

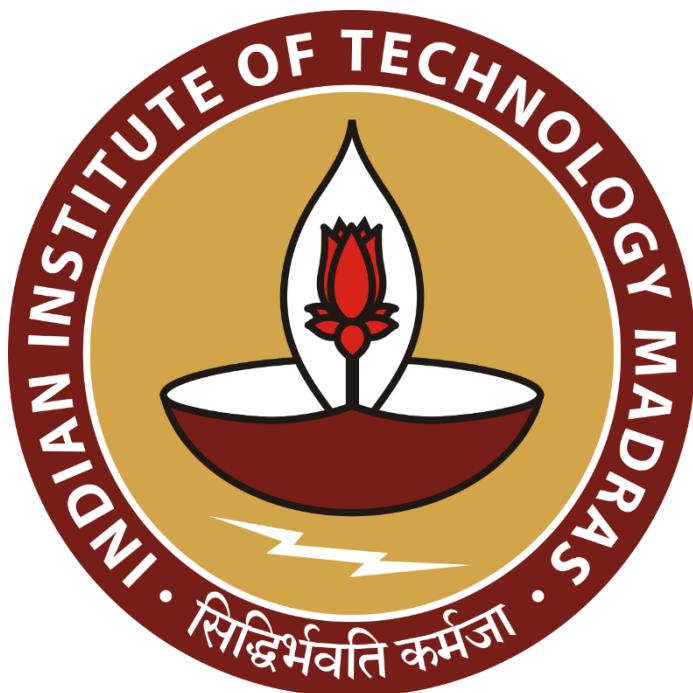
Transforming Jaiswal Cycle Stores: Data Strategies for Bicycle Retail Success.

A Mid-term report for the BDM capstone Project

Submitted by

Name: SATISH JAISWAL

Roll number: 21f2000142



IIT Madras BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 600036

Contents

1	Executive Summary and Title	3
2	Proof of Originality of Data	3
3	MetaData	4
4	Descriptive Statistics	7
5	Detailed Explanation of Analytical Process	9
6	Results and Findings	10

1 Executive Summary and Title

Jaiswal Cycle Stores, situated in Kunwar Singh Chowk, Main Road Jainagar, Madhubani-847226, has been a trusted hub for bicycle enthusiasts, catering directly to the community's demand for eco-friendly and affordable transportation. As a B2C (business-to-consumer) establishment, the shop serves individual customers, providing them with bicycles and related accessories. Despite its reputable standing, the shop encounters challenges, including a decline in bicycle sales due to the rising popularity of motorized options and seasonal disruptions leading to reduced sales during the rainy season.

This capstone project aims to address these challenges through a data-driven approach, specifically focusing on the preferences of individual customers. By analyzing customer preferences, market trends, and historical sales data, the project aims to implement strategic interventions, such as targeted marketing campaigns and optimized inventory management. These initiatives aim to not only counteract the impact of declining bicycle sales and seasonal fluctuations but also to position Jaiswal Cycle Stores as the preferred destination for high-quality bicycles among individual consumers. The goal is to thrive in the dynamic B2C landscape by adeptly adapting to evolving consumer needs and ensuring long-term profitability.

2 Proof of Originality of Data:



[CLICK HERE FOR INTERVIEW AND PHOTO PROOF WITH OWNER](#)

Jaiswal Cycle Stores

Kunwar Singh Chowk, Main Road Jainagar
Madhubani, Bihar - 847226
GSTIN - 10AVOPJ6258J1ZD
Contact: +91 9504567435

01-03-2024

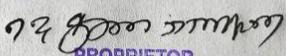
To Whom it may concern,

Subject: Authorization for Data Utilisation for Business Data Management Capstone Project.

I am writing to confirm that Mr. Satish Jaiswal (21F2000142), a student enrolled in the BS Degree program in Data Science & Applications at IIT Madras, has been granted permission to utilise our data for his business data management capstone project. As the representative of **Jaiswal Cycle Stores**, I hereby approve Mr. Satish's access and usage of this data for his college project.

This letter serves as an official confirmation, granting Mr. Satish the necessary rights to access the data throughout the duration of his project. The provided data is genuine and authenticated to the best of my knowledge. We are delighted to extend our support to Satish in his educational journey and his project.

