CHAPTER 1

INTRODUCTION

CHAPTER 1

INTRODUCTION

In the world of wholesale distribution, where supply and demand control everything, how well a company sells its products is really important. Sales operations are like the foundation of a building—they're crucial for success. This study is all about looking deeply into sales records to understand what's going on, find any trends, and figure out what can be done to make things better. We're doing this because we believe that using data and analysis can help us make smarter decisions and find new ways to grow and make more money.

The main goal of this study is to understand how sales work in wholesale distribution. We want to figure out patterns like when demand goes up or down, how seasons affect sales, and what changes in what customers want. By carefully looking at data and using graphs, we hope to make it easier for everyone involved to see what's going on with sales and why. This will help us make better decisions about how to improve sales for the company.

Moreover, this study endeavours to delve deeper into the segmentation of customer base, recognizing the heterogeneous nature of consumer preferences and purchasing behaviours. By delineating distinct customer cohorts based on demographic attributes, geographic location, and transactional histories, we aim to uncover latent patterns and preferences that may inform targeted marketing strategies and personalized approaches to customer engagement. Through the lens of statistical analysis, we seek to transcend superficial observations, plumbing the depths of a sales data to unveil the nuanced interplay of variables that underpin customer relationships and drive purchase decisions.

In addition to retrospective analysis, this study adopts a forward-looking perspective, harnessing the power of predictive modelling and forecasting techniques to anticipate future sales trajectories and mitigate uncertainty. By extrapolating from historical data and accounting for external factors such as market trends and economic indicators, we endeavour to equip with the foresight necessary to proactively adapt its strategies and optimize inventory management practices. Through the development and validation of robust predictive models, grounded in statistical theory and empirical evidence, we aspire to empower decision-makers with the tools necessary to navigate the ever-shifting currents of the wholesale distribution landscape with confidence and agility.

Integral to the success of this endeavour is a methodological framework grounded in rigor and precision, encompassing the full spectrum of data collection, analysis, and interpretation. Leveraging a diverse array of statistical techniques, including but not limited to regression analysis, time series analysis, and clustering algorithms, we endeavour to extract maximum value from the sales records while adhering to best practices in data management and analysis. Moreover, this study places a premium on transparency and reproducibility, documenting each step of the analytical process and providing clear rationale for methodological decisions to ensure the integrity and reliability of our findings.

It is imperative to acknowledge the inherent limitations and constraints that shape the scope and applicability of our study. While we aspire to provide a comprehensive analysis of a sales performance, we recognize that our findings may be subject to the constraints of sample size, data quality, and contextual specificity. Moreover, the dynamic nature of the wholesale distribution industry necessitates a degree of flexibility and adaptability in our approach, as we strive to remain responsive to emerging trends and evolving market dynamics.

In the dynamic and ever-evolving landscape of wholesale distribution, where the seamless flow of goods from manufacturers to retailers is the lifeblood of commerce, the importance of optimizing sales performance cannot be overstated. As navigates the intricate web of supply chains, market dynamics, and customer demands, the ability to glean actionable insights from its sales records stands as a linchpin of success. Against the backdrop of an industry characterized by intense competition, razor-thin margins, and rapidly shifting consumer preferences, the imperative for strategic decision-making grounded in empirical evidence and statistical rigor has never been more pronounced.

The wholesale distribution sector occupies a pivotal position within the broader ecosystem of global trade, serving as a crucial intermediary between producers and end consumers. From the distribution of raw materials and components to the delivery of finished products to retail outlets, wholesale distributors play a vital role in facilitating the efficient movement of goods across diverse industries and geographic regions. In doing so, they are tasked with navigating a myriad of challenges, including volatile market conditions, fluctuating demand patterns, and logistical complexities inherent in the distribution process.

Against this backdrop, the ability to optimize sales performance emerges as a critical determinant of competitiveness and profitability for wholesale distributors. At its core, sales performance analysis encompasses a multifaceted examination of key metrics such as revenue,

profit margins, sales volume, and customer acquisition costs, with the overarching goal of identifying areas of strength, pinpointing areas for improvement, and informing strategic decision-making. By leveraging advanced statistical techniques and data analytics tools, wholesale distributors can unlock valuable insights buried within their sales records, enabling them to refine pricing strategies, tailor marketing efforts, and enhance customer relationships with precision and foresight.

Moreover, the imperative for sales performance analysis is further underscored by the intensifying pressures facing wholesale distributors in today's hypercompetitive marketplace. With the proliferation of e-commerce platforms, digital marketplaces, and direct-to-consumer channels, traditional distribution models are being disrupted at an unprecedented pace, forcing companies to adapt or risk obsolescence. In this context, the ability to harness the power of data analytics to anticipate market trends, identify emerging opportunities, and mitigate risks assumes heightened significance, providing wholesale distributors with a strategic advantage in an increasingly uncertain environment.

The rationale for the present study is clear to empower with the insights necessary to navigate the complexities of the wholesale distribution landscape with confidence and clarity. By delving deep into its sales records and subjecting them to rigorous statistical analysis, we aim to unearth hidden patterns, discern actionable insights, and illuminate the path forward. Through a combination of descriptive analytics, predictive modelling, and prescriptive insights, we seek to equip with the tools necessary to optimize sales performance, drive sustainable growth, and thrive in an ever-changing marketplace.

In conclusion, this study represents a collaborative endeavour to unlock the transformative potential inherent in the sales records. By harnessing the power of data-driven analytics to inform strategic decision-making, we aspire to empower with the insights necessary to navigate the complexities of the wholesale distribution landscape with confidence and clarity. By delving deep into the labyrinthine realm of data, we seek to illuminate the path forward, providing stakeholders with the insights necessary to navigate the complexities of the wholesale distribution landscape with confidence and clarity. As we embark on this journey of exploration and discovery, we do so with a sense of purpose and determination, recognizing the transformative potential inherent in data-driven analytics to drive organizational growth, foster innovation, and empower to realize its fullest potential in an ever-changing world.

1.1 OBJECTIVES OF THE STUDY

- The primary objective of this study is to analyse the sales record of the company with a focus on identifying trends patterns and there by providing valuable insights that will help the company boost their sales and improve the bottom line.
- Determine the variation in order volume and quantity sold across different months to identify trends and patterns in sales performance.
- Analyse the impact of discounts and taxes on net and gross amounts to understand their relative effects on overall revenue.
- Assess the relationship between customer orders and the quantities sold to identify any correlations or dependencies between these variables.
- Evaluate the performance of individual shops and product categories based on metrics such as order volume, quantity sold, and net amount generated.
- Investigate the effectiveness of promotional strategies by analysing the distribution of free quantities and their impact on sales.
- Compare performance across different geographic regions (beats) to identify areas of strength and weakness in sales outcomes.
- Conduct statistical tests to determine significant differences in various sales-related metrics, such as quantities sold, discounts given, and taxes charged, across different product categories, shops, and time periods.

1.2 SCOPES OF THE STUDY

The main scopes of this study include:

- **Performance Analysis**: Evaluate the sales performance of products or services over a certain period.
- **Trend Identification**: Identify trends, patterns, and seasonal variations in sales data.
- **Market Segmentation**: Analyse sales performance across different market segments or customer demographics.
- **Pricing Strategy Impact**: Assess how pricing strategies have influenced sales outcomes.
- **Sales Forecasting**: Use historical sales data to predict future sales trends.

1.3 LIMITATIONS OF THE STUDY

The major limitations of our study are:

- We only gathered information from Thoothukudi district, so our findings might not represent other areas.
- We only looked at data from the past six months (from September to February), which might not capture long-term trends.
- We focused on just six specific areas (beats) within Thoothukudi district, which might not reflect the entire district's situation.
- Because we had limited time, money, and resources for our research, we might not have been able to explore all aspects of the sales records thoroughly, which could affect the accuracy and completeness of our analysis.

1.3.1 LIMITATIONS IN SECONDARY DATA:

Further limitations in the secondary data includes:

1. **Data Quality**:
   The quality of the secondary data, including accuracy, completeness, and reliability, may vary, potentially leading to errors or biases in the analysis.
2. **Data Availability**:
   Limited availability of relevant and up-to-date secondary data on sales records of wholesale distribution companies in the district may restrict the scope and depth of the analysis.
3. **Data Consistency**:
   Inconsistencies or discrepancies in the secondary data sources used for analysis can affect the reliability and validity of the findings.
4. **Data Relevance:**
   The secondary data available may not fully align with the specific research objectives or variables of interest, limiting the ability to draw meaningful conclusions.
5. **Lack of Context:**
   Secondary data may lack contextual information or details about the circumstances surrounding the sales transactions, making it challenging to interpret the findings accurately.

1.4 CHAPTERIZATION

- Chapter 1: Introduction – This chapter includes introduction, objectives of the study, scopes and limitation of the study.

- Chapter 2: Review of literature – This chapter focuses on the empirical review of Literature.

- Chapter 3: Research methodology – This chapter focuses on research design,research methodology explanations about the statistical methods and tools used on the study.

- Chapter 4: This chapter includes the diagrammatic representation of data.

- Chapter 5: This chapter includes the statistical analysis and interpretation of our data.

- Chapter 6: This chapter includes the findings and suggestions of our statistical study.

CHAPTER 2

REVIEW OF LITERATURE

CHAPTER 2

REVIEW OF LITERATURE

AUTHORS: Smith, J. and Johnson, L.

