

SALES PERFORMANCE ANALYSIS

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- **Project Title:**
 - Sales Transaction Data Analysis for World Wide Depstor 2019
- **Project Duration:**
 - 1 Month - January, 2025
- **Role:**
 - Data Analyst - Individual Project
- **Tool Used:**
 - Phyton (Pandas, NumPy, Matplotlib), Looker Studio, Excel, PowerPoint
- **Project Description:**
 - Analyze department store sales data in 2019 to evaluate overall sales performance. Identify key trends in product categories, seasonal sales patterns, and customer buying behavior. Provide actionable insights to optimize product offerings, improve marketing strategies, and increase customer engagement.
- **Objectives:**
 - Monthly and Daily sales performance
 - Highest and Lowest product sales
 - Customer Behavior Condition

- **Data Source:**
 - Sales Transaction v.4a.csv
- **Original Data Set (Before Data Cleansing):**
 - 536,350 rows
 - 8 Columns
- **After Data Set Cleansing:**
 - 527,765 rows
 - 8 columns
- **Data Analysis Techniques:**
 - Time Series Analysis
 - Top Contributing Product Analysis
 - Price Elasticity
 - Retention Cohort Analysis
 - Market Basket Analysis
- **Visualization and Reporting:**
 - Developed visualization using looker and power point
 - Interactive dashboard and dynamic reports for stakeholder

Time Series Analysis

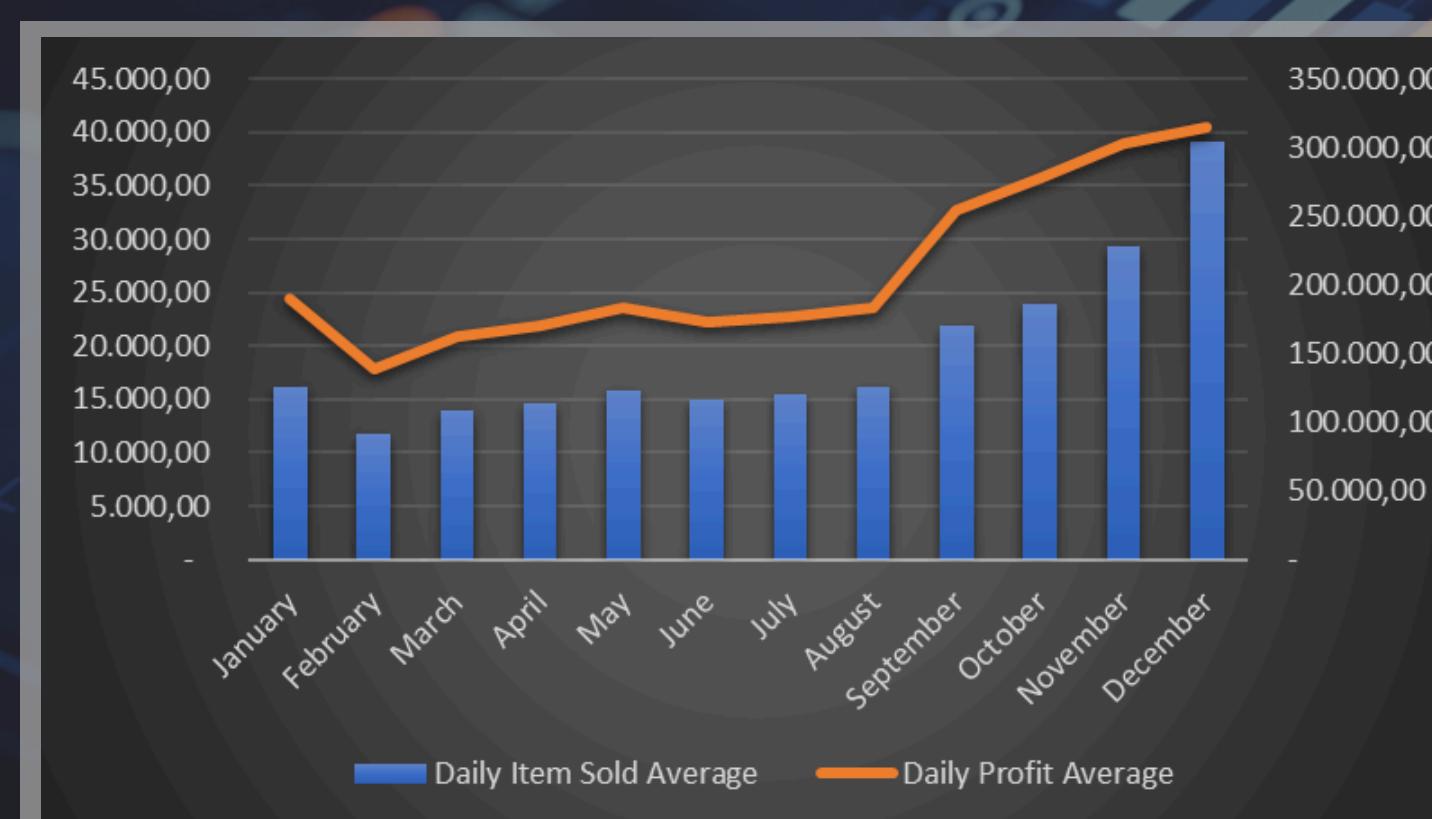
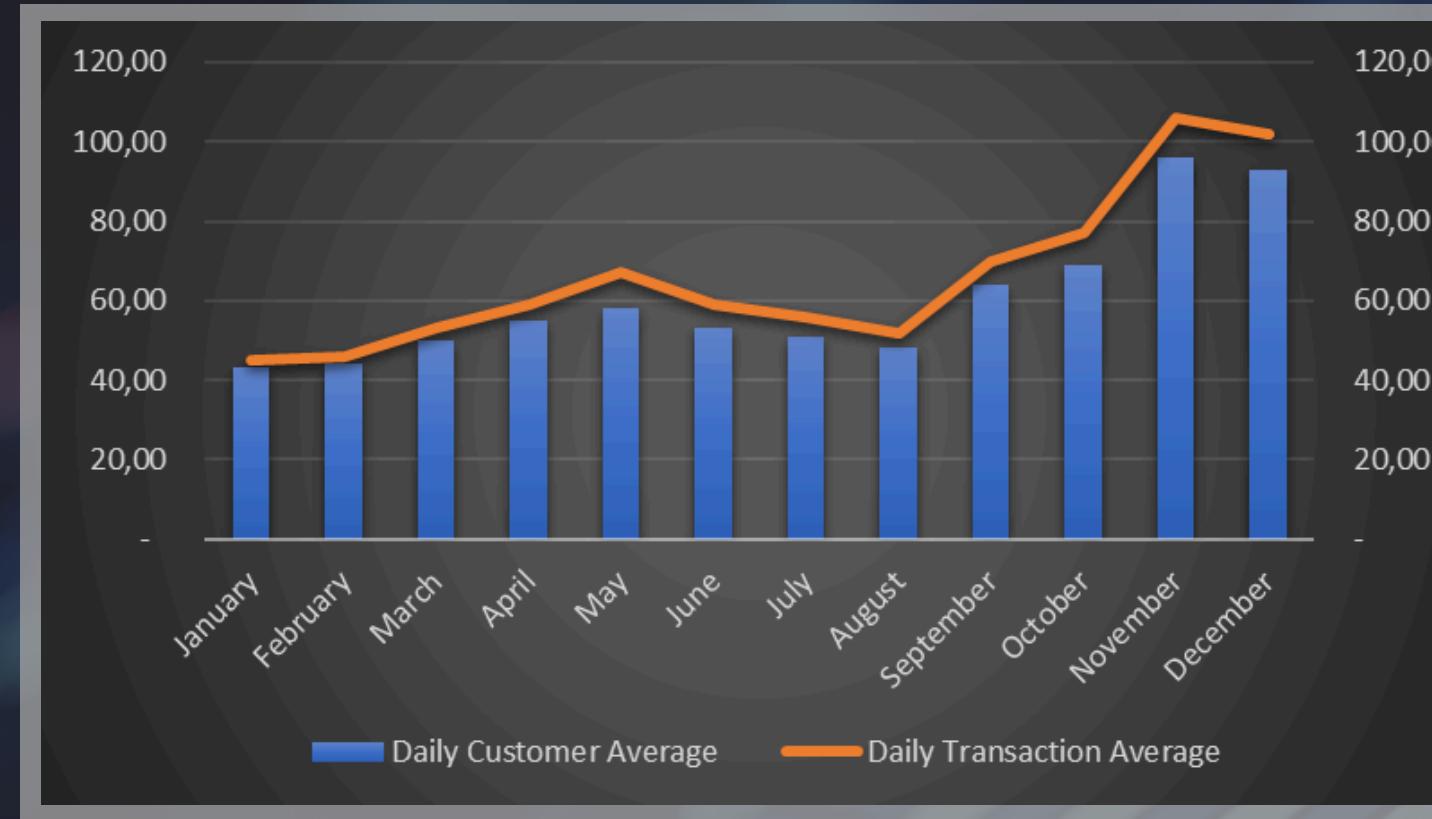
- Monthly Sales Reports



- Total Customer
 - 13,163
- Total Transaction
 - 18,238
- Total Sold Item
 - 5.232.590,00
- Total Profit
 - 58.550.558,00
- There was a decrease in the number of customers and transaction in:
 - April, June - August, and December
- There was a decrease in the number of sold items and profit in:
 - February, April, and December
- Based on the graphic table, the sales trend performance in 2019 highlights two notable declines during April and December, indicating unfavorable conditions during these months.