Yours Truly,
Nand Kumar Jaiswal
Proprietor
Jaiswal Cycle Stores

JAISWAL CYCLE STORES

PROPRIETOR
01-03-2024

3 METADATA

The collected data includes Stock Data and Stock-Sales Summary data for **Jaiswal Cycle Stores**. Metadata refers to descriptive details about this data. The product data comprises three columns:

- 1. Description of goods:** This column lists all SKUs (Stock Keeping Units), representing different products.
- 2. Purchase Rate:** It contains the buying price for each SKU, indicating the rate at which the store purchases the product(including all costs like CGST+SGST+Transportation).
- 3. Sales Rate:** This column displays the selling price for each SKU, showing the rate at which the store sells the product to customers.

DESCRIPTION OF GOODS	Purchase Rate	Sales Rate
HERO TERRAIN 50 CM S/B RB	4283.75	4497.9375
HERO JET GOLD 55CM GR	3967.5	4165.875
HERO ROYAL GOLD 55CM GN	4312.5	4528.125
BONFIRE 26T SS V-BRK	3910	4105.5
HERO NEXT 26T SS V-BRK	4140	4347
HERO AIYANA 26T CKD	4830	5071.5
HERO EMPRESS 50CM C/B	4427.5	4648.875
PARROT H/D CARRIER B.C.P.	333.5	350.175
CARRIER MDR ACCO	184	193.2
RIM 28*1.1/2 32/40H	356.5	374.325
RIM 28*1.1/2 32H	178.25	187.1625
FRAME HERO ROYAL GREEN	1035	1086.75
FORK ROYAL 22" GR.	322	338.1
FREEWHEEL B.M.	46	48.3
CHAIN BIRDI JUMBO	80.5	84.525

The Stock Data includes monthly information categorized by company and contains five columns:

- 1. Company:** This column lists various Major companies of which items are present in our shop.
- 2. Amount of Monthly Stock:** The total capital value of the stock available for every company in a given month.(based on the sales and necessity of a product of that particular company).
- 3. Amount of Monthly Sales:** It displays the overall sales amount for each company within the month.
- 4. Company Wise Profit:** This column shows the gross profit gained by each company, calculated based on their sales and stock data.
- 5. No of Items and Variety:** It represents the total count of different types or variations of items offered by each company (e.g., "HERO" produces Frames, Seats, Lock, Pydle, carrier, etc.).

COMPANY	MONTHLY_STOCK_AMT	MONTH_SALE_AMT	PROFIT	NO_ITEMS_VARIETY
HERO	89528	78784.64	3939.232	8
BSA	29452	23561.6	1178.08	3
TERRAIN	24521	19616.8	980.84	5
BIRDI	15427	12341.6	617.08	4
LOVE BELL	9854	7883.2	394.16	4
FIFTY	5254	4203.2	210.16	2
AVON	49521	39616.8	1980.84	5
ATLAS	49520	39616	1980.8	3
EMPERSS	26958	21566.4	1078.32	6
KONARK	4250	3400	170	5
RALSON	58214	46571.2	2328.56	8
RALCO	45024	36019.2	1800.96	3
Total	407523	333180.64	16659.032	56

The below data concerns the monthly stock of products, including variations, and includes four columns:

- 1. Item Name:** This column lists the name of the product.
- 2. Quantity:** It indicates the quantity of the item available in stock for that month.
- 3. Rate:** This column displays the purchase rate of the item(including all costs).

4. Amount: It represents the total value of the stock for that particular item, calculated by multiplying the quantity by the purchased rate that is mentioned above.

DESCRIPTION OF GOODS	QUANTITY	Rate per piece	Total Purchase Amount
HERO TERRAIN 50 CM S/B RB	24	4283.75	102810
HERO JET GOLD 55CM GR	20	3967.5	79350
HERO ROYAL GOLD 55CM GN	16	4312.5	69000
BONFIRE 26T SS V-BRK	4	3910	15640
HERO NEXT 26T SS V-BRK	4	4140	16560
HERO AIYANA 26T CKD	8	4830	38640
HERO EMPRESS 50CM C/B	4	4427.5	17710
PARROT H/D CARRIER B.C.P.	20	333.5	6670
CARRIER MDR ACCO	40	184	7360
RIM 28*1.1/2 32/40H	30	356.5	10695
RIM 28*1.1/2 32H	50	178.25	8912.5
FRAME HERO ROYAL GREEN	10	1035	10350
FORK ROYAL 22" GR.	15	322	4830
FREEWHEEL B.M.	300	46	13800
CHAIN BIRDI JUMBO	150	80.5	12075
LOVE92 REGULAR BELL BCP	200	46	9200
BICYCLE BELL FIFTY	300	28.75	8625

The monthly sales dataset present below includes three columns:

- 1. Months:** This column specifies the particular month of sales.
- 2. Duration:** It indicates the time span covered within that specific month.
- 3. Sales Amount:** This column displays the amount of total sales for each month.