YEAR OF PUBLICATION: 2019

TOPIC:

Forecasting Wholesale Sales: A Comparative Analysis of Time Series Models

This study aims to compare different time series forecasting models to determine their effectiveness in predicting wholesale sales.

METHODS USED:

In this study, the researchers gathered past sales data from a wholesale distribution company. They then tested different methods for predicting future sales using this historical data. These methods included ARIMA (Autoregressive Integrated Moving Average), exponential smoothing, and seasonal decomposition.

To assess the performance of each forecasting model, the researchers used accuracy metrics such as Mean Absolute Error (MAE) and Mean Squared Error (MSE). These metrics help measure how close the forecasted values are to the actual sales data. A lower MAE and MSE indicate better accuracy, meaning the forecasted values are closer to the actual sales figures. By applying each forecasting model to the sales data and comparing their performance using MAE and MSE, the researchers aimed to determine which method was the most effective for predicting future sales in the wholesale distribution company. This analysis provides valuable insights into the reliability and accuracy of different forecasting techniques, helping businesses make informed decisions about their sales forecasting strategies.

RESULTS:

The study found that all three models—ARIMA, exponential smoothing, and seasonal decomposition-were effective in forecasting wholesale sales. However, ARIMA showed slightly better performance compared to the other models, especially when dealing with complex sales patterns and seasonal fluctuations. Exponential

smoothing, while simpler to implement, tended to perform slightly worse in capturing the nuances of the sales data. Seasonal decomposition methods were useful for identifying and isolating seasonal patterns but required additional adjustments to improve accuracy.

Overall, the study suggests that while all three models can be used for forecasting wholesale sales, ARIMA may offer slightly better predictive performance, particularly in scenarios with intricate sales patterns and seasonal variations.

AUTHORS: Gupta. A. and Patel.R.

YEAR OF PUBLICATION: 2018

TOPIC:

Impact of Inventory Management Practices on Wholesale Sales Performance

This study examines how the way a wholesale company manages its inventory affects how much it sells.

METHODS USED:

In this study, the researchers gathered data from various wholesale companies and examined their approaches to managing inventory. They focused on several key factors to assess the effectiveness of inventory management practices. Firstly, they likely looked at how frequently these wholesale companies placed orders for new inventory. This involves understanding the timing and frequency of orders to replenish stock levels. Secondly, the researchers analysed the quantity of stock that these companies typically kept on hand. This includes assessing the inventory levels maintained by the companies to meet customer demand while avoiding excess or insufficient stock. Thirdly, they investigated how quickly orders were fulfilled by the wholesale companies. This aspect involves assessing the efficiency of order processing and fulfilment, including the time it takes from receiving an order to delivering the products to customers. By examining these factors, the researchers aimed to gain insights into the effectiveness of inventory management practices among wholesale companies. Understanding how these companies handle inventory, order placement, and order fulfilment can provide valuable insights into their overall operational efficiency and performance. This information can help identify areas for improvement

and optimization in inventory management processes to enhance sales performance and customer satisfaction.

RESULTS:

The study found that better inventory management practices often lead to higher sales performance. Companies that order inventory more efficiently and keep just the right amount of stock tend to sell more. Also, those who fulfil orders quickly and avoid stockouts (when they run out of products) tend to have better sales results. Overall, the study shows that good inventory management is important for wholesale companies to sell more effectively.

AUTHORS: Kumar. S. and Sharma.P.

YEAR OF PUBLICATION: 2020

TOPIC:

Analyzing Seasonal Sales Patterns in Wholesale Distribution: A Case Study Approach

This study looks at how sales patterns change during different seasons for wholesale distribution companies.

METHODS USED:

In this study, the researchers selected several wholesale distribution companies and examined their sales data across various seasons. The objective was to identify any recurring patterns or trends in sales that occurred during specific times of the year. To accomplish this, the researchers likely collected historical sales data from the chosen wholesale distribution companies, including information on the quantity of products sold, revenue generated, and possibly other relevant factors such as customer demographics or geographic regions. By analyzing this sales data over different seasons, the researchers aimed to detect any consistent patterns or trends that emerged. For example, they might have looked for increases in sales during certain seasons or months, such as a spike in demand for winter clothing during the colder months or a surge in outdoor equipment sales during the summer. The researchers sought to uncover insights into how sales fluctuated throughout the year for wholesale distribution companies, which could help these businesses better understand and anticipate seasonal

variations in demand. This understanding could inform inventory management decisions, marketing strategies, and overall business planning to optimize sales performance across different seasons.

RESULTS:

The study found that sales patterns in wholesale distribution do change depending on the season. During certain times of the year, like holidays or special events, sales tended to go up. They also noticed that some products sold better during specific seasons, like warm clothing in winter or outdoor equipment in summer.

Overall, the study shows that understanding seasonal sales patterns is important for wholesale distribution companies to plan and manage their inventory effectively.

AUTHORS: Chen.Y. and Wang.L.

YEAR OF PUBLICATION: 2017

TOPIC:

Customer Segmentation and Wholesale Sales: A Data Mining Perspective

This study explores how wholesale companies can divide their customers into different groups based on their buying habits and preferences, and how this segmentation affects sales.

METHODS USED:

In this study, the researchers employed data mining techniques to examine the purchasing data of customers from wholesale companies. Data mining involves extracting patterns and insights from large datasets, which in this case, included information about what products customers bought, how much they bought, and when they made their purchases. To segment customers based on their buying behaviors, the researchers utilized algorithms. These algorithms are mathematical formulas or sets of rules that analyze the data and group customers who exhibit similar purchasing patterns together. For example, customers who frequently buy similar products or who make purchases at similar times might be grouped together. By using data mining algorithms to segment customers, the researchers aimed to uncover distinct groups or segments within the customer base. These segments could then be used by wholesale companies

to better understand their customers' preferences, tailor marketing strategies to specific groups, and ultimately increase sales by offering products that better meet the needs of each segment.

RESULTS:

The study found that dividing customers into groups based on their buying habits can help wholesale companies understand their customers better. By identifying different customer segments, companies can tailor their marketing strategies and product offerings to meet the specific needs of each group. This approach often leads to higher sales because customers feel like the company understands them and offers products that they are more likely to buy.

Overall, the study shows that using data mining to segment customers can be a valuable tool for wholesale companies to increase their sales**.**

AUTHORS: Lee.H. and Kim.M.

YEAR OF PUBLICATION: 2021

TOPIC:

Geospatial Analysis of Wholesale Sales Territories: Optimizing Distribution Networks.

This study focuses on understanding the geographical distribution of wholesale sales territories and how to improve their efficiency.

METHODS USED:

In this study, the researchers used a method called geospatial analysis to study where wholesale sales territories are located on a map. They looked at where customers are, where distribution centres are, and any other important locations related to sales. They probably used special software called Geographic Information Systems (GIS) to help them see this information on maps and analyze it. By doing this, they could understand how sales territories are spread out geographically and find ways to make them more efficient. For example, they might figure out better routes for delivering products or find areas where there are lots of customers but not enough coverage.

Overall, using geospatial analysis helps companies plan their sales strategies better and improve their distribution networks.

RESULTS:

The study found that by analyzing the geographical distribution of wholesale sales territories, companies can identify opportunities to optimize their distribution networks. By mapping out the locations of customers and distribution centres, companies can determine the most efficient routes for delivering products and servicing customers. Geospatial analysis helps companies identify areas where demand is high but distribution coverage is low, allowing them to prioritize resources and expand their presence in underserved regions.

Overall, the study demonstrates how geospatial analysis can be used to improve the efficiency and effectiveness of wholesale distribution networks, ultimately leading to increased sales and customer satisfaction.

CHAPTER 3

RESEARCH METHODOLOGY

CHAPTER 3

RESEARCH METHODOLOGY

The research method employed in this study involves the use of secondary data collection, where existing data from Thoothukudi district is gathered and analyzed. Specifically, 1630 data records related to 26 shops, 97 items and 6 beats were classified for the past six months and tabulated for further analysis and interpretation. Secondary data collection involves utilizing information that has already been collected by others for different purposes. In this case, the data collected likely includes sales records, customer information, and other relevant data sources.

The systematic procedures, techniques, and strategies used in this study would include methods for organizing and categorizing the data, as well as statistical analysis techniques to identify trends, patterns, and relationships within the data set. We have applied various analytical tools and methods to interpret the data and derive meaningful insights.

Given the nature of the study, the choice of research methods is likely influenced by the availability and accessibility of existing data in Thoothukudi district, as well as the specific research questions or objectives being addressed. The researchers may have employed descriptive statistics, correlation analysis, regression analysis, and other quantitative methods to analyze the data and draw conclusions.

Overall, the research method used in this study involves the systematic analysis of secondary data to gain insights into sales performance, customer behaviour, and other relevant factors within Thoothukudi district.

3.1 DATA REPRESENTATION:

The data is represented by using SPSS 26.0 version and Microsoft Office Excel Worksheet 2019.

3.2 DATA COLLECTION:

The researcher has used the secondary data method for analysing and the data was collected in Thoothukudi district.

3.3 RESERCH PROCESS:

The data was collected from existing sources, not directly from customers or surveys. It covers six months from September to February. It includes information like the date of the sale, order number, number of shops involved, items sold, maximum retail price (MRP), price per case, number of units per case, unit price, differences in billed quantity, free quantity given, discounts, gross amount, taxable value, CGST and SGST percentages and amounts, total tax, net amount after tax, number of bills, and the sales beat. These data covers 26 shops and sales happened across 6 different sales beats.