Time Series Analysis

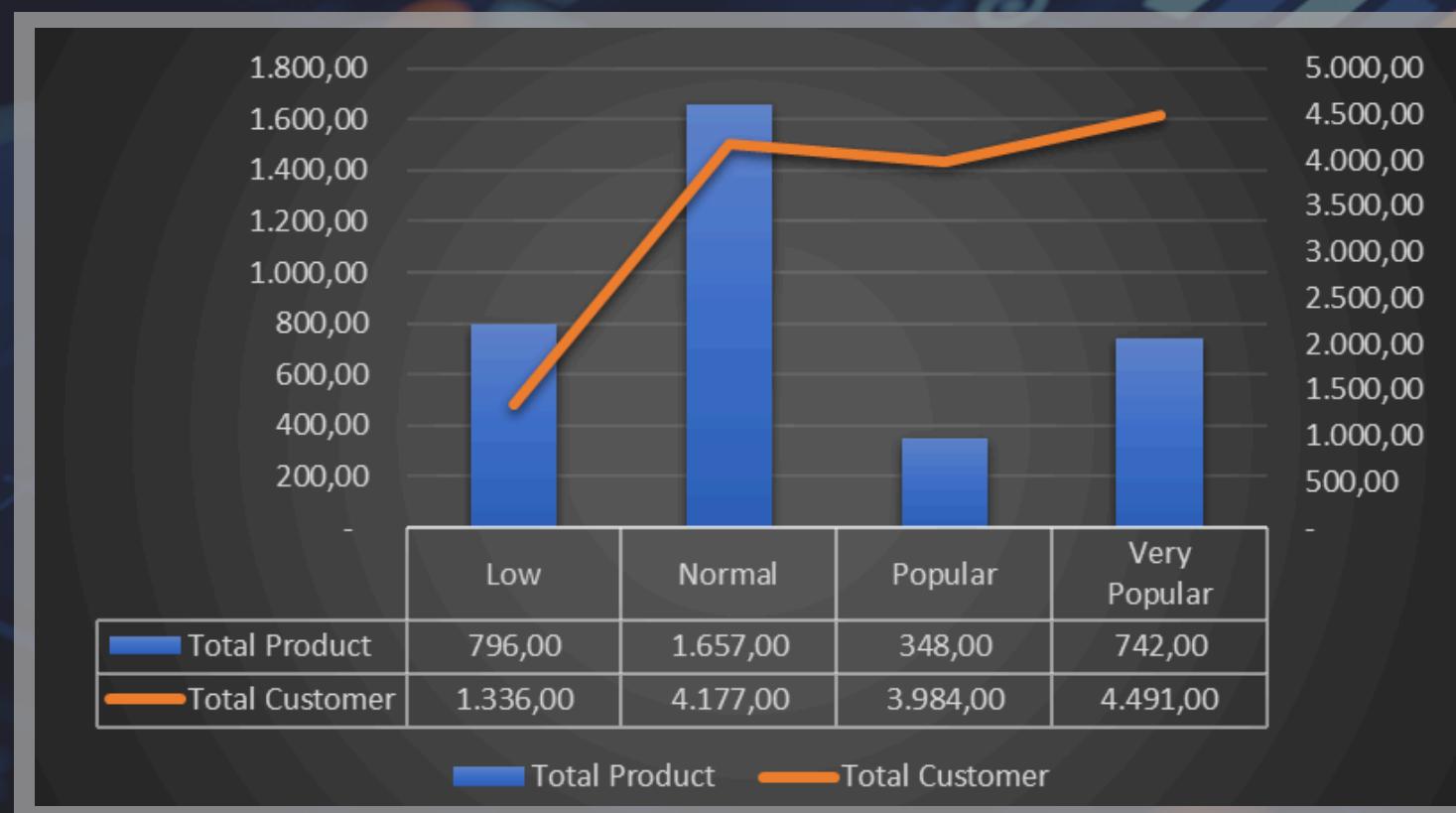
- Daily Sales Reports



- Average number of customers per month and day
 - 1,097/Month & 60.3/Day
- Average number of transaction per month and day
 - 1,520/Month & 66/Day
- Average number of item sold per month and day
 - 436,049/Month & 19,450/Day
- Average number of profit per month and day
 - 4,879,213/Month & 210,712/Day
- Based on daily analysis, the chart indicates that the lowest sales figures occurred in February and the period from June to August.

Top Contributing Products

- Products Performance Condition

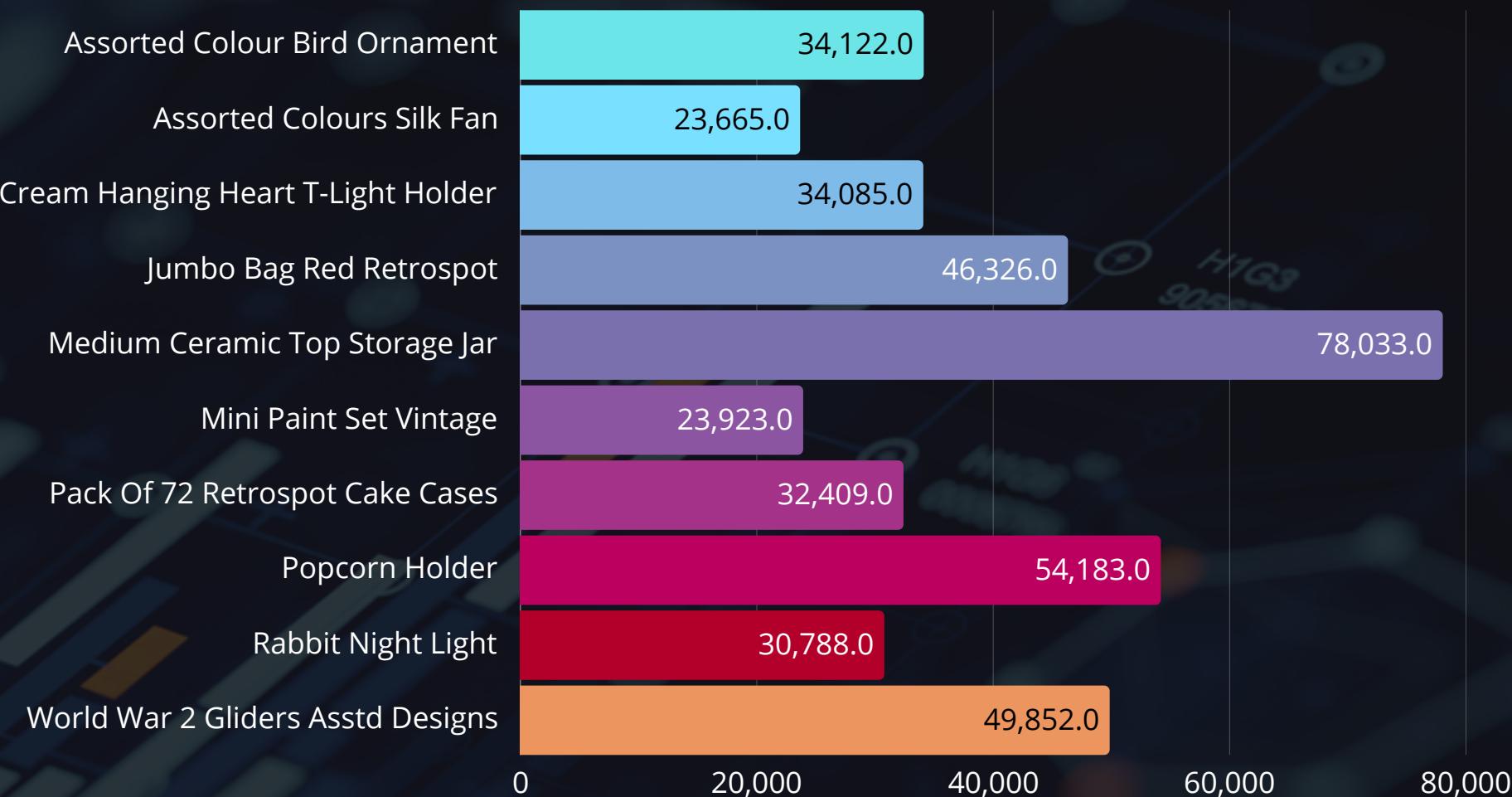


- Product Score is based on Transaction Volume (TV) and Revenue Volume (RV)
 - Very Popular (25% Products with high TV and RV)
 - Popular (25% Products with High TV and RV and 25%-75% products with Normal TV and RV)
 - Low (25% Products with Low TV and RV)
 - Normal (In addition to the combination of Super Popular, Popular, and Low)
- Based on graphic table, the products with Normal Score is more a lot than products with Popular Score and Super Popular Score
- Based on the number of products sold and total customers, the "Super Popular" product category has the highest number