MONTHS	DURATION	SALES AMOUNT
July 2023	07-2023 to 31-07-2023	521458
August 2023	08-2023 to 31-08-2023	354056
September 2023	09-2023 to 31-09-2023	460025

The data underwent cleaning and preparation to align with the project objectives. Specifically, for the product's monthly stock table:

- The Product_Data Excel sheet was imported and transformed into a DataFrame using the pandas library, utilizing the read_excel() function in a Google Colab Notebook.
- The resulting DataFrame consisted of 27 rows(of unique products) and 10 columns (1. DESCRIPTION OF GOODS, 2. QUANTITY, 3. RATE PER PIECE/SET, 4. CGST+SGST(6%+6%), 5. TRANSPORTATION COST(3%), 6. PURCHASE AMOUNT(PER PIECE), 7. TOTAL PURCHASE

AMOUNT, 8. SALE PRICE PER PIECE(5% PROFIT), 9.. TOTAL SALE PRICE, 10. PROFIT) after the import process was completed.

- An **excerpt** of the result of the above mentioned steps in Colab has been attached below.

```
1s  ⏴ import numpy as np
    import pandas as pd
    df = pd.read_excel('/content/BDM Project Data(21f2000142) (4).xlsx', sheet_name='QUANTITY')
    df.head()
```

	DESCRIPTION OF GOODS	QUANTITY	Rate per piece	Total Purchase Amount
0	HERO TERRAIN 50 CM S/B RB	24	4283.75	102810.0
1	HERO JET GOLD 55CM GR	20	3967.50	79350.0
2	HERO ROYAL GOLD 55CM GN	16	4312.50	69000.0
3	BONFIRE 26T SS V-BRK	4	3910.00	15640.0
4	HERO NEXT 26T SS V-BRK	4	4140.00	16560.0

The steps taken for cleaning the **overall monthly sales** data were as follows:

1. The data from the **overall monthly sales** Summary Excel sheet was imported and transformed into a DataFrame using pandas' `read_excel()` function. The sales quantity for each company was derived from the in-stock and outward stock figures.
2. An **excerpt** of the result of the above mentioned steps in Colab has been attached below.

```
[44] import numpy as np
    import pandas as pd
    df = pd.read_excel('/content/BDM Project Data(21f2000142) (4).xlsx', sheet_name='COLAB2')
    df.head()
```

	MONTHS	DURATION	SALES AMOUNT	GROSS PROFIT	NET PROFIT
0	2023-07-01	1-07-2023 to 31-07-2023	521458	41716.64	26072.90
1	2023-08-01	1-08-2023 to 31-08-2023	354056	28324.48	17702.80
2	2023-09-01	1-09-2024 to 31-09-2024	460025	36802.00	23001.25

4 Descriptive Statistics

- Once the DataFrame is created in Python, the '`df.describe()`' function is used to obtain the relevant statistics for the dataset.
 - Descriptive Statistics of the product (including variety) monthly stock :
 - Upon analyzing the statistics, it was observed that the item '**HERO TERRAIN 50 CM S/B RB**' has the highest mean, while '**BRAKE CHIMTY BACK**' exhibits the lowest mean.
 - An **excerpt** of the result of the above mentioned steps in Colab has been attached below.

```
[45] import numpy as np
import pandas as pd
df = pd.read_excel('/content/BDM Project Data(21f2000142) (4).xlsx', sheet_name='T_QUANTITY')
df.describe()
```