3.4 TYPE OF DATA:

- Primary data
- Secondary data

3.4.1 SECONDARY DATA:

Secondary data refers to information that has been previously collected, processed, and published for purposes other than the current research or study. This type of data is not collected directly by the researcher but is rather obtained from existing sources. Secondary data can come from various origins, including government agencies, research institutions, businesses, or other individuals or organizations that have conducted previous research or collected information for different purposes.

3.4.2 ADVANTAGES OF SECONDARY DATA:

The benefits and positive aspects associated with utilizing information that has been previously collected and processed for purposes other than the present research. This includes advantages such as time and cost efficiency, access to large sample sizes, historical analysis capabilities, and the ability to compare different datasets to derive valuable insights. Secondary data is particularly advantageous for researchers seeking to address research questions or test hypotheses without the need for primary data collection.

1. **Time Efficiency:**

   Secondary data is readily available, saving significant time compared to the time-consuming process of collecting new data. Researchers can access existing datasets promptly, allowing them to expedite the research process.

2. **Cost Effectiveness**:

Utilizing secondary data is often more cost-effective than conducting new research. The expenses associated with data collection, including surveys, interviews, and experiments, are avoided, making it an economical choice for researchers with limited budgets.

3. **Large Sample Sizes**:

Secondary data frequently comes from extensive sources, providing researchers with large sample sizes. This can enhance the statistical power of the study and increase the reliability of findings, especially in quantitative research.

4. **Comparative Research:**

Secondary data enables researchers to compare different datasets, allowing for cross-sectional or longitudinal comparisons. This comparative approach can uncover variations, similarities, or trends across different groups, time periods, or regions.

5. **Multiple Perspectives:**

Accessing secondary data from various sources provides researchers with multiple perspectives on a given topic. Combining data from governmental reports, academic research, and industry publications offers a comprehensive view of the subject.

6. **Cross-Verification and Validation:**

Researchers can cross-verify and validate their findings by comparing secondary data with information from other sources. This process enhances the reliability and credibility of the data, especially when corroborating it with data from independent studies.

7. **Usefulness for Exploratory Research**:

Secondary data is valuable for exploratory research, allowing researchers to generate hypotheses and identify trends or gaps in existing knowledge. Exploring literature, databases, and historical records can serve as a foundation for further investigation.

3.4.3 DISADVANTAGES OF SECONDARY DATA:

The disadvantage of secondary data refers to the drawbacks or limitations associated with using data that has been previously collected and processed for purposes other than the researcher's current study. Secondary data, in this context, typically refers to information gathered by someone else for a different research project, government report, business analysis, or any other non-research purpose. These disadvantages can impact the reliability, relevance, and overall suitability of the data for a new research investigation.

1. **Quality and Reliability:**

Secondary data may lack the quality and reliability needed for a specific research purpose. The original data might have been collected for a different purpose, leading to potential biases or inaccuracies.

2. **Limited Scope:**

The available secondary data may be limited in scope, and certain aspects of the research question may not be adequately covered. This can constrain the depth and breadth of the analysis.

3. **Bias and Selectivity:**

The original data collection process may have been influenced by biases or selective sampling methods. This bias can carry over into the secondary data and affect the validity of the research findings.

4. **Data Incompatibility:**

Different studies may use different methodologies, measurement tools, or units of analysis. Combining data from diverse sources can be challenging due to these incompatibilities, potentially leading to flawed interpretations.

3.5 STATISTICAL HYPOTHESIS:

Statistical hypothesis is an assumption about a population parameter. The assumption may not be true at all time. Hypothesis testing refers of the formal procedures used by statistician to accept or reject statistical hypothesis.

NULL HYPOTHESIS:

A statistician should take up a neutral or null attitude regarding the outcome of the test. This neutral or non-committal attitude of the statistician or decision maker before the sample observations are taken as the key note of the null hypothesis and is usually denoted by H_0.

E.g.: There is no difference between the sample mean and population mean.

(i.e.) $H_0: \mu = \bar{x}$

ALTERNATIVE HYPOTHESIS:

The opposite or composite of null hypothesis is called alternative hypothesis. It is usually denoted by H_1.

E.g.: There is a difference between the sample mean and population mean.

(i.e.) $H_1: \mu \neq \bar{x}$

LEVEL OF SIGNIFICANCE:

The probability of type-I error is known as the level of significance(α). It is also called the size of the critical region.

3.6 STATISTICAL TOOLS USED

For the purpose of analysing the secondary data, the data were coded and prepared for analysis by using Statistical Packages of Social Sciences (SPSS). The following analyses are done in this study.

1. Diagrammatic Representation
    - Bar Chart
    - Pie Chart
    - Line Chart
2. Descriptive Statistics
3. Correlation Test
4. Regression Analysis
5. Kolmogorov-Smirnov test
6. Shapiro Wilk test
7. Mann Whitney U test
8. Wilcoxon signed rank Test
9. Kruskal-Wallis Test
10. One-sample Wilcoxon Signed Rank Test
11. Friedman's Two-Way Analysis of Variance

3.6.1 DIAGRAMMATIC REPRESENTATION

Diagrammatic presentation is an essential operational tool for the purpose of presentation of statistical data in numeric through bar diagram, Pie diagram, etc. It's easier, simpler, and most attractive presentation. Diagrammatic presentation of data gives an immediate understanding of the real situation to be defined by data in comparison to the tabular presentation of data or textual representations.

BAR CHART

A bar chart is a visual tool that uses bars to compare data among categories. A bar may run horizontally or vertically. If the description is on the horizontal axis, the bars will be oriented vertically, and if the values are along the vertical axis, the bars will be oriented horizontally. Bar diagram consist of two axes. One axis will describe the types of categories being compared and numerical values their present the values of the data. We have used both simple bar diagram and multiple bar diagram.

PIE CHART

A pie diagram shows percentage values as a slice of a pie. It is type of pictorial representation of data. It's requiring a list of categorical variables and thenumerical variables. Pie diagram is a diagrammatic representation of a frequency,but the percentage proportions of the frequency are calculated. Depending upon the proportions of the frequency the area of the space may vary. Pie diagram is round in structure.

LINE CHART

A line chart is a type of graph that displays information as a series of data points (markers) connected by straight line segments. Line charts are commonly used to illustrate trends over time or to show the relationship between two variables.

3.6.2 DESCRIPTIVE STATISTICS

Descriptive Statistics is summarizing the data at hand through certain numbers like mean, median etc., so as to make the understanding of the data easier. It does not involve any generalization or inference beyond what is available. This means that the descriptive statistics are just the representation of the data (sample) available and not based on any theory of probability.

• **Measures of central tendency** (It help you find the middle, or the average, of a data set. The 3most common measures of central tendency are the mean, median and mode. The mode is the most frequent value)

• **Measures of Dispersion or Variability** (It describes the spread of the data around the central value)

• Skewness is a **measure of the symmetry** of a dataset. A perfectly symmetrical dataset has a skewness of 0, but if one tail is longer than the other, the skewness will be positive or negative depending on which tail is longer. Positive skewness means that the tail on the right side of the distribution is longer, while negative skewness means that the tail on the left side of the distribution is longer. Skewed datasets can affect measures of central tendency and dispersion, so it's important to be aware of skewness when interpreting data.

• Kurtosis, on the other hand, measures the "peakedness" or flatness of a dataset. A normal distribution has a kurtosis of 0, meaning it has a standard amount of peak or flatness. Positive kurtosis means the distribution has more extreme values and a higher peak than a normal distribution, while negative kurtosis means the distribution is flatter and more spread out than a normal distribution

3.6.3 CORRELATION TEST

A correlation test is a statistical method used to measure the relationship between two or more variables. By calculating a correlation coefficient, typically represented by the symbol "r", this test quantifies the strength and direction of the association between variables. A correlation coefficient ranges from -1 to 1, where positive values indicate a positive relationship (as one variable increases, the other tends to increase), negative values indicate a negative relationship (as one variable increases, the other tends to decrease), and values close to zero suggest little to no relationship. Correlation tests are essential tools in research, helping to identify patterns, establish connections, and guide further analysis. They provide valuable insights into the interplay between variables, informing decision-making processes and driving scientific inquiry across various fields.

3.6.4 REGRESSION ANALYSIS

Regression analysis is a statistical method used to examine the relationship between one dependent variable and one or more independent variables. It aims to understand how changes in the independent variables are associated with changes in the dependent variable. By fitting a regression model to the data, this analysis quantifies the nature and strength of these relationships, allowing researchers to make predictions and draw insights about the dependent variable based on the values of the independent variables. Regression analysis provides valuable information about the direction and magnitude of effects, helping to identify patterns, uncover trends, and make informed decisions in different fields. Through the estimation of regression coefficients and the assessment of model fit, researchers can evaluate the significance of relationships and draw meaningful conclusions about the factors influencing the outcome of interest.

3.6.5 KOLMOGOROV-SMIRNOV TEST

The Kolmogorov-Smirnov test, named after mathematicians Andrey Kolmogorov and Nikolai Smirnov, is a statistical method used to determine whether a sample comes from a specific probability distribution. It's particularly useful when you want to assess whether your data follows a particular theoretical distribution, such as a normal distribution. The test compares the empirical cumulative distribution function (CDF) of the sample data with the cumulative distribution function of the theoretical distribution. The test statistic, often denoted as D, represents the largest absolute difference between the two cumulative distribution functions. If the calculated test statistic is less than the critical value from a pre-defined significance level table, then the sample is considered to be from the specified distribution. Otherwise, if the calculated statistic exceeds the critical value, it suggests that the sample does not follow the specified distribution.

