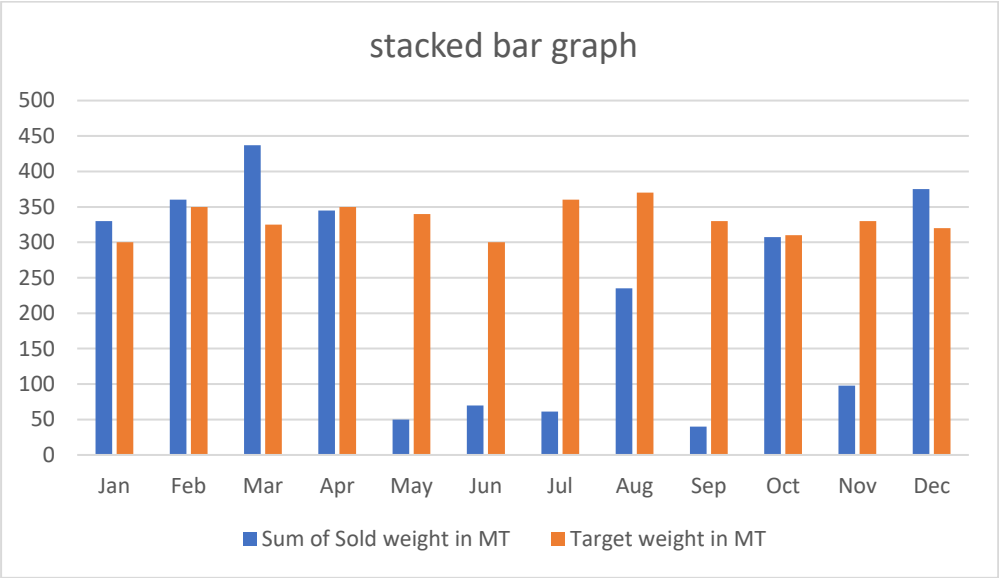


Chart 1.2

The stacked bar chart shows that some of the months of the year 2021 targets were not achieved by the cement firm. the month of the year clearly identifies through this chart. In the months of May to July cement selling is too low than the target.

- The month in which most sold the cement is March with 330 mt. whereas the target in the month is 300 mt.
- In the year 2021 the month of January, February, March, April, October, and December cement sold is equal to or more than of target set.

Monsoon season also affects other heavy-weight products like sand, metal concrete etc.

now it is interesting to see the selling price of cement throughout the year. Let us see the graph.

Chart 1.3

The selling price per bag of cement also correlates with a stacked bar chart. In the month where the target is not achieved then the selling price also goes down in the months of May, and Jun.

Maximum selling price in the month of March with 512 rupees.

From the month of fab to March price goes up and in the month of May to Jun price goes down.