- Very Popular Product Based On Total Customer



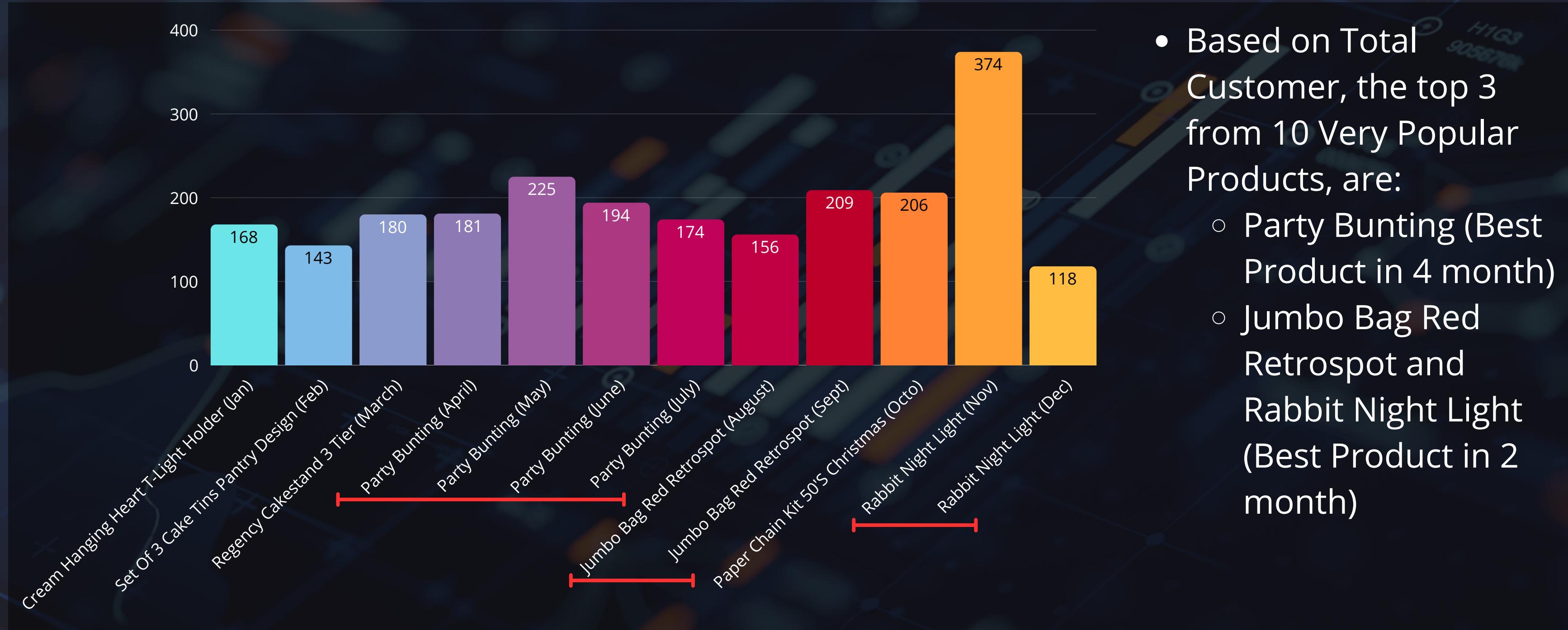
- Very Popular Product Based On Total sold



- Based on the total customers and the total sold item numbers, we can see that the products with the Very Popular Product Score are owned by household and kitchen products
- For example, Popcorn Holder, Rabbit Night Light, Cream Hanging Heart T-Light Holder, and Lunch Bag Red Retrosport

Top Contributing Products

- Top Very Popular Product / Month
 - Based on Total Customer



- Based on Total Customer, the top 3 from 10 Very Popular Products, are:
 - Party Bunting (Best Product in 4 month)
 - Jumbo Bag Red Retrospot and Rabbit Night Light (Best Product in 2 month)

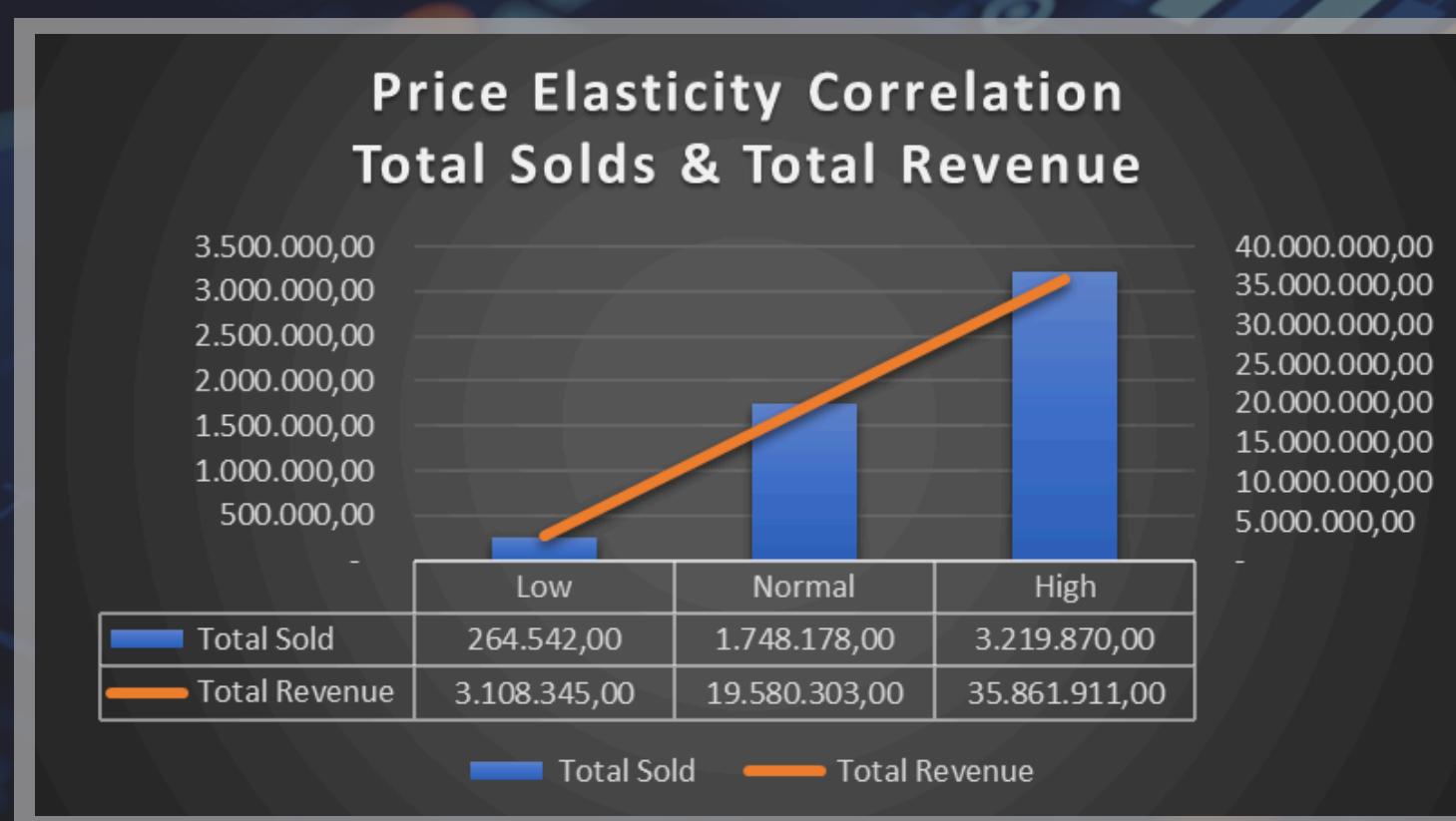
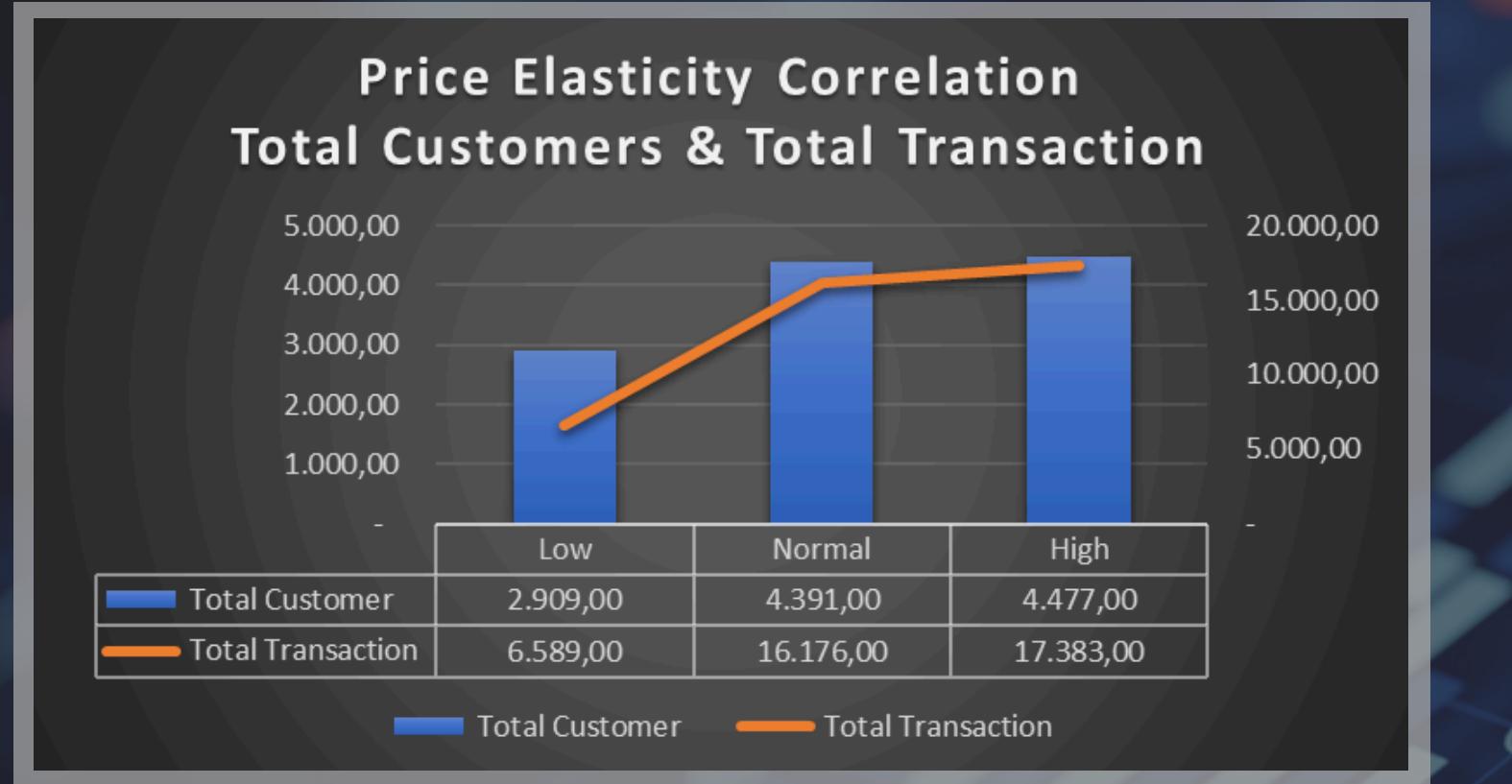
Top Contributing Products