3.6.6 SHAPIRO-WILK TEST

The Shapiro-Wilk test, developed by statisticians Samuel Shapiro and Martin Wilk, is a statistical method used to assess the normality of a data sample. It evaluates whether the data follows a normal distribution, which is essential for many statistical analyses. The test calculates a test statistic based on the discrepancy between the observed sample data and what would be expected under a normal distribution. If the p-value associated with the test statistic is greater

than a predetermined significance level (often 0.05), then the null hypothesis is not rejected, indicating that the data can be considered approximately normally distributed. However, if the p-value is less than the significance level, the null hypothesis is rejected, suggesting that the data significantly deviates from a normal distribution.

3.6.7 MANN WHITNEY U TEST

The Mann-Whitney U test, a non-parametric statistical method, determines whether there is a significant difference between two independent groups based on their distributions. The test calculates a p-value, representing the probability of observing the data if there were no true difference between the groups. If the p-value is smaller than a chosen significance level (often 0.05), the null hypothesis—that there is no difference between the groups—is rejected. In other words, a small p-value suggests that there is a significant difference between the groups. Conversely, if the p-value is greater than the chosen significance level, the null hypothesis cannot be rejected, indicating no significant difference between the groups.

3.6.8 WILCOXON SIGNED RANK TEST

The Wilcoxon signed-rank test, often referred to simply as the Wilcoxon test, is a non-parametric statistical hypothesis test used to determine whether two paired samples come from populations with the same distribution. It's commonly used when the data do not meet the assumptions of normality required for parametric tests like the t-test.

3.6.9 KRUSKAL-WALLIS TEST

The Kruskal-Wallis test is a non-parametric statistical test used to determine whether there are statistically significant differences between the medians of three or more independent groups. It is an extension of the Mann-Whitney U test, which compares the distributions of two groups. he test calculates a p-value, which represents the probability of observing the data if the null hypothesis—that there are no differences between the group medians—is true. If the p-value is smaller than the chosen significance level (typically 0.05), the null hypothesis is rejected, indicating that there are statistically significant differences between at least two of the groups. Conversely, if the p-value is greater than the significance level, the null hypothesis cannot be rejected, suggesting no significant differences between the groups.

3.6.10 ONE SAMPLE WILCOXON SIGNED RANK TEST

The one-sample Wilcoxon signed-rank test is a non-parametric statistical method used to assess whether the median of a single sample differs significantly from a hypothesized median. It is particularly valuable when the data do not meet the assumptions of parametric tests, such as when the sample size is small or the data is not normally distributed**.** The test computes a p-value, which represents the probability of observing the data if the null hypothesis—that there is no difference between the sample median and the specified value—is true. If the p-value is smaller than the chosen significance level (typically 0.05), the null hypothesis is rejected, indicating a significant difference between the sample median and the specified value. Conversely, if the p-value is greater than the significance level, the null hypothesis cannot be rejected, suggesting no significant difference**.**

3.6.11 FRIEDMAN'S TWO-WAY ANALYSIS OF VARIANCE

Friedman's Two-Way Analysis of Variance is a non-parametric statistical test used to determine whether the means of multiple groups are significantly different in a randomized block design with two factors (treatments) and blocking. It's an extension of the Friedman test, which is used for a single factor.

CHAPTER 4

DIAGRAMMATIC REPRESENTATION

CHAPTER 4

DIAGRAMTIC REPRESENTATION

4.1 TABLES AND CHARTS

4.1.1 NO.OF.ORDERS IN PAST SIX MONTHS

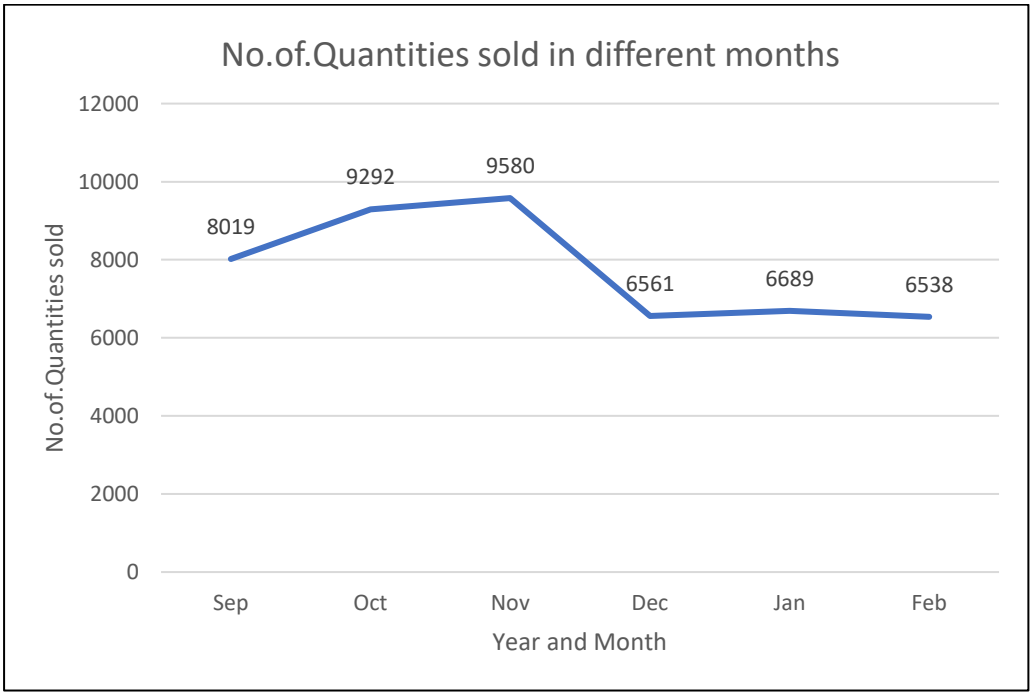
YEAR	MONTH	NO.OF. ORDERS	PERCENT
2023	Sep	201	12.33%
	Oct	255	15.65%
	Nov	390	23.94%
	Dec	222	13.63%
2024	Jan	266	16.34%
	Feb	295	18.11%
TOTAL		1629	100%

INTERPRETATION:

The above chart and table depict the no.of.orders received by the wholesale company in past six months. From this, it is inferred that the company has received more no.of.orders during November,2023 and less no.of.orders during September,2023.

4.1.2 NO OF QUANTITY SOLD IN PAST SIX MONTH

YEAR	MONTH	NO.OF. QUANTITIES SOLD
2023	Sep	8019
	Oct	9292
	Nov	9580
	Dec	6561
2024	Jan	6689
	Feb	6538



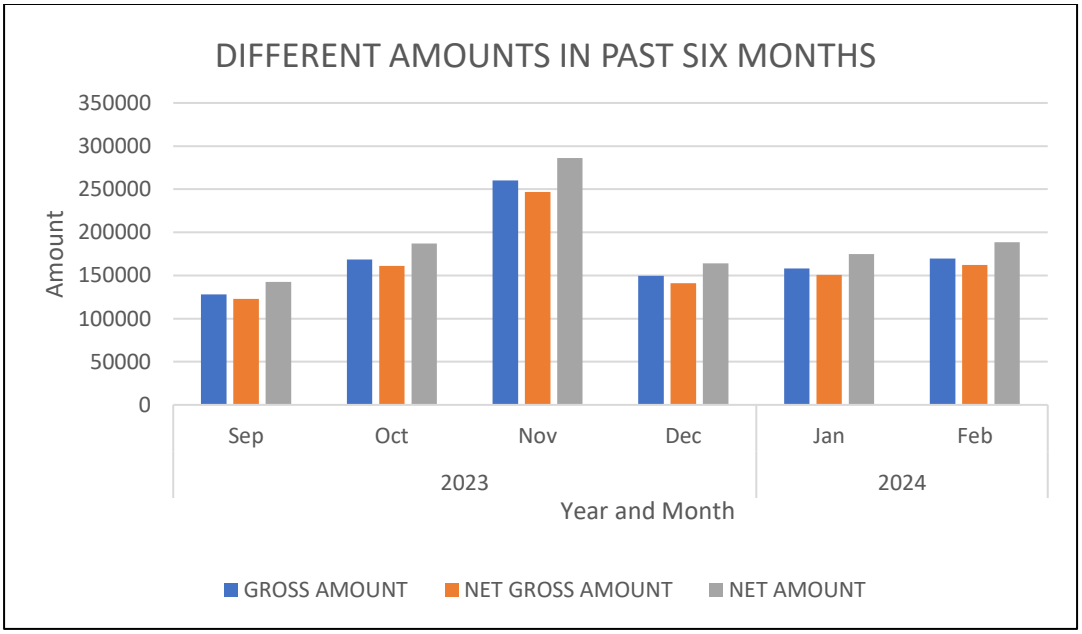
INTERPRETATION:

The above line chart and table depict the no.of.quantities sold by the wholesale company to shops in past six months. From this, it is inferred that the company has sold more no.of. Quanities during November,2023 and less no.of. quanities during February,2024. Then,

we see that there is slight increase in no.of.quantities sold in first three months and then there is a sudden decrease in the fourth month and then the trend remains approximately same.