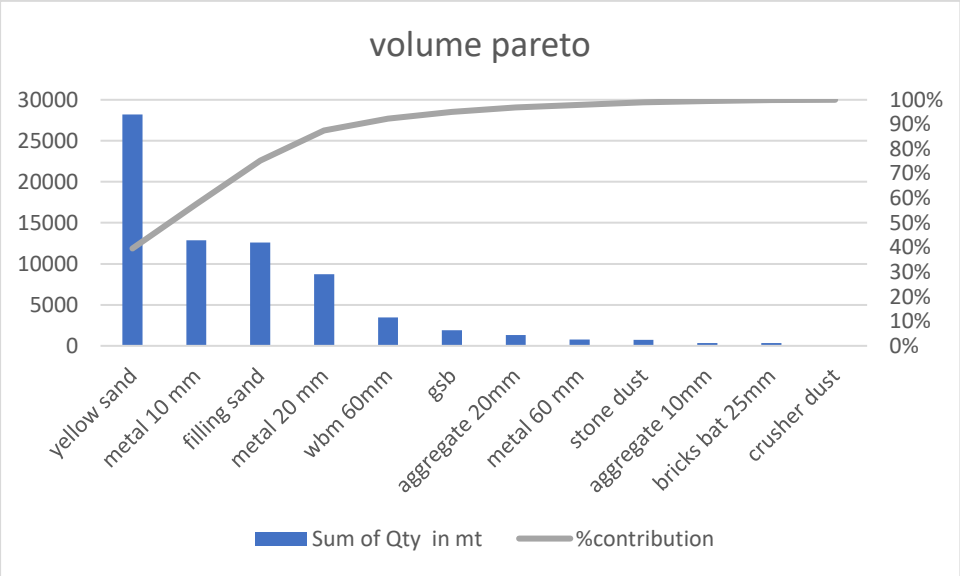
Chart 1.4

Let's. We see the effect of the monsoon season effect on profit from cement sales.

In the monsoon season from May to Jun profit is less than 10k rupees. Profit trend lines are very dynamic in nature.

For heavily weight product results and finding are following.

3rd problem is to analyse the firm's overall performance over a given period of data.



In 2021-year, the firm sold the 80 % quantity of 3 products yellow sand, metal 10 mm, and filling sand.

The most sold product is yellow sand with 40% of the total volume sells.

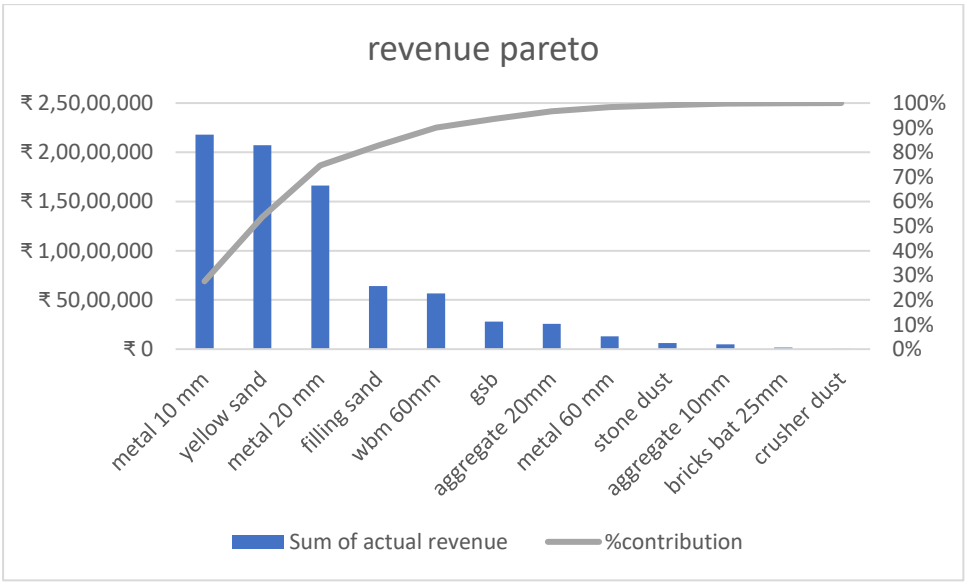


Chart 2.1

Now let's see revenue Pareto it indicates that 80 % of revenue comes from three heavy-weight products metal 10 mm, yellow sand and filling sand.

One thing is noticed here after comparing with volume Pareto's highest sold product is yellow sand but in contrast, the highest revenue comes from metal 10mm which is 28 % of total revenue.

Why this is happening will be explained in the interpretation of results and recommendation section of the report.