	HERO TERRAIN 50 CM S/B RB	HERO JET GOLD 55CM GR	HERO ROYAL GOLD 55CM GN	BONFIRE 26T SS V-BRK	HERO NEXT 26T SS V-BRK	HERO AIYANA 26T CKD	HERO EMPRESS 50CM C/B	PARROT H/D CARRIER B.C.P.	CARRIER MDR ACCO	RIM 28*1.1/2 32/40H	STAND JAGDAMBA 22"	CHAIN K C H/D	FOOT REST
count	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000	3.000000
mean	35705.916667	27779.166667	24442.833333	6518.000000	6901.333333	14492.666667	7380.500000	2341.166667	2528.000000	3693.833333	2528.000000	955.333333	934.866667
std	58152.857776	44705.243843	38647.390650	8137.712947	8616.496117	21050.729235	9214.975081	3752.155258	4185.254114	6065.385526	4185.254114	1562.902855	1207.910201
min	24.000000	20.000000	16.000000	4.000000	4.000000	8.000000	4.000000	20.000000	40.000000	30.000000	40.000000	46.000000	4.600000
25%	2153.875000	1993.750000	2164.250000	1957.000000	2072.000000	2419.000000	2215.750000	176.750000	112.000000	193.250000	112.000000	53.000000	252.300000
50%	4283.750000	3967.500000	4312.500000	3910.000000	4140.000000	4830.000000	4427.500000	333.500000	184.000000	356.500000	184.000000	60.000000	500.000000
75%	53546.875000	41658.750000	36656.250000	9775.000000	10350.000000	21735.000000	11068.750000	3501.750000	3772.000000	5525.750000	3772.000000	1410.000000	1400.000000
max	102810.000000	79350.000000	69000.000000	15640.000000	16560.000000	38640.000000	17710.000000	6670.000000	7360.000000	10695.000000	7360.000000	2760.000000	2300.000000

8 rows × 27 columns

- Descriptive Statistics of Sales and stock by Amount of each company:

```
▶ import numpy as np
import pandas as pd
df = pd.read_excel('/content/BDM Project Data(21f2000142) (4).xlsx', sheet_name='variety')
df.describe()
```

	SNo	NO_ITEMS_VARIETY	MONTHLY_STOCK_AMT	MONTH_SALE_AMT	PROFIT	grid icon
count	12.000000	13.000000	13.000000	13.000000	13.000000	grid icon
mean	6.500000	8.615385	62695.846154	51258.560000	2562.928000	grid icon
std	3.605551	14.355826	106413.910460	87232.247823	4361.612391	grid icon
min	1.000000	2.000000	4250.000000	3400.000000	170.000000	grid icon
25%	3.750000	3.000000	15427.000000	12341.600000	617.080000	grid icon
50%	6.500000	5.000000	29452.000000	23561.600000	1178.080000	grid icon
75%	9.250000	6.000000	49521.000000	39616.800000	1980.840000	grid icon
max	12.000000	56.000000	407523.000000	333180.640000	16659.032000	grid icon

- After analyzing the statistics, it was determined that the company “HERO” has the maximum variety with a value of 8, while “FIFTY” has the minimum variety with a value of 2.

- Descriptive Statistics of purchase and sales rate of each product:

```
[47] import numpy as np
import pandas as pd
df = pd.read_excel('/content/BDM Project Data(21f2000142) (4).xlsx', sheet_name='PURCHASE VS SALES')
df.head()
```

	DESCRIPTION OF GOODS	Purcse Rate	Sales Rate	grid icon
0	HERO TERRAIN 50 CM S/B RB	4283.75	4497.9375	grid icon
1	HERO JET GOLD 55CM GR	3967.50	4165.8750	grid icon
2	HERO ROYAL GOLD 55CM GN	4312.50	4528.1250	grid icon
3	BONFIRE 26T SS V-BRK	3910.00	4105.5000	grid icon
4	HERO NEXT 26T SS V-BRK	4140.00	4347.0000	grid icon

Upon analysis of the statistics, it was revealed that the product "**FOOTREST**" has the lowest sale rate valued at Rs 05, while the product "**HERO ROYAL GOLD 55CM GN**" holds the highest sale rate of Rs 4528. Similarly, regarding the purchase rates, "**FOOTREST**" has the minimum rate of Rs 4.6, whereas "**HERO ROYAL GOLD 55CM GN**" boasts the maximum rate of Rs 4312.

- Descriptive Statistics of Sales by Amount of three month (July, August, September):

df.describe()				
	SALES AMOUNT	GROSS PROFIT	NET PROFIT	
count	3.000000	3.000000	3.000000	
mean	445179.666667	35614.373333	22258.983333	
std	84682.615349	6774.609228	4234.130767	
min	354056.000000	28324.480000	17702.800000	
25%	407040.500000	32563.240000	20352.025000	
50%	460025.000000	36802.000000	23001.250000	
75%	490741.500000	39259.320000	24537.075000	
max	521458.000000	41716.640000	26072.900000	