4.1.3 GROSS AMOUNT, NET GROSS AMOUNT, NET AMOUNT IN PAST SIX MONTHS

YEAR	MONTH	GROSS AMOUNT	NET GROSS AMOUNT	NET AMOUNT
2023	Sep	128126.22	122849.43	142630.09
	Oct	168393.36	160969.51	187159.48
	Nov	260299.79	246956.24	286196.09
	Dec	149508.09	141153.3	164045.19
2024	Jan	158126.17	150598.84	174652.94
	Feb	169643.94	162362.77	188439.92



INTERPRETATION:

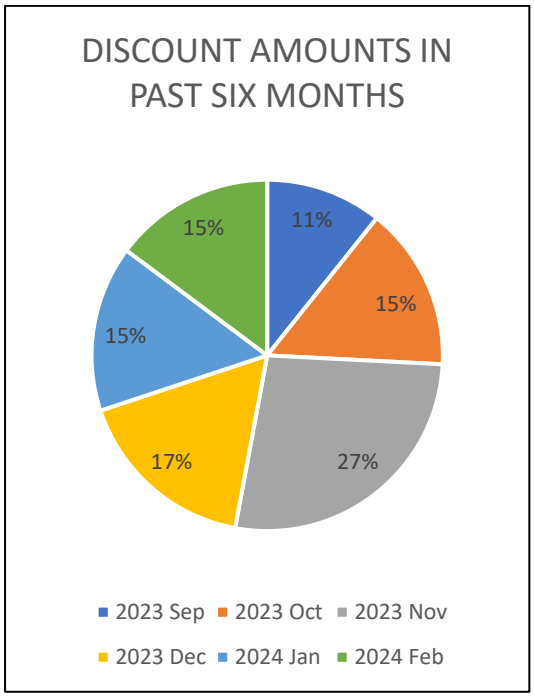
The above multiple bar diagram and the table represents the different amounts (Gross Amount, Net Gross Amount, Net Amount) in past six months. In all the months, the Net Amount is higher than the Gross Amount and Net Gross Amount which implies that the impact

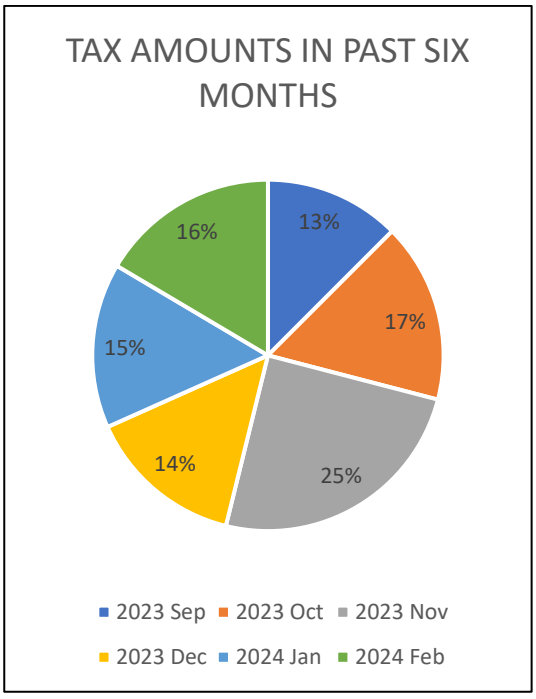
of tax amount is greater than the impact of discount. Also, November 2023 has the highest value of amounts and September 2023 has the lowest value of amounts compared to the other months.

4.1.4 DISCOUNT AMOUNTS AND TAX AMOUNTS IN PAST SIX MONTHS

YEAR	MONTH	DISCOUNT AMOUNT	PERCENT
2023	Sep	5276.79	11%
	Oct	7423.85	15%
	Nov	13343.55	27%
	Dec	8354.79	17%
2024	Jan	7527.33	15%
	Feb	7281.17	15%
TOTAL		49207.48	100%

YEAR	MONTH	TAX AMOUNT	PERCENT
2023	Sep	19780.6	13%
	Oct	26189.93	17%
	Nov	39239.81	25%
	Dec	22891.89	14%
2024	Jan	24053.94	15%
	Feb	26077.2	16%
TOTAL		158233.37	100%





INTERPRETATION:

The above pie chart and the table depicts the discount amounts and tax amounts in past six months. It can be seen that 27% of total discount amount which has been given in November,2023 and this is highest value. Similarly, 25% of total tax amount which has been charged in November,2023 and this is highest value. Also, we can infer that the discount percentage is lower than tax percentage in Sep 2023, Oct 2023 and Feb 2024. During Nov 2023 and Dec 2023, the discount percentage is higher than the tax percentage. In Jan 2024, the discount percentage and tax percentage are equal.

4.1.5 TABULAR REPRESENTATIONS

SHOPS	**NO.OF ORDERS**	**NO.OF. DIFFERENT ITEMS SOLD**	**TOTAL NO.OF. QUANTITIES SOLD**
A.K.S. STORE /KUR	26	19	1175
ANNAI /ERAL	56	28	839
ANSARI STORE	11	10	388
BUHARI STORE/AUT	**10**	**9**	**66**
FANCY WORLD/ ERAL	74	36	245
JEYA MURUGAN STORE. / S. AUTOOR.	105	35	6347
JOLLY STORE	65	27	2372
LINGAM STORE/S.AUTHOOR	60	38	792
M.S. MANI STORE/AUT	68	34	2936
M.THAMIL STORE/S.AUTHOOR	83	35	3659
MURUGAN STORE. MAIN ROAD/AUTHOOR	80	37	4998
MUTHU MEDICAL/PAL	70	33	310
NESAM SUPER MARKET	67	39	630

PAMPAIYA STORE/AUT	64	18	2201
PSS STORE/AUTHOOR	49	26	749
R.R. STORE/AUT	113	**52**	953
R.S.K. MALIGAI& SHOPPING/AUTHOOR.S	**117**	45	5554
RAJA FLOWER SHOP/AUT	31	24	270
SAMUVEL SUPERMARKET	64	21	2361
SEKAR STORE/AUT	70	36	1237
SELVA MEERA MEDICALS	54	33	345
SIVA SAKTHI STORE	100	49	**6350**
THANALAKSHMI STORE	47	29	565
THANGAM STORE/ERAL	71	19	398
THIRUMURUGAN STORE/MUKKANI	51	34	868
UMA MEDICAL/MUKKANI	23	19	71

INTERPRETATION:

From the above table, it is inferred that more no.of. orders have been received from R.S. K Maligai & Shopping and less no.of. orders has been received from Buhari Store. Also, more no.of. Items has been preferred by R.R. Store and less no.of. Items has been preferred by Buhari Store. Then, we see that more no.of. Quantities has been sold to the shop Siva Sakthi Store and less no.of. Quantities has been sold to the shop Buhari Store. Thus, we could say that Buhari Store is the only shop which performs low in these records.

4.1.6 TOTAL.NO.OF.FREE QUANTITIES GIVEN TO DIFFERENT SHOPS

SHOPS	TOTAL NO.OF. FREE QUANTITIES GIVEN
A.K.S. STORE /KUR	1
ANSARI STORE	20
JEYA MURUGAN STORE. / S. AUTOOR.	1
JOLLY STORE	6
M.S. MANI STORE/AUT	10
MURUGAN STORE. MAIN ROAD/AUTHOOR	1
MUTHU MEDICAL/PAL	1
NESAM SUPER MARKET	1
PSS STORE/AUTHOOR	2
R.R. STORE/AUT	6
R.S.K. MALIGAI& SHOPPING/AUTHOOR.S	1
RAJA FLOWER SHOP/AUT	2
SEKAR STORE/AUT	3
SELVA MEERA MEDICALS	1
SIVA SAKTHI STORE	1
THANALAKSHMI STORE	2
THIRUMURUGAN STORE/MUKKANI	2
Grand Total	61

4.1.7 TOTAL NO.OF.FREE QUANTITIES GIVEN IN DIFFERENT ITEMS

ITEMS	NO.OF. FREE QUANTITIES GIVEN
GK CREAM RS20	5
ENO ORANGE RS10	20
CYCLE RS55	12
HIM BABY LOTION 50ML	1
HIM GENTLE BABY SOAP 50GM	1
HIM BABY SAMBOO 60ML RS65	2
SANDAL CONE RS10	20
Total	61

INTERPRETATION:

From the above tables, we see that high no.of. Free quantities given to ANSARI STORE and high no.of. Free quantities given in the item named “ENO ORANGE RS10” and “HIM BABY SAMBOO 60ML RS65”. Also, totally there are 61 free quantities which are given to different shops by the wholesale distribution