- Top Very Popular Product / Month
 - Based on Total Sold Item



Price Elasticity

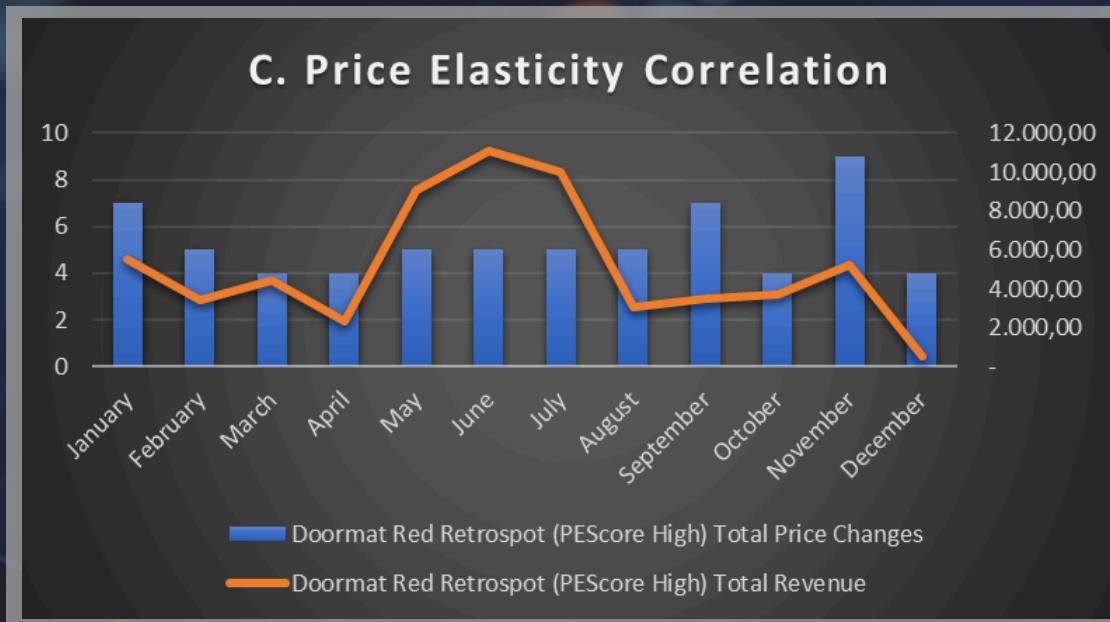
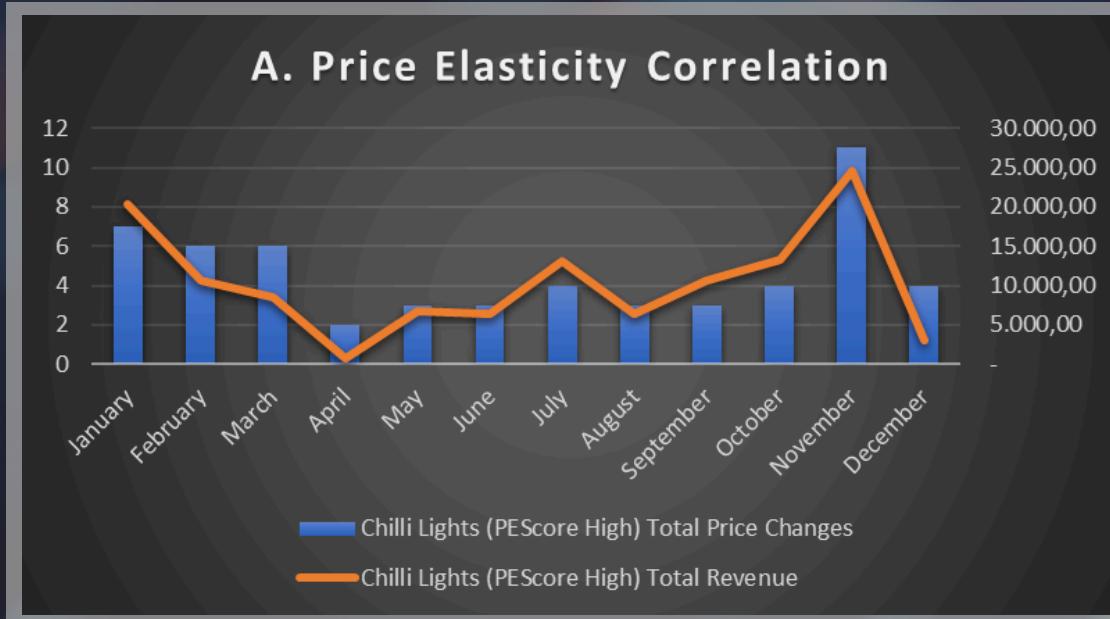
- The Impact of Price Elasticity on Sales Movement



- The Price Elasticity Score is based on how much the price of a product changes
 - Low \leq 3 Price Changes (1,052 Product)
 - Normal \geq 3 and \leq 8 Price Changes (1,769 Products)
 - High $>$ 8 Price Changes (855 Products)
- Based on graphic table, the products with Normal Price Elasticity Score is more than the products with Low and High Price Elasticity Score
- But, based on the total number of customers, transactions, sold item, and revenue. Products with a High Price Elasticity Score are higher than the others

Price Elasticity

- The Impact of Price Elasticity on Sales Movement

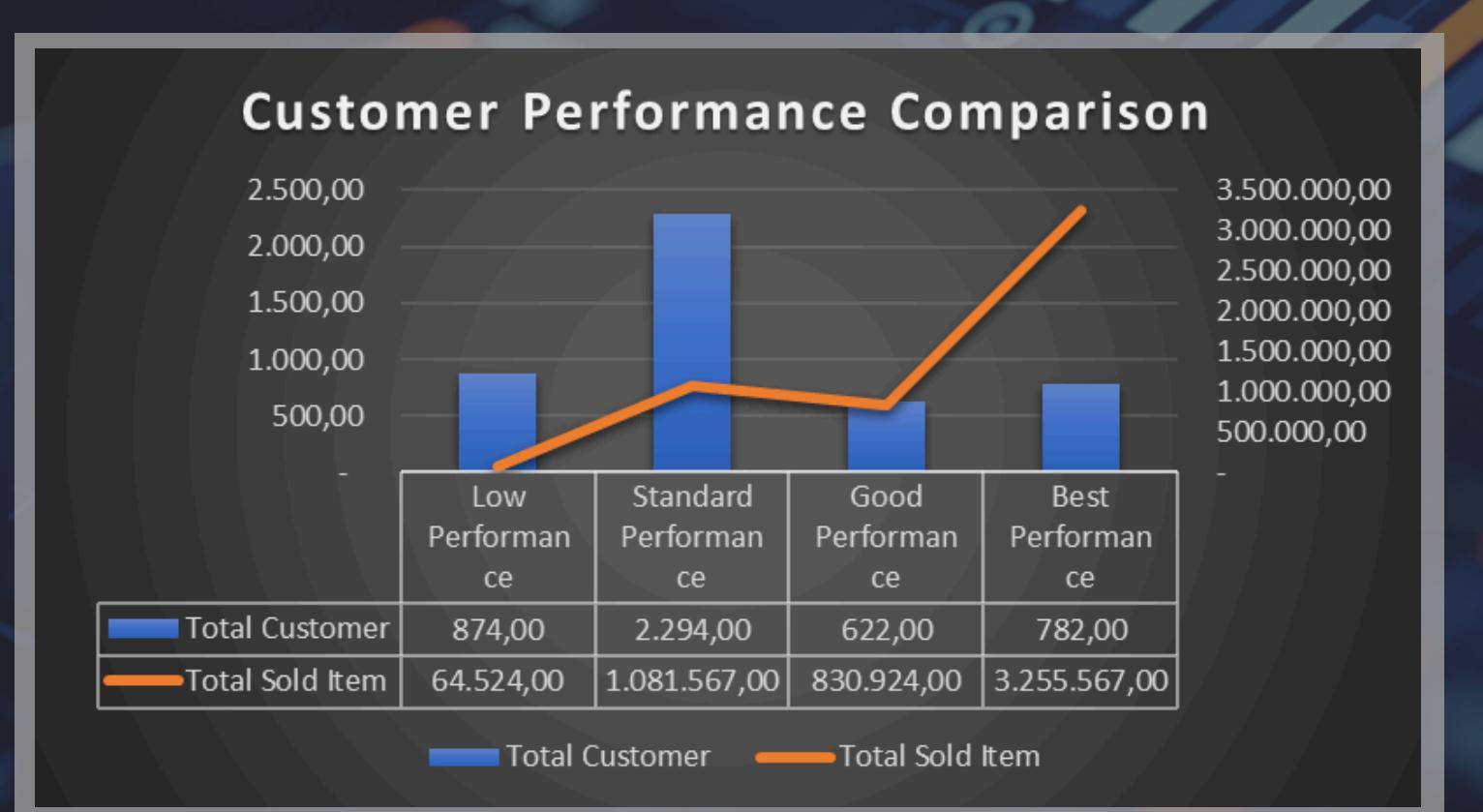


Correlation between Price Elasticity and Sales performance

- The chart table shows that price elasticity has a big impact on sales performance.
- The price stability of a product has a different impact on sales profits.
- For example, in the graph tables B and C we can see that from May to July the price change has the same value for each product, but the profits obtained have a very distant comparison.