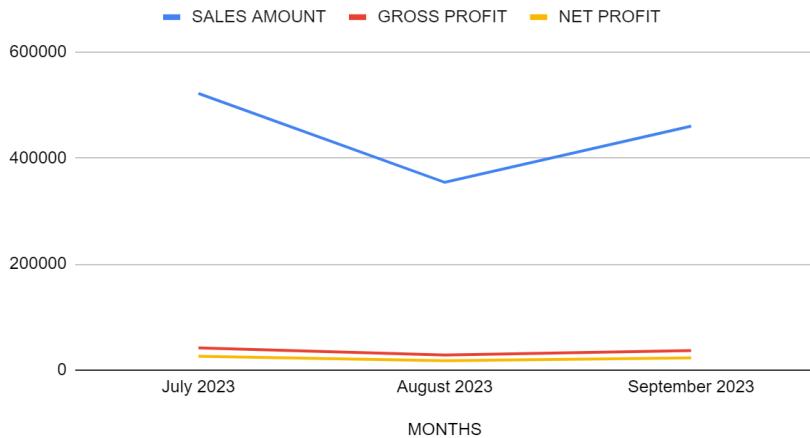
Upon analysis, it was discovered that the average sales value across months amounted to 445,179.66. Notably, in three months, the maximum sales amount, reaching 521,458, occurred specifically in July while the lowest was in August, reaching 354,056 only(due to rainy reasons).

5 Detailed Explanation of Analytical Process

- 1. Bicycle Sales and Stock Analysis:** Utilize Excel's Sum function to aggregate the monthly stock quantities for each bicycle type and related products. Extract monthly sales quantities from the stock-sales summary. Employ a Column chart to visually compare monthly stock and sales quantities. Introduce an Amount Quantity Pareto chart to pinpoint the most impactful bicycle types.
- 2. Customer Preferences Analysis for Bicycles:** Compile monthly sales quantities for each bicycle product and compute the total sales amount per month. Present Sales Quantity and Sales Amount using Line and Bar charts, respectively. These visualizations will highlight top-selling bicycles and customer preferences.
- 3. Monthly Sales Data Compilation for Bicycles:** Sum up daily bicycle sales for monthly sales data. Utilize a Line Chart in Excel to illustrate overall performance and trends in bicycle sales, providing a clear overview of monthly sales patterns.
- 4. Monthly Inventory Analysis for Bicycles:** Sum up the total inventory for each bicycle type on a monthly basis. Use a column plot in Excel to depict these monthly stock levels and variations. Additionally, employ another column plot to showcase the total variety of bicycle products per specific company.