4.1.8 NO.OF.ORDERS RECEIVED FROM DIFFERENT SHOPS IN THE PAST SIX MONTHS

SHOPS	SEP, 2023	OCT, 2023	NOV, 2023	DEC,2023	JAN,2024	FEB, 2024	Total
A.K.S. STORE /KUR	5	7	2	2	6	4	26
ANNAI /ERAL	13	15	10	6	6	6	56
ANSARI STORE		6		5			11
BUHARI STORE/AUT	1	3	6				10
FANCY WORLD/ ERAL	15	12	15	13	10	9	74
JEYA MURUGAN STORE. / S. AUTOOR.	13	17	21	9	29	16	105
JOLLY STORE	7	7	13	8	10	20	65
LINGAM STORE/S.AUTHOOR	11	13	10	3	16	7	60
M.S. MANI STORE/AUT	6	8	18	14	10	12	68
M.THAMIL STORE/S.AUTHOOR	12	19	11	18	17	6	83
MURUGAN STORE. MAIN ROAD/AUTHOOR	8	17	19	9	19	8	80
MUTHU MEDICAL/PAL	4	5	32	7	7	15	70
NESAM SUPER MARKET	23	6		6	19	13	67
PAMPAIYA STORE/AUT	5	13	12	10	10	14	64
PSS STORE/AUTHOOR	4	6	12	11	9	7	49
R.R. STORE/AUT	1	8	39	18	38	9	113
R.S.K. MALIGAI& SHOPPING/AUTHOOR.S	20	20	27	14	22	14	117
RAJA FLOWER SHOP/AUT	1	1	5	5		19	31
SAMUVEL SUPERMARKET	10	11	21	6	4	12	64
SEKAR STORE/AUT	6	15	13	19	12	5	70
SELVA MEERA MEDICALS	10	8	13	4	1	18	54
SIVA SAKTHI STORE	11	12	28	12	1	36	100

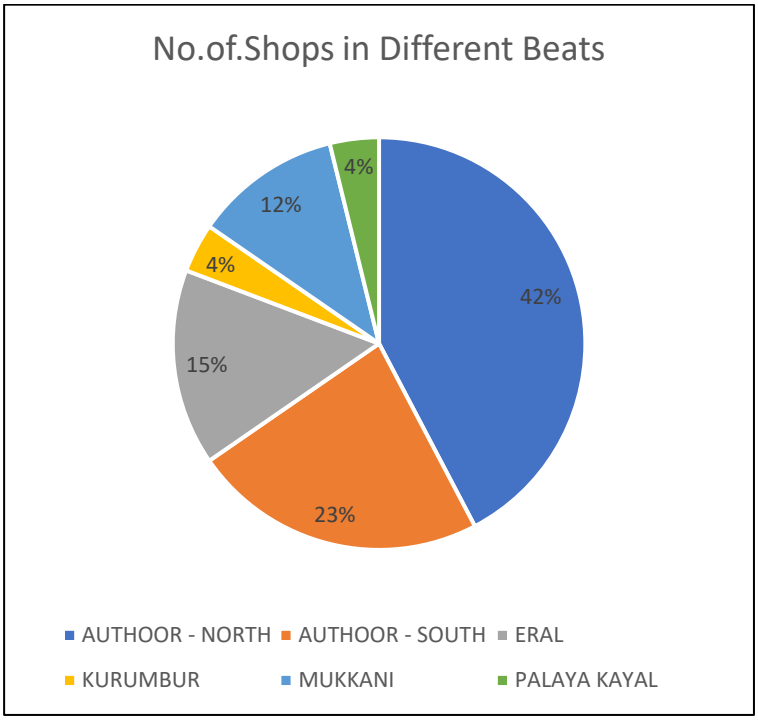
THANALAKSHMI STORE		5	22	11	2	7	47
THANGAM STORE/ERAL	13	12	12	9	12	13	71
THIRUMURUGAN STORE/MUKKANI	2	9	20	3	6	11	51
UMA MEDICAL/MUKKANI			9			14	23
Total	201	255	390	222	266	295	1629

INTERPRETATION:

From the above table, we can identify the shop by which the company receives more no.of. orders in each month and also, we could identify the month in which more no.of. orders have been received from each shop.

4.1.9 NO.OF. SHOPS IN DIFFERENT BEATS OF THOOTHUKUDI

BEATS	NO.OF. SHOPS	PERCENT
AUTHOOR – NORTH	11	42%
AUTHOOR – SOUTH	6	23%
ERAL	4	15%
KURUMBUR	1	4%
MUKKANI	3	12%
PALAYA KAYAL	1	4%
TOTAL	26	100%

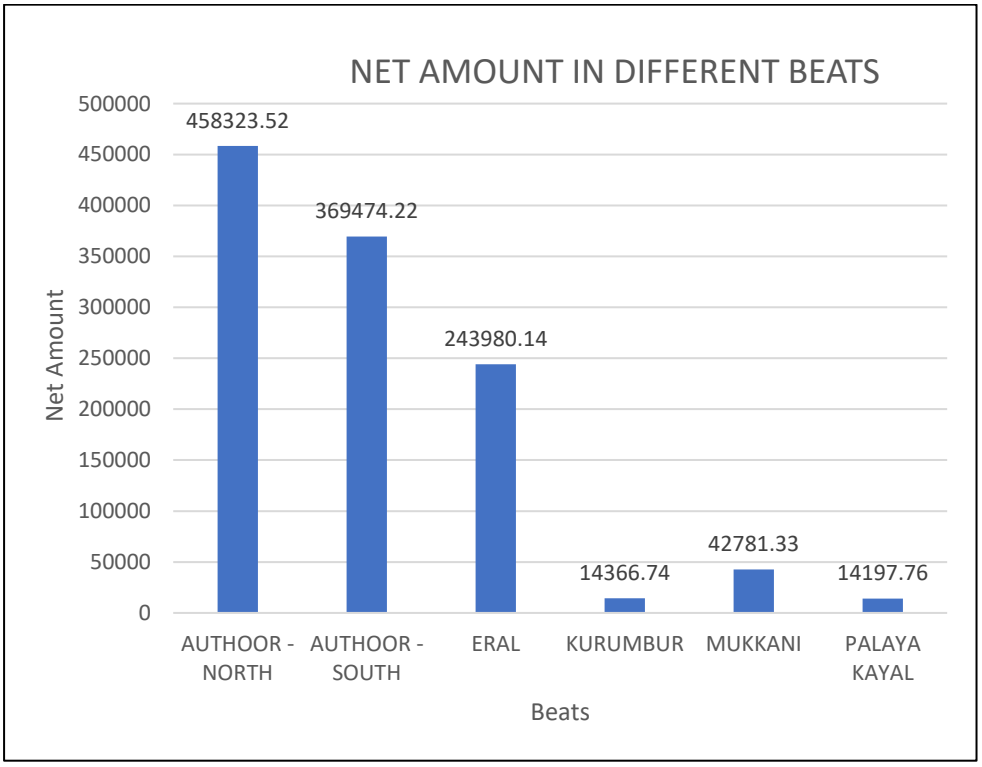


INTERPRETATION:

From the above table and pie chart, we can infer that there are more no.of. Shops in the beat Authoor-North (42%) and less no.of. Shops in the beats Kurumbur (4%) and Palayakayal (4%).

4.1.10 NET AMOUNT IN DIFFERENT BEATS OF THOOTHUKUDI

BEATS	NET AMOUNT
AUTHOOR - NORTH	458323.52
AUTHOOR - SOUTH	369474.22
ERAL	243980.14
KURUMBUR	14366.74
MUKKANI	42781.33
PALAYA KAYAL	14197.76

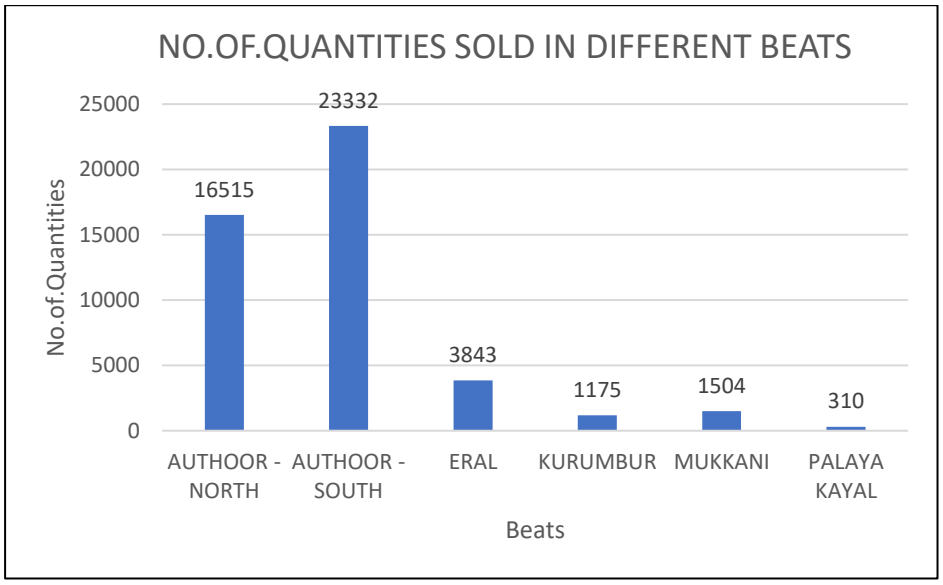


INTERPRETATION:

The above table and simple bar diagram depict the Net Amount generated from different beats of Thoothukudi. From this, we can infer that the net amount generated from the beat Authoor-North is higher and the net amount generated from the beat Palaya Kayal is lower. Also, we could say that the best performing beats are Authoor-North and Authoor-South and the least performing beats are Kurumbur and Palaya Kayal.