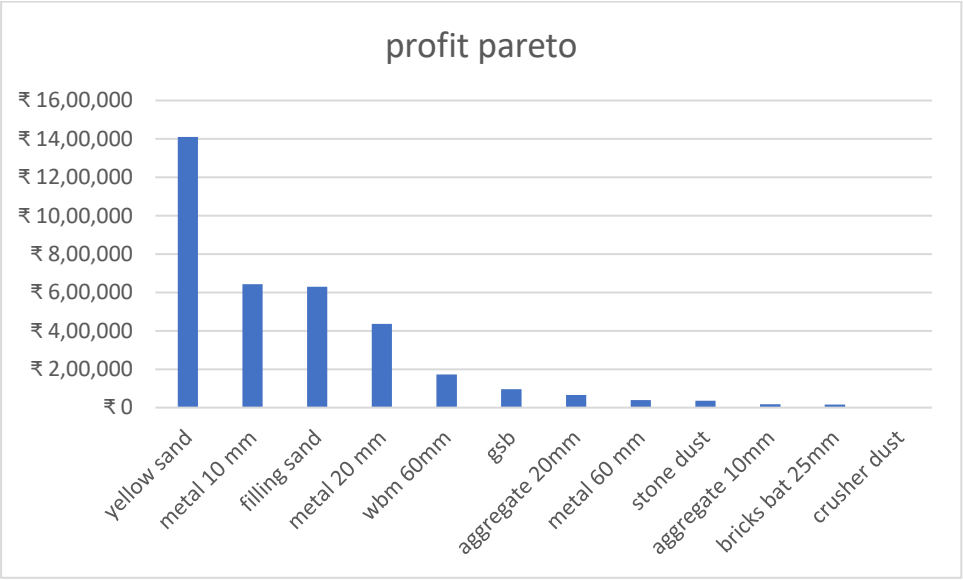


Chart 2.2

Now lets we come on to interesting things after seeing the volume of Pareto and revenue Pareto here profit of the firm through the yellow sand is higher. Yellow sand generates 14 Lak rupees throughout the year 2021 to March 2022. In another word

yellow sand generates 40% profit from the total amount of profit through the other product.

Why this is happening will be explained in the interpretation of results and recommendation section of the report.

Metal 10 mm generates 18 % profit of the total profit amount.

Chart 2.3

Now lets we see the heavy-weight product selling trend. Highest sold product in the month of March.

The effect of the monsoon season can also be seen here. product selling goes decreases after the April month.

The month of May to July is showing continuous constant selling of products in low quantity.

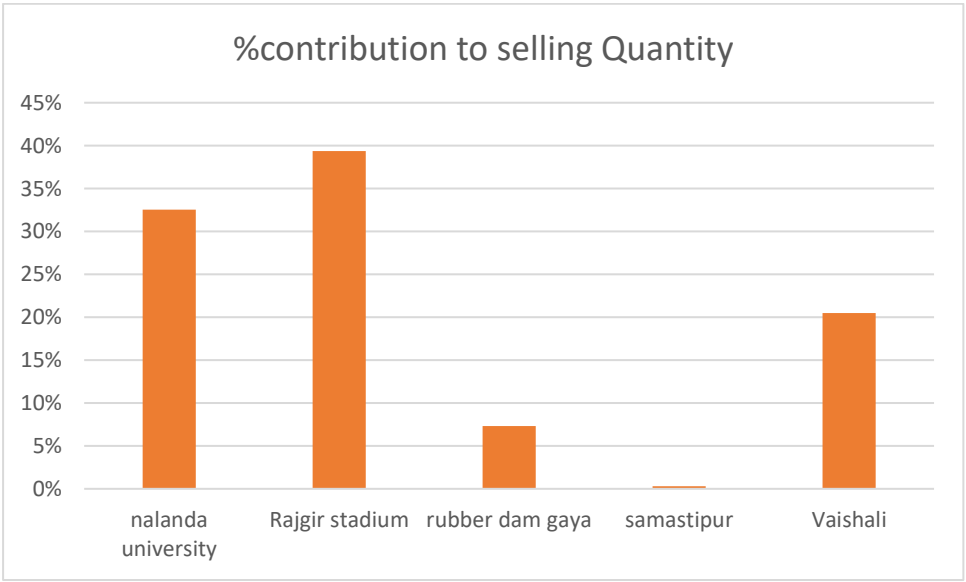


Chart 2.4

Does this graph tell a story that which of the supply place of heavy products goes the maximum amount to deliver?

The maximum amount of product delivered to Rajgir stadium with almost 40 % of the share of the total investment.

Interpretation of Results and Recommendation:

1st problem business firm faced is high-value transportation charges for delivering the product.