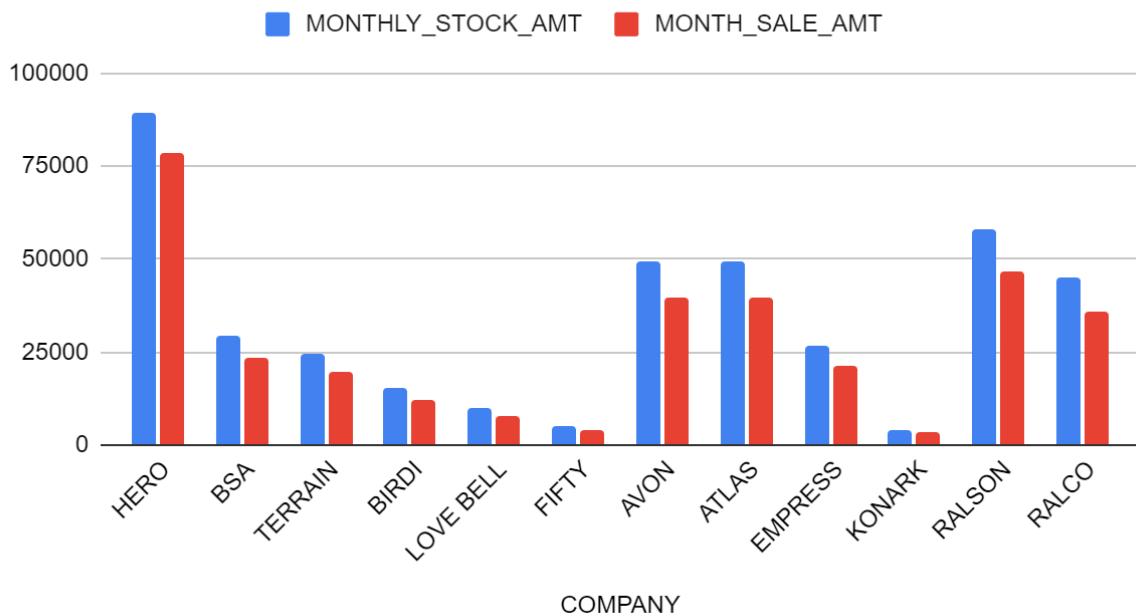
6 Results and Findings

SALES AMOUNT, GROSS PROFIT and NET PROFIT



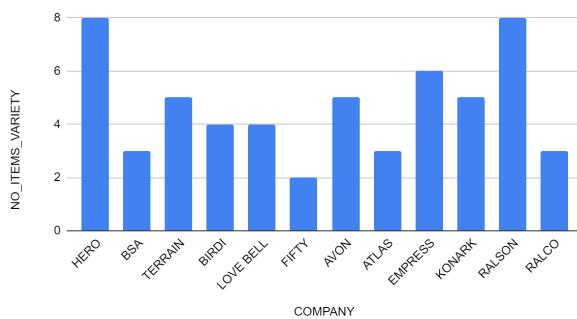
- Upon analyzing the Line Chart depicting Total Monthly Sales and Total Monthly Stock, it's noticeable that compared to the sales in July, the total sales during the other two months were lower.(Due to less customers in the market in the high Rainy season).
- NOTE : The Gross Profit and Net Profit are also curved lines. But due to very less value of these two as compared to the Sales amount, they are appearing to be the straight lines.

MONTHLY_STOCK_AMT and MONTH_SALE_AMT



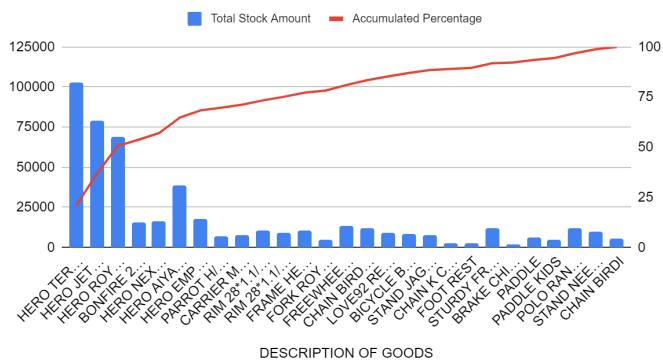
- Upon analyzing the Column Chart depicting Stock Quantity and Sales Quantity, it's evident that "HERO" Company's products dominate both sales and stock quantities, comprising the majority of both metrics.

NO_ITEMS_VARIETY vs COMPANY



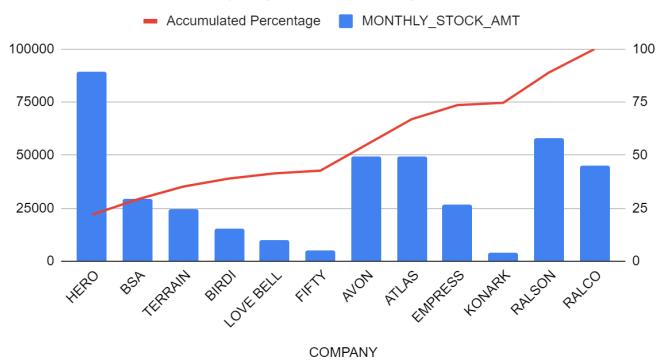
After analyzing the Column Chart based on the number of varieties, it's apparent that “**HERO**” and “**RALSON**” Company offers the maximum variety in products, whereas “**FIFTY**” Company offers the minimum variety in their product range.

Pareto Chart for Monthly Stock Amount



The Pareto chart representing product stock amounts does not fully adhere to the Pareto Principle. Approximately 57% of the items sold originate from only four specific products: HERO TERRAIN 50 CM S/B RB, HERO JET GOLD 55CM GR, HERO ROYAL GOLD 55CM GN, and BONFIRE 26T SS V-BRK.

Pareto Chart for Company Wise Monthly Stock



The Pareto chart illustrating company stock amounts does not completely align with the Pareto Principle. Roughly one-third of the items sold originate from only three specific companies: Hero, BSA, and TERRAIN.

Customer Preference- Analyzing the Sales Quantity and Sales Amount chart it is clear that customers prefer to buy “**HERO**” company products. Customers like to buy “**RALSON**” and “**EMPRESS**” products but “**HERO**” contributes the most to the bicycle market with its large variety and sales.