Customer Retention

- Customer Retention Analysis



- Customer Performance Score is based on Transaction Volume (TV) and Revenue Volume (RV)
 - Best Performance (25% Customers with high TV and RV)
 - Good Performance (25% Customers with High TV and RV and 25%-75% Customers with Normal TV and RV)
 - Low Performance (25% Customers with Low TV and RV)
 - Standard Performance (In addition to the combination of Best, Good, and Low Performance)
- Total customers with Standard Performance Score is more a lot than total customer with Good and Best Performance Score

Customer Retention

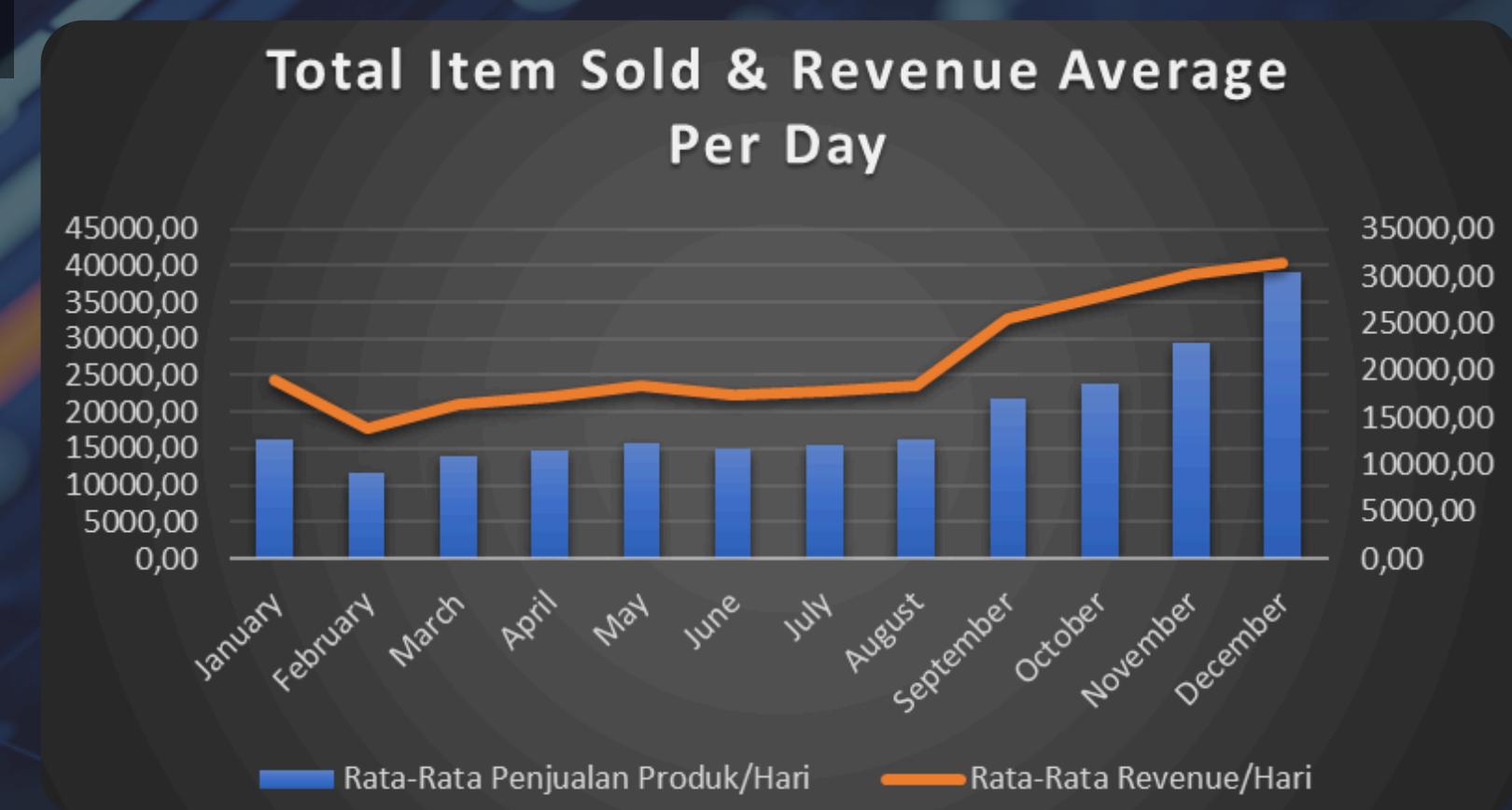
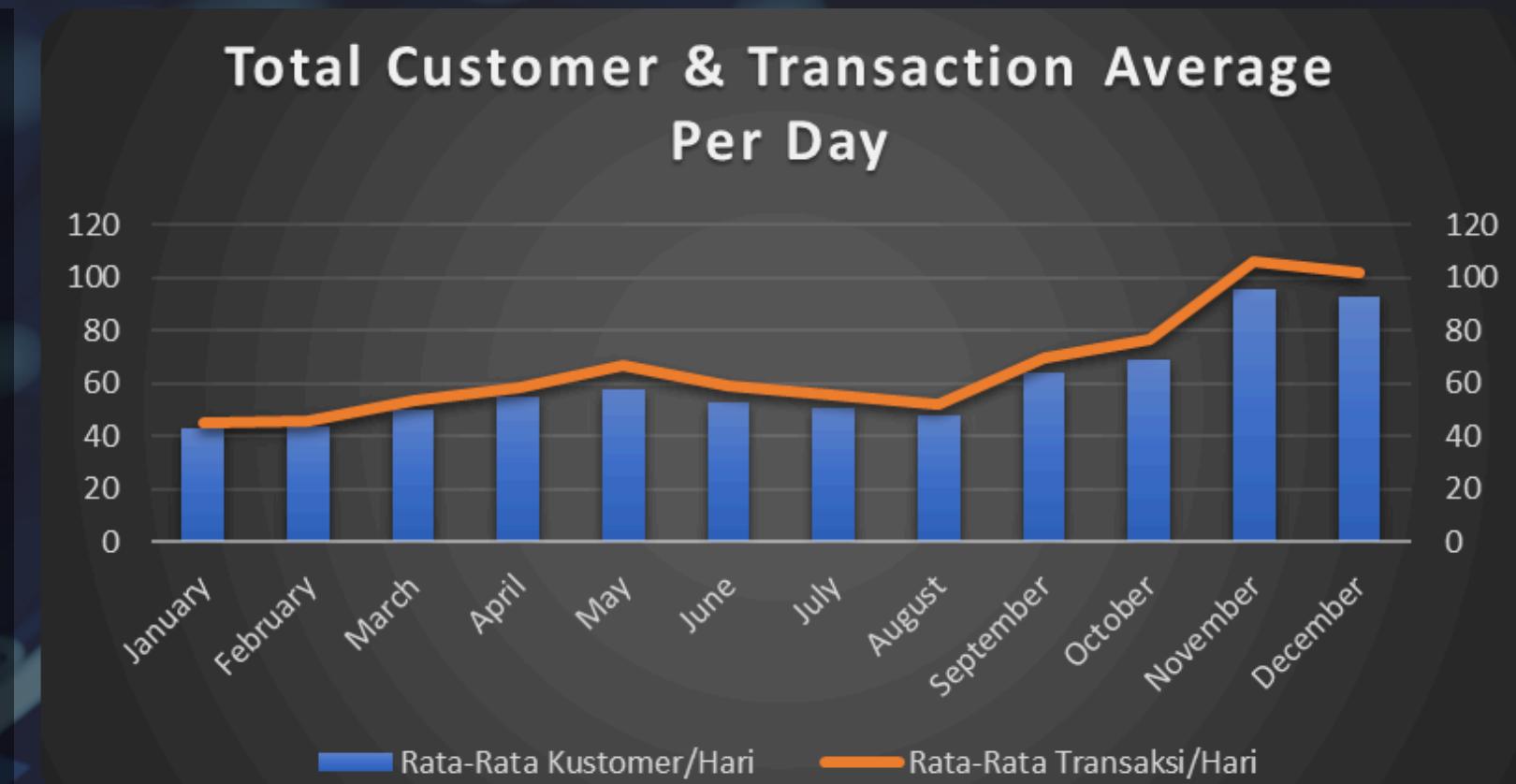
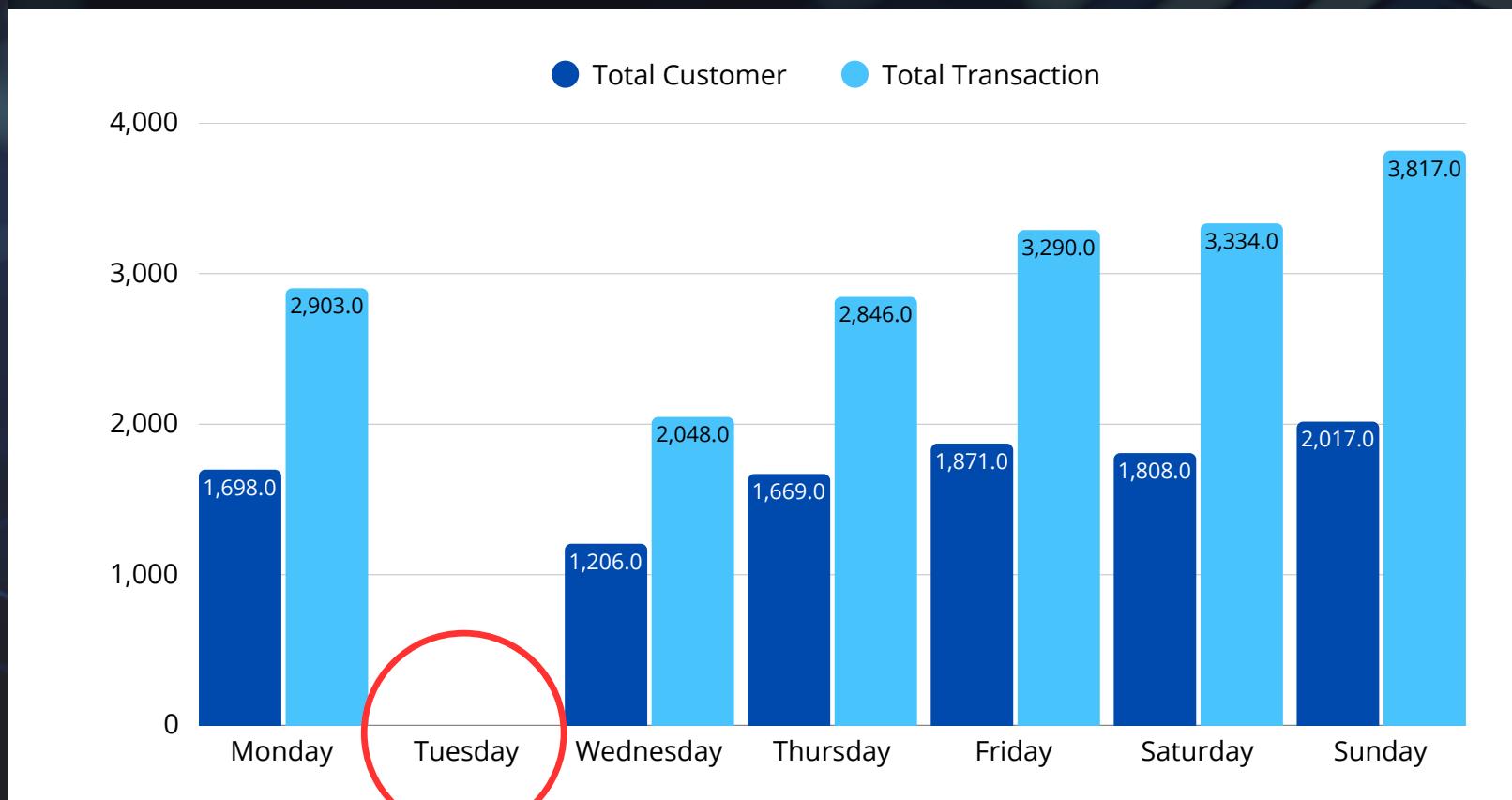
- Customer Retention Analysis