To handle this issue earlier I have explained in the section of the details analysis process how to resolve this problem.

To interpret the result, we can see the volume Pareto chart in the section on results and finding. After seeing the chart 1.1 we would interpret the result in the following ways.

- Most of the cement is sold in major four delivery places rajgir,Nalanda ,nawada and Vaishali.
- Cement sold in rajgir city with the 31% ,Nalanda with the 25 % and nawada with the 21 %.

To minimise the high-value transportation cost we would give a few recommendations.

- To open the store/godown near to the most sold city rajgir, Nalanda,nawada.
- It would reduce the distance between godown to the delivery place.
- Earlier shops/go down are situated far from these delivery addresses.
- This recommendation may be also increased revenue generation after the store opens in these three cities.

2nd major problem business firm face is some months of the year target sales given by the company is not achieved.

To handle this issue earlier I have explained in the section of the details analysis process how to identify the month in which the target is not achieved.

To interpret the result, we can see the stacked bar chart in the section on results and finding. After seeing the chart 1.2 we would interpret the result in the following ways.

- Low-sold cement in the month of May, Jun and July.
- This is happening due to the monsoon season in India starting in the month of Jun.

- Maximum sold month is March. More than or equal to the target sold month is Jan, fab, April, Oct, and Dec.
- This happened due to most of the construction work speeding up in the month of Dec to April.

Recommendations to handle this problem are the following.

- Inform the ultra-tech company through the mail and the business community. The cause of low sales in the monsoon season
- In monsoon season low target will demand from the uppermost company
- For increasing the sales of cement take the help of the social media.
- In monsoon season create a skim for customers. on the basis of the number of bags sold.

3rd problem is to analyse the firm's overall performance over a given period of data.

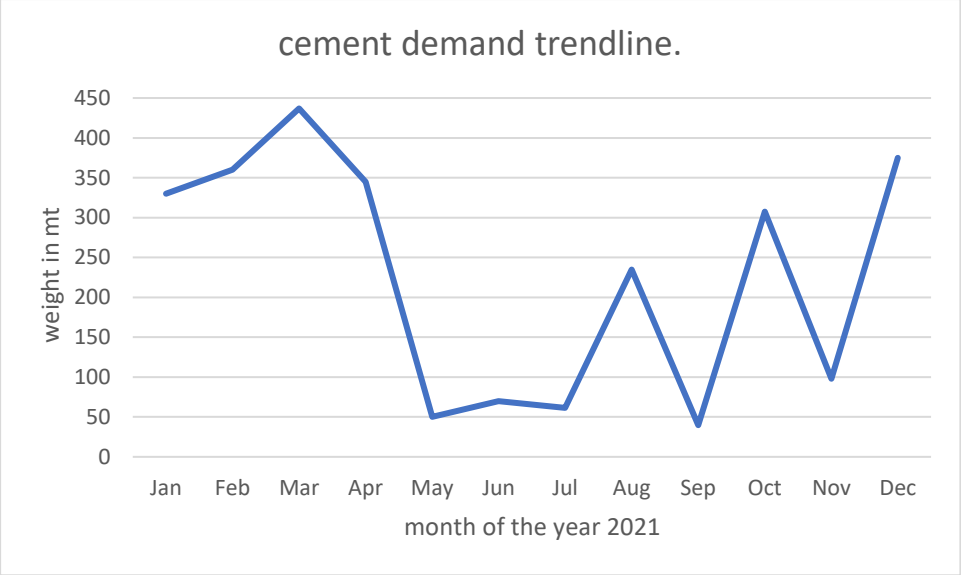
For this we created a revenue Pareto, the trend line of revenue overall of the year, the selling price trend over the year, a volume Pareto chart, a volume demand trend overall the year, a profit-wise stack chart, a product profit-wise chart etc. I have already explained these things in the section on the details analysis process and results and finding.

Here I am going to interpret the results of these following graph.

First, we are analysing the performance of cement sales.