4.1.11 NO.OF. QUANTITIES SOLD IN DIFFERENT BEATS OF THOOTHUKUDI

BEATS	NO.OF. QUANTITIES SOLD
AUTHOOR - NORTH	16515
AUTHOOR - SOUTH	23332
ERAL	3843
KURUMBUR	1175
MUKKANI	1504
PALAYA KAYAL	310

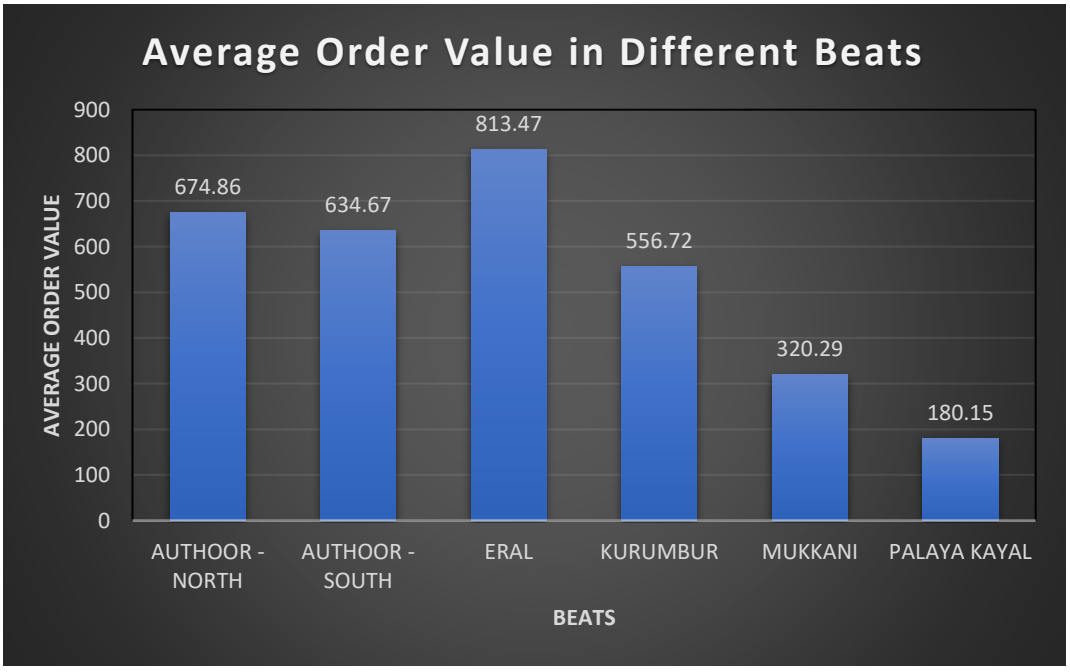


INTERPRETATION:

The above table and simple bar diagram depict the No.of. Quantities sold in different beats of Thoothukudi. From this, we can infer that the no.of. Quantities sold in the beat Authoor-South is higher and the no.of. Quantities sold in the beat Palaya Kayal is lower.

4.1.12 AVERAGE ORDER VALUE IN DIFFERENT BEATS OF THOOTHUKUDI

BEATS	GROSS AMOUNT	NO.OF. ORDERS	AVERAGE ORDER VALUE
AUTHOOR - NORTH	415040.3	615	674.86
AUTHOOR - SOUTH	337646.66	532	634.67
ERAL	215569.36	265	813.47
KURUMBUR	14474.77	26	556.72
MUKKANI	38756.13	121	320.29
PALAYA KAYAL	12610.35	70	180.15



INTERPRETATION:

The above table and simple bar diagram depict the Average Order Value in different beats of Thoothukudi. From this, we can infer that the average order value in the beat Eral is higher and the average order value in the beat Palaya Kayal is lower.

From the above three simple bar diagrams, it can be seen that the beat Palaya Kayal is the lower performing beat in these sales records.

4.1.13 NET AMOUNT GENERATED FROM THE SHOPS

SHOPS	NET AMOUNT
SAMUVEL SUPERMARKET	152214.64
MURUGAN STORE. MAIN ROAD/AUTHOOR	116176.61
JEYA MURUGAN STORE. / S. AUTOOR.	90730.71
M.S. MANI STORE/AUT	88367.54
SIVA SAKTHI STORE	80952.86
R.S.K. MALIGAI& SHOPPING/AUTHOOR.S	68081.11
M.THAMIL STORE/S.AUTHOOR	51920.21
R.R. STORE/AUT	41372.33
JOLLY STORE	39354.8
PAMPAIYA STORE/AUT	39186.83
NESAM SUPER MARKET	34900.45
PSS STORE/AUTHOOR	31489.59
ANNAI /ERAL	30618.29
THIRUMURUGAN STORE/MUKKANI	28370.74
THANGAM STORE/ERAL	24961.71

SEKAR STORE/AUT	21127.79
SELVA MEERA MEDICALS	15959.02
ANSARI STORE	14672.42
A.K.S. STORE /KUR	14474.77
MUTHU MEDICAL/PAL	12610.35
LINGAM STORE/S.AUTHOOR	11061.32
FANCY WORLD/ ERAL	7774.72
THANALAKSHMI STORE	7419.52
RAJA FLOWER SHOP/AUT	5520.96
UMA MEDICAL/MUKKANI	2965.87
BUHARI STORE/AUT	1812.41

INTERPRETATION:

The above table represents the Net amount generated from different shops. From this, we can infer that the top 3 best performing shops are Samuvel Supermarket, Murugan Store and Jeya Murugan Store and the 3 least performing shops are Raja Flower Shop, Uma Medical and Buhari Store.

CHAPTER 5

STATISTICAL ANALYSIS

5.1 DESCRIPTIVE STATISTICS

Sep,2023	Qts	Net Amt	Tax Amt	Discount Amt
Mean	39.9	709.6024	98.4109	26.2527
Median	**12**	**367.77**	**47.62**	**9.46**
Std. Deviation	126.633	944.40874	143.07589	50.92777
Range	1199	6043.63	922.41	357.14
Minimum	1	31.38	4.29	0
Maximum	1200	6075.01	926.7	357.14
Sum	8019	142630.09	19780.6	5276.79

Oct,2023	Qts	Net Amt	Tax Amt	Discount Amt
Mean	36.44	733.9587	102.7056	29.1131
Median	**12**	**409.09**	**52.19**	**9.24**
Std. Deviation	74.403	931.75448	143.30041	52.94861
Range	799	7049.53	1075.35	336.52
Minimum	1	23.22	3.54	0
Maximum	800	7072.75	1078.89	336.52
Sum	9292	187159.48	26189.93	7423.85

Nov,2023	Qts	Net Amt	Tax Amt	Discount Amt
Mean	24.56	733.8361	100.6149	34.2142
Median	**10**	**400.545**	**51.66**	**10.255**
Std. Deviation	41.135	1054.9033	157.35188	66.68266
Range	359	8104.63	1236.3	717.38
Minimum	1	23.79	3.63	0
Maximum	360	8128.42	1239.93	717.38
Sum	9580	286196.09	39239.81	13343.55

Dec,2023	Qts	Net Amt	Tax Amt	Discount Amt
Mean	29.55	738.9423	103.1166	37.6342
Median	**12**	**424.765**	**55.36**	**11.565**
Std. Deviation	52.64	923.25005	139.27691	82.42735
Range	299	7335.72	1119.84	698.18
Minimum	1	31.72	4.01	0
Maximum	300	7367.44	1123.85	698.18
Sum	6561	164045.19	22891.89	8354.79

Jan,2023	Qts	Net Amt	Tax Amt	Discount Amt
Mean	25.15	656.59	90.4283	28.2982
Median	**10**	**395.305**	**51.43**	**8.915**
Std. Deviation	49.156	789.41057	118.83877	71.42577
Range	479	7369.65	1131.58	761.9
Minimum	1	72.21	3.62	0
Maximum	480	7441.86	1135.2	761.9
Sum	6689	174652.94	24053.94	7527.33

Feb,2023	Qts	Net Amt	Tax Amt	Discount Amt
Mean	22.16	638.7794	88.3973	24.6819
Median	**6**	**385.61**	**48.52**	**7**
Std. Deviation	39.387	708.79214	107.01726	52.15568
Range	359	4762.93	729.95	402.15
Minimum	1	35.25	1.98	0
Maximum	360	4798.18	731.93	402.15
Sum	6538	188439.92	26077.2	7281.17

INTERPRETATION:

Since the data invloves many outliers, mean is not a good measure in each of the case. So, we consider the median value of the different variables to measure its central tendency.

In the month of September, the median value of Quantities sold is 12 , median value of Net amount is 367.7, median value of Tax amount is 47.62 and the median value of Discount Amount is 9.46.

In the month of October, the median value of Quantities sold is 12 , median value of Net amount is 409.09, median value of Tax amount is 52.19 and the median value of Discount Amount is 9.24.

In the month of November, the median value of Quantities sold is 10, median value of Net amount is 400.54, median value of Tax amount is 51.66 and the median value of Discount Amount is 10.25

In the month of December, the median value of Quantities sold is 12, median value of Net amount is 424.77, median value of Tax amount is 55.36 and the median value of Discount Amount is 11.56

In the month of January, the median value of Quantities sold is 10 , median value of Net amount is 395.31, median value of Tax amount is 51.43 and the median value of Discount Amount is 8.92.

In the month of February, the median value of Quantities sold is 6 , median value of Net amount is 385.61, median value of Tax amount is 48.52 and the median value of Discount Amount is 7.

5.2 CORRELATION

5.2.1 AIM:

Under the correlation, to find the relationship between the no.of.orders received and no.of.quantities sold to different shops.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant relationship between the no.of.orders received and no.of.quantities sold to different shops.

$$\boldsymbol{H_0: \rho = 0}$$

Alternative Hypothesis:

There is significant relationship between the no.of.orders received and no.of.quantities sold to different shops.