Date	Total Cus...	1'st	2'nd	3'rd	4'th	5'th	6'th	7'th	8'th	9'th	10'th	11'th
1 Jan 2019	827	33%	41%	37%	44%	41%	37%	37%	41%	41%	50%	25%
1 Feb 2019	569	22%	24%	32%	30%	26%	28%	31%	30%	36%	12%	null
1 Mar 2019	610	16%	25%	22%	24%	18%	28%	24%	30%	11%	null	null
1 Apr 2019	397	22%	21%	22%	20%	25%	25%	29%	10%	null	null	null
1 Mei 2019	374	18%	18%	18%	21%	23%	27%	9%	null	null	null	null
1 Jun 2019	309	18%	15%	21%	22%	30%	10%	null	null	null	null	null
1 Jul 2019	242	15%	19%	22%	30%	12%	null	null	null	null	null	null
1 Agu 2019	192	20%	23%	23%	12%	null	null	null	null	null	null	null
1 Sep 2019	312	25%	34%	13%	null	null						
1 Okt 2019	353	23%	10%	null	null							
1 Nov 2019	334	10%	null	null								
1 Des 2019	53	null	null									

- Cohort Analysis
 - The highest number of new customers based on the first transaction falls in January, March, and February. And the lowest falls in December.
 - Based on the Cohort chart, it can be seen that the number of regular customers has an unstable value, this is based on the random decline and increase in the number of regular customers.
- Based on the first month of customer transactions, the 3rd and 4th months are the months with the smallest percentage gap in number regular customers among the other months
- Based on the data that has been underlined, it shows a significant decrease, especially in the 2nd month and from the 6th to the 10th month, which have a very large gap