To interpret the results of the selling price trendline of cement we can see chart 1.3 in the section on results and finding. After seeing the chart, we can interpret the results in the following way.

- In the month of March price of cement is so high because of demand in the month of March so high we can see in the demand trendline of cement. it follows the law of supply and demand.



- In the month of July to December selling price is almost Constant. Because demand is not predictable.
- In the month of Jan to March demand increased so the price of selling cement per bag also increased.
- In the month of May to Jun demand is low and almost constant .effect of this is also seen in the selling price tradeline.

Recommendation

- In the monsoon season stock should be minimum.
- Cement firm will give vacation to the employee in the month of May to July.
- In the month of Oct to November create a skim for business. That would help to increase the selling of cement.

Now we are analysing the performance of heavily weight products overall the year.

To interpret the results of the volume Pareto chart of heavily weight products we would see chart 2.1 in the section of results and finding. After seeing the chart, we can interpret the results in the following way.

- Most sold the product in the year of 2021 is yellow sand with a percentage of 40.
- Volume Pareto follow the 80:20 Pareto principle.
- Most sold products are yellow sand, metal 10 mm and filling sand with respect to 40%,18% and 17%.

products type	Average of rate per mt
metal 20 mm	₹ 1,865
aggregate 20mm	₹ 1,850
metal 10 mm	₹ 1,624
metal 60 mm	₹ 1,600
Gsb	₹ 1,425
Wbm 60mm	₹ 1,421
Aggregate 10mm	₹ 1,300
crusher dust	₹ 840
yellow sand	₹ 683
stone dust	₹ 681
bricks bat 25mm	₹ 522
filling sand	₹ 434

Table 1.0

Now let us interpret the results from revenue Pareto. we would to see chart 2.2 in the section on results and finding.

- It follows the 80:20 rule of Pareto principle.
- 80 % of revenue com from 20 percent of heavy-weight products.
- One thing is noticed here after comparing with volume Pareto highest sold product is yellow sand but in contrast highest revenue comes from metal 10mm which is 28 % of total revenue. Same as for filling sand and metal 20 mm.
- This is happening due to the price selling of metal 10 mm per MT is much higher than yellow sand. We can see in Table 1.1.
- Same thing happened between filling sand and metal 20 mm.
- Average price of metal 10 mm per MT is 1624 rupees whereas the price for yellow sand per MT is 683 rupees.
- Another interesting thing noticed after seeing the average price for all the products, price per MT for metal 20 mm is higher than metal 10 mm .but revenue generation through metal 20 mm is in the 3rd position.
- This happened due to sold of metal 20 mm Quantity less than metal 10 mm and yellow sand.

Recommendation

- never stop selling aggregate 10 mm, metal 60mm,gsb and wbm 60 mm .
- these products have a high rate selling price per mt. if you increase the selling of these products then revenue generation will be higher than other yellow sand, filling sand etc.

- Advertise the properties of products which are low selling amount through the banner, poster etc.
- Use social media handle for advertising the product's specification and skim for customers.

let's interpret the result of profit bar chart 2.3 .it would be seen in the section on results and finding in the report.

- Here profit of the firm through the yellow sand is higher. Yellow sand generates 14 Lak rupees throughout the year 2021 to March 2022. In other words, yellow sand generates 40% profit from the total amount of profit through the other product.
- Profit through the yellow sand is the higher due highest amount of sold quantity among all these products. And profit per MT is similar for all products.
- Metal 10 mm generates 18 % profit of the total profit amount.
- Filling sand also generates 18 % profit of the total amount.

Interpretation of results of product selling trend of heavy products. It would be seen in chart 2.2 in the section on results and finding.

- Heavy product sales trendline shows like cement sell trendline almost.
- It indicate that monsoon season also effect heavy products .they are correlated with each other.
- In the month of May to Jun products selling is lowest .

Recommendations:

- For heavy material in monsoon season, sand are come from river get stopped.to avoid this we would make a stock for yellow sand, filling sand before monsoon season.

----------End of the Report----------