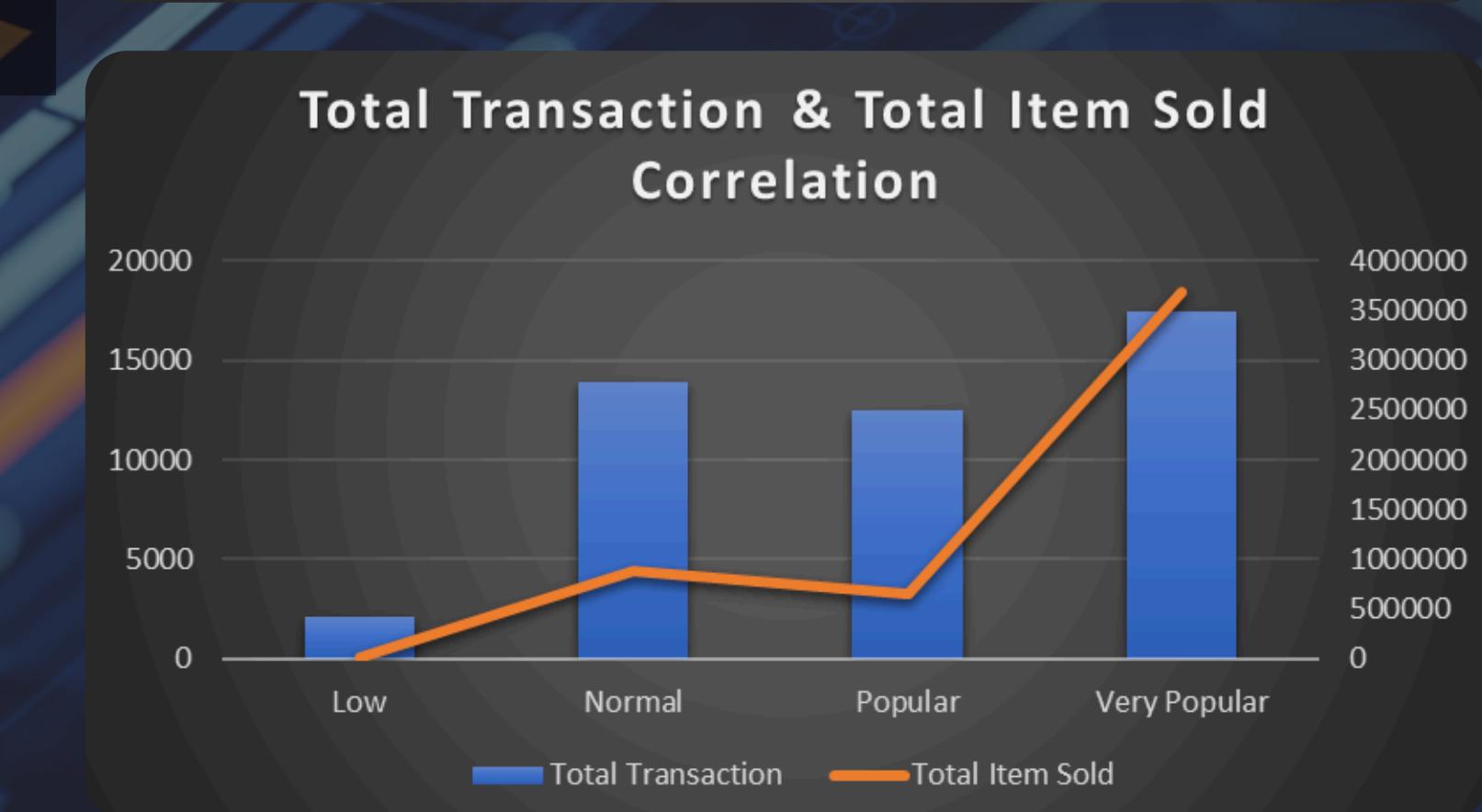
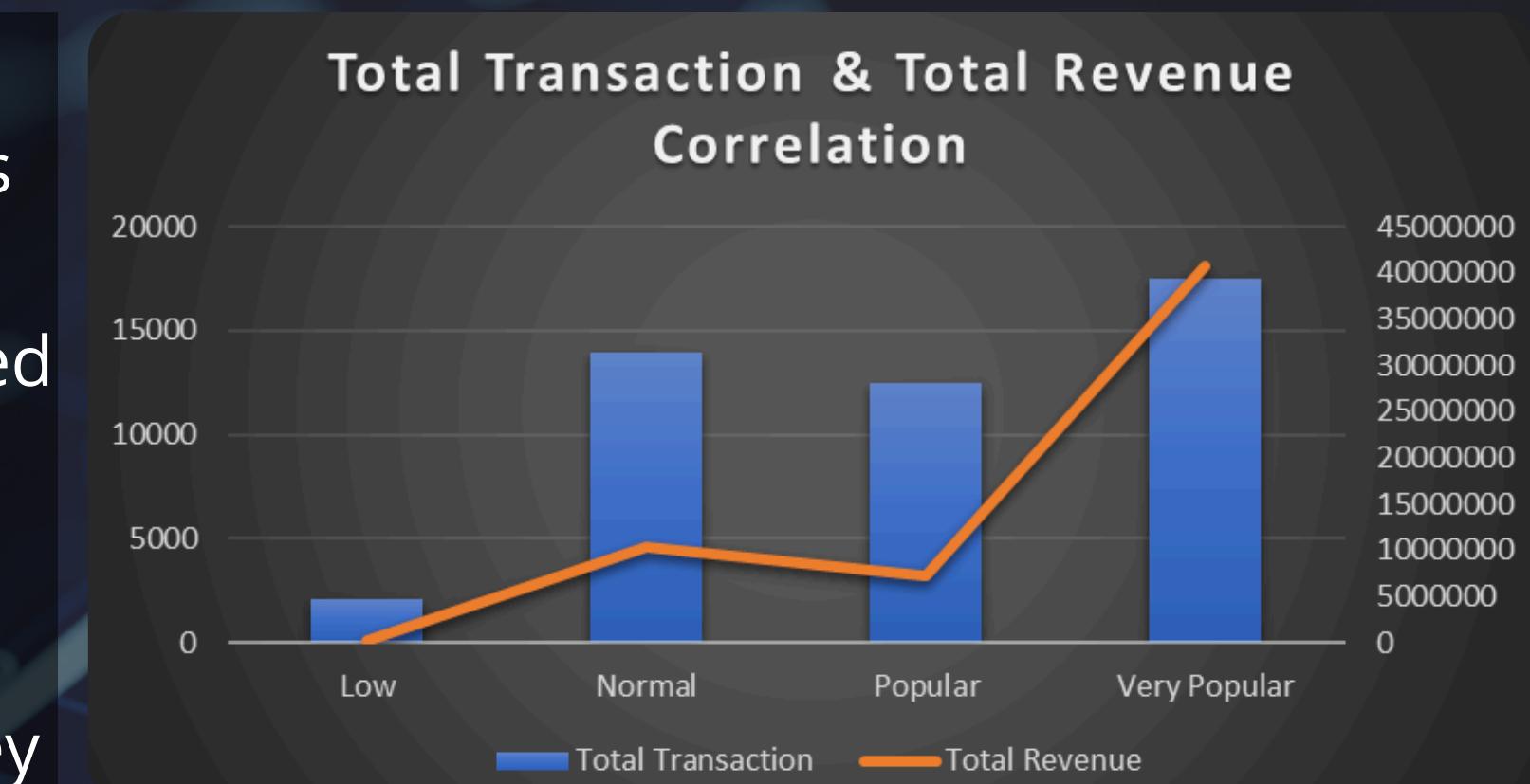
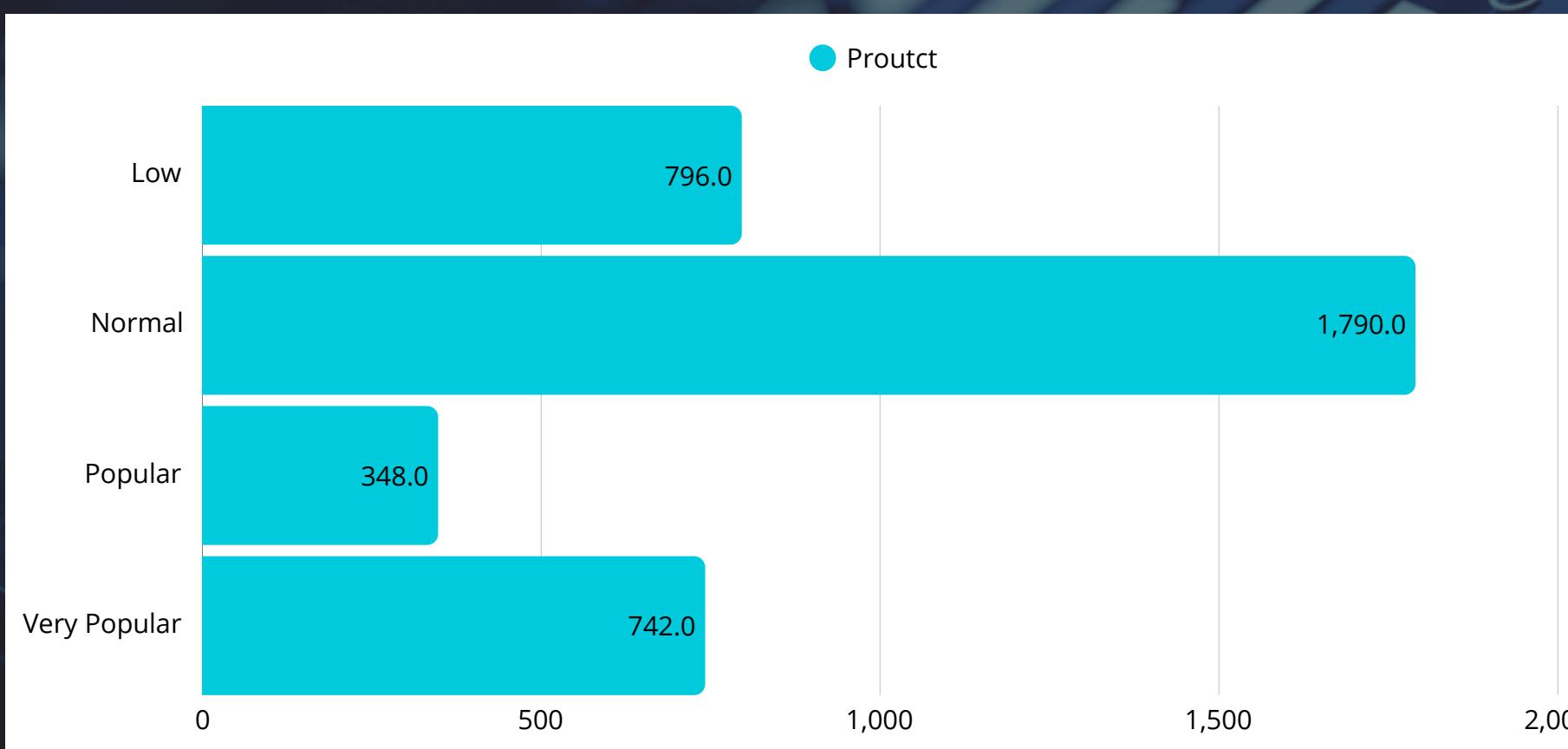
Time Series Analysis Report

- Sales performance has been satisfactory, as shown in the charts indicating a consistent increase in customer numbers across all sectors, including transactions, product sales, and total revenue, both monthly and daily averages.
- However, there is a anomaly in daily sales activities, particularly on Tuesdays, where no customers or transactions were recorded. This could be attributed to routine weekly maintenance on the website or mobile application.



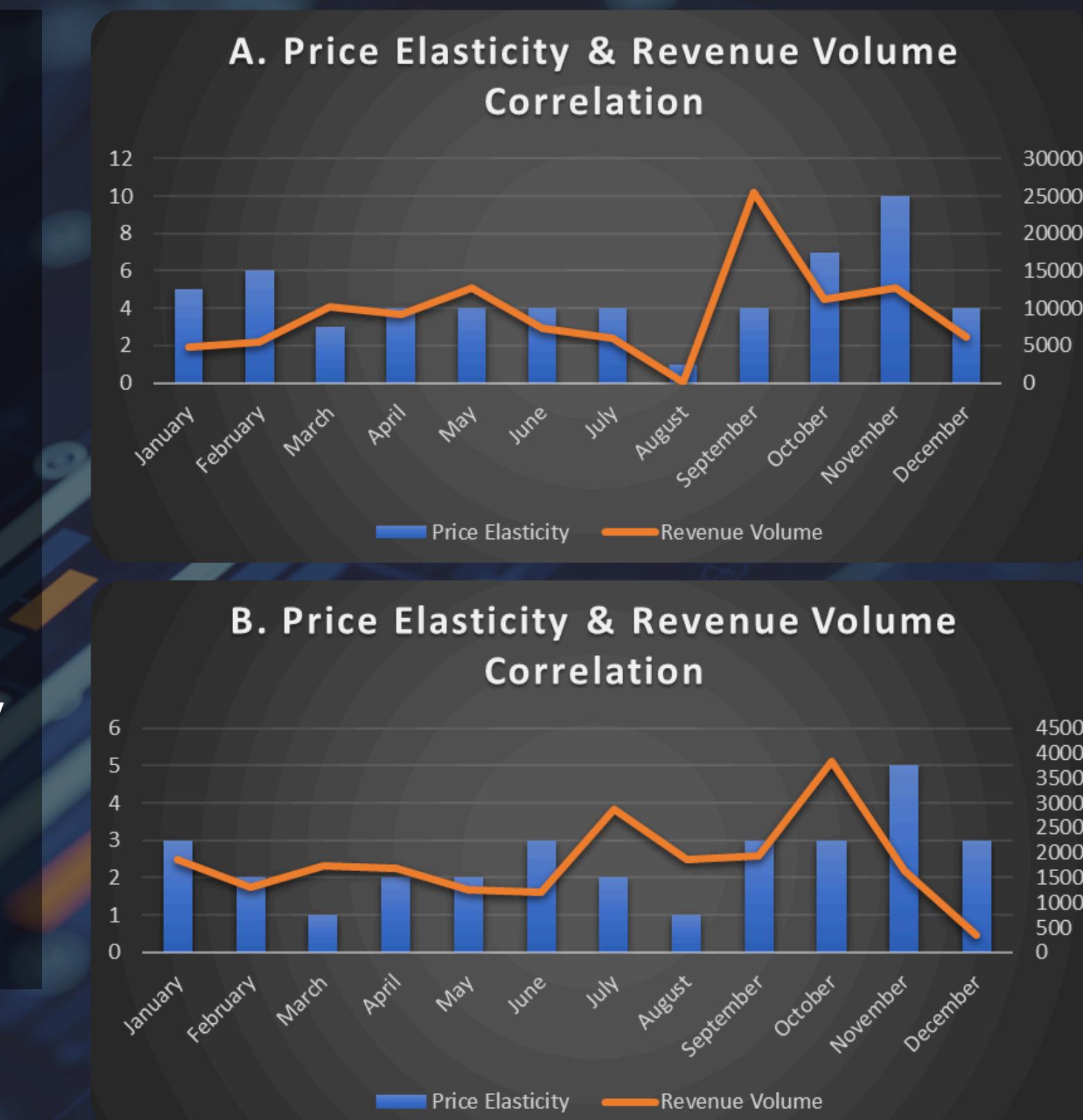
Top Contributing Products Analysis Report

- Based on the graph data, product performance in 2019 was quite good, as seen from the number of transactions and profits obtained. However, products with low Transaction Volume and Revenue still dominate compared to high-transaction products. The Very Popular category recorded the highest transaction volume, items sold, and profit revenue due to high consumer interest. Although more expensive, these products are popular because they offer more significant **functions** or **benefits**.



Price Elasticity Analysis Report

- Price Elasticity plays a crucial role in determining the success of product sales, as shown in the data presented in the table.
- It impacts various aspects, including customer interest, sales volume, and generated profit. For instance, in August, despite having the same Price Elasticity value, products A (Cook With Wine Metal Sign) and B (Pack Of 12 Blue Paisley Tissues) displayed significantly different revenue outcomes.
- Thus, it can be roughly concluded that Price Elasticity has a significant influence on the **profit/revenue** of a product and increases **customer purchasing interest** in the product.



Customer Retention Analysis Report

Date ▾	Total Cus...	1'st	2'nd	3'rd	4'th	5'th	6'th	7'th	8'th	9'th	10'th	11'th
1 Jan 2019	827	33%	41%	37%	44%	41%	37%	37%	41%	41%	50%	25%
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- Based on the graphical table, it is evident that the customer development trend, both in terms of new customers and returning customers, experienced a less favorable condition, particularly during the mid-year period. A decline in the number of customers occurred over three consecutive months, namely June, July, and August.
- Referring to the cohort table, the customer retention percentage during the 2019 period also shows a relatively poor performance. The highest customer retention rate was recorded at the beginning of the year, in January, with an average value exceeding 30%. Meanwhile, the lowest retention rate was observed in the 11th month, with a value of 25%.
- These insights highlight the need for targeted strategies to improve customer acquisition and retention, especially during the mid-year period and towards the end of the year.

- The 3rd and 4th months are the months that have a fairly good retention value even though there is a decrease in retention value, but the comparison of retention values between each month is not too far. The decrease in customer retention every month from the time the customer makes the first transaction can be caused by several factors, if we assume that there are 2 main factors in the decrease in customer retention, there's:
 - Customers' Internal Factors
 - Passive Income difference for every customer
 - Urgency and Purpose of the customer in buying a product
 - External Factors of the Customer
 - Social trends in buying products (Accessory or home furnishings)
 - Fluctuating/irregular customer buying interest

Conclusion and Recomendation

- The analysis of product price changes and their correlation with sales activities reveals that price elasticity significantly impacts product sales, customer interest, and overall revenue generation. Based on these findings, the following recommendations are proposed:
 - Comprehensive Market Price Analysis:** Perform a detailed evaluation of product pricing, including both unit and bulk pricing structures. This should also involve comparative research to assess market trends and competitor pricing strategies. Understanding these dynamics will help in setting competitive yet profitable price points.
 - Price Stabilization:** Implement measures to stabilize product prices. Consistent pricing can help maintain customer interest, foster loyalty, and mitigate the risks associated with **extreme price volatility**. Stability in pricing also ensures predictable revenue streams and sustains long-term profitability.
- By adopting these strategies, businesses can better align pricing decisions with market demands, optimize sales performance, and enhance customer satisfaction while achieving financial objectives.

CustomerNo	TransactionNo	Quantity	Price
5.97	2	2	304
6.02	1	1	2
6.04	6	7	2888
6.13	17	17	1440
6.19	76	85	3701
6.39	1	1	100
7.24	31	34	1621
7.29	2	2	28
10.99	42	119	27700
11.12	345	722	10541
11.92	249	259	1734
11.95	6	6	24
12.25	3	3	3587

CustomerNo	TransactionNo	Quantity	Price
5.97	2	2	11
6.04	2	2	15
6.13	3	3	22
6.19	15	15	99
6.64	1	1	48
7.24	5	5	163
7.72	1	1	48
11.32	17	24	75847
11.53	122	155	1695
12.77	39	39	85

Conclusion and Recomendation

- The analysis results indicate that customer movement is currently in a less favorable condition due to a decline in both loyal and new customers. The primary factors contributing to this situation include a decrease in customer interest or purchasing power, shifts in customer needs and priorities, as well as differences in internal and external circumstances affecting customers. To address this issue, the following recommendations are proposed:
 - Implement Customer Engagement Initiatives:** Focus on strategies to attract new customers and re-engage previous customers to encourage them to shop again.
 - Conduct In-Depth Customer Segmentation:** This will help ensure that customer engagement efforts are more targeted, effective, and efficient.
 - Enhance Customer Loyalty Programs:** Maintain customer loyalty by offering rewards or appreciation incentives, such as point-based systems or exclusive gifts, based on transaction volume and revenue contribution.
- By adopting these strategies, businesses can work towards **revitalizing customer interest**, fostering loyalty, and ultimately improving overall performance.

ProductName	
Red Peony Cushion Cover	1
Red Glass Tassle Bag Charm	1
Red Hearts Light Chain	1
Cd Wall Tidy Red Flowers	1
Cd Wall Tidy Blue Office	1
...	...
Jumbo Bag 50'S Christmas	266
Paper Chain Kit Vintage Christmas	276
Hot Water Bottle Keep Calm	289
Paper Chain Kit 50'S Christmas	390
Rabbit Night Light	487

ProductName	
Doggy Rubber	1
Pink/Green Flower Design Big Mug	1
Pink/White Christmas Tree 60cm	1
Polyester Filler Pad 30cmx30cm	1
Polyester Filler Pad 45x30cm	1
...	...
Hand Warmer Owl Design	78
Paper Chain Kit Vintage Christmas	85
Hot Water Bottle Keep Calm	90
Paper Chain Kit 50'S Christmas	116
Rabbit Night Light	127

- November

- December

Conclusion and Recomendation

ProductName	TransactionNo	Quantity	TotalRevenue
ProductScore			
Low	796	2122	15211
Normal	1790	13934	887523
Popular	348	12486	647201
VeryPopular	742	17483	3682655
			189796.39
			10407405.51
			7257286.65
			40696070.27

- Based on the analysis, the number of products in the "Normal" category exceeds that of other categories. However, the total value across all sectors is highest for products in the "Very Popular" category. This discrepancy may occur because "Very Popular" products offer greater **utility** and **benefits** based on their **functionality** and **usability**. Additionally, the success of Product Engagement in reaching the right customer segments and the effectiveness of Product Advertisement in attracting buyers significantly contribute to this outcome. Given these insights, the following recommendations are proposed:
 - Focus Product Advertisement on "Low" and "Popular" Categories: The objective is to increase sales in these categories, making them more comparable to the performance of "Very Popular" and "Normal" products.
 - Implement Product Segmentation: This aims to identify products that are unprofitable, unsold, or have very low sales. By doing so, the company can allocate its resources more effectively and focus on maximizing returns.
- These strategies will help optimize sales performance and resource allocation, ultimately driving better overall results.

Conclusion and Recomendation

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- These strategies will help optimize sales performance and resource allocation, ultimately driving better overall results.

Thank You
For Your Time

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