$\boldsymbol{H_1: \rho \neq 0}$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Descriptive Statistics			
	Mean	Std. Deviation	N
No.of. Orders Recieved	62.65	28.147	26
No.of.Quantities Sold	1795.35	1985.240	26

Correlations			
		No.of. Orders Recieved	No.of.Quantities Sold
No.of. Orders Recieved	Pearson Correlation	1	.678**
	Sig. (2-tailed)		.000
	N	26	26
No.of.Quantities Sold	Pearson Correlation	.678**	1
	Sig. (2-tailed)	.000	
	N	26	26

INTERPRETATION:

It is observed that the significant value is 0.001, which is lesser than the probability value p=0.05. Hence, it is concluded that there is sufficient evidence to reject the null hypothesis and it follows that there is significant relationship between the no.of.orders received and no.of.quantities sold to different shops.

5.2.2 AIM:

Under the correlation, to find the relationship between the no.of.orders received and no.of.items sold to different shops.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant relationship between the no.of.orders received and no.of.items sold to different shops.

$$H_0: \rho = 0$$

Alternative Hypothesis:

There is significant relationship between the no.of.orders received and no.of.items sold to different shops.

$$H_1: \rho \neq 0$$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Descriptive Statistics			
	Mean	Std. Deviation	N
No.of. Orders Received	62.65	28.147	26
No.of.Items	30.19	10.826	26

Correlations			
		No.of. Orders Recieved	No.of.Items
No.of. Orders Received	Pearson Correlation	1	.826**
	Sig. (2-tailed)		.000
	N	26	26
No.of.Items	Pearson Correlation	.826**	1
	Sig. (2-tailed)	.000	
	N	26	26

INTERPRETATION:

It is observed that the significant value is 0.001, which is lesser than the probability value p=0.05. Hence, it is concluded that there is sufficient evidence to reject the null hypothesis and it follows that there is significant relationship between the no.of.orders received and no.of.items sold to different shops.

5.2.3 AIM:

Under the correlation, to find the relationship between the Gross amounts and Net amounts generated by the company in the past six months.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant relationship between the Gross amounts and Net amounts generated by the company in the past six months.

$\boldsymbol{H_0: \rho = 0}$

Alternative Hypothesis:

There is significant relationship between the Gross amounts and Net amounts generated by the company in the past six months.

$\boldsymbol{H_1: \rho \neq 0}$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5% (0.05)

SPSS TEST:

Correlations

		Gross Amount	Net Amount
Gross Amount	Pearson Correlation	1	.996**
	Sig. (2-tailed)		.000
	N	1629	1629
Net Amount	Pearson Correlation	.996**	1
	Sig. (2-tailed)	.000	
	N	1629	1629

INTERPRETATION:

It is observed that the significant value is 0.001, which is lesser than the probability value p=0.05. Hence, it is concluded that there is sufficient evidence to reject the null hypothesis and it follows that there is significant relationship between the Gross amounts and Net amounts generated by the company in the past six months.

5.2.4 AIM:

Under the correlation, to find the relationship between the Gross amounts generated by the company and the no.of.quantities sold.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant relationship between the Gross amounts generated by the company and the no.of.quantities sold.

$$H_0: \rho = 0$$

Alternative Hypothesis:

There is significant relationship between the Gross amounts generated by the company and the no.of.quantities sold.

$$H_1: \rho \neq 0$$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Correlations

		Gross Amount	No.of.Quantities Sold
Gross Amount	Pearson Correlation	1	.393**
	Sig. (2-tailed)		.000
	N	1629	1629
No.of.Quantities Sold	Pearson Correlation	.393**	1
	Sig. (2-tailed)	.000	
	N	1629	1629

INTERPRETATION:

It is observed that the significant value is 0.001, which is lesser than the probability value p=0.05. Hence, it is concluded that there is sufficient evidence to reject the null hypothesis and it follows that there is significant relationship between the gross amounts generated by the company and the no.of.quantities sold.

5.2.5 AIM:

Under the correlation, to find the relationship between the Gross amounts generated by the company and the Discount amounts given by the company.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant relationship between the Gross amounts generated by the company and the Discount amounts given by the company.

$$H_0: \rho = 0$$

Alternative Hypothesis:

There is significant relationship between the Gross amounts generated by the company and the Discount amounts given by the company.

$$H_1: \rho \neq 0$$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Correlations

		Gross Amount	Discount Amount
Gross Amount	Pearson Correlation	1	.587**
	Sig. (2-tailed)		.000
	N	1629	1629
Discount Amount	Pearson Correlation	.587**	1
	Sig. (2-tailed)	.000	
	N	1629	1629

INTERPRETATION:

It is observed that the significant value is 0.001, which is lesser than the probability value p=0.05. Hence, it is concluded that there is sufficient evidence to reject the null hypothesis and it follows that there is significant relationship between the gross amounts generated by the company and the Discount amounts given by the company.

5.3 REGRESSION ANALYSIS

5.3.1 AIM:

Under Linear Regression analysis, to examine the relationship between MRP(Maximum Retail Price) and WholeSale price per unit.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant relationship between the MRP(Maximum Retail Price) and WholeSale price per unit.

$$\boldsymbol{H_0: \beta = 0}$$

Alternative Hypothesis:

There is significant relationship between the MRP(Maximum Retail Price) and WholeSale price per unit.

$$\boldsymbol{H_1: \beta \neq 0}$$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.987[a]	.974	.974	7.43567

a. Predictors: (Constant), Max Retail Price

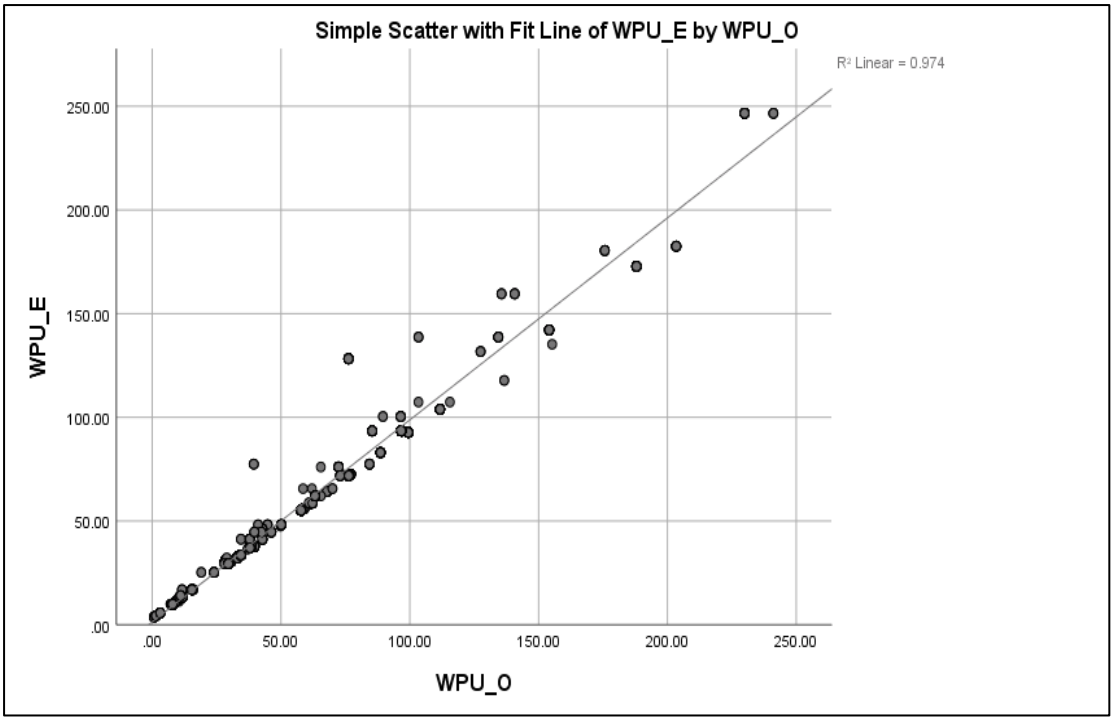
ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3390724.791	1	3390724.791	61327.019	.000[b]
	Residual	89955.607	1627	55.289		
	Total	3480680.398	1628			
a. Dependent Variable: Wholesale Price						
b. Predictors: (Constant), Max Retail Price						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.976	.275		10.812	.000
	Max Retail Price	.696	.003	.987	247.643	.000
a. Dependent Variable: Wholesale Price						

INTREPRETATION:

From the above tables, we infer that adjusted R squared value is 97.4% which implies that 97.4% of variation in dependent variable (Wholesale Price per unit) has been explained by the independent variable (MRP).Also, the p-value is observed as 0.001 which is less than the probability value p=0.05 and hence there is sufficient evidence to reject the null hypothesis and we conclude that there is a significant relationship between the MRP and Wholesale Price per unit.

We observe that the value of β is 0.696 and the constant value is 2.976 and thus the linear regression fit is given by $y = 0.696x + 2.976$, where y is the dependent variable(WholeSale Price per unit) and x is the independent variable(MRP).



As the points are mostly surrounded near the trend line and hence this model is a good fitting model.

5.4 MANN WHITNEY U TEST

5.4.1 AIM:

Under the Mann-Whitney U test, to find the difference between the Net Amounts generated from Nesam Super Market and Samuvel Super Market.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the Net Amounts generated from Nesam Super Market and Samuvel Super Market.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is a significant difference between the Net Amounts generated from Nesam Super Market and Samuvel Super Market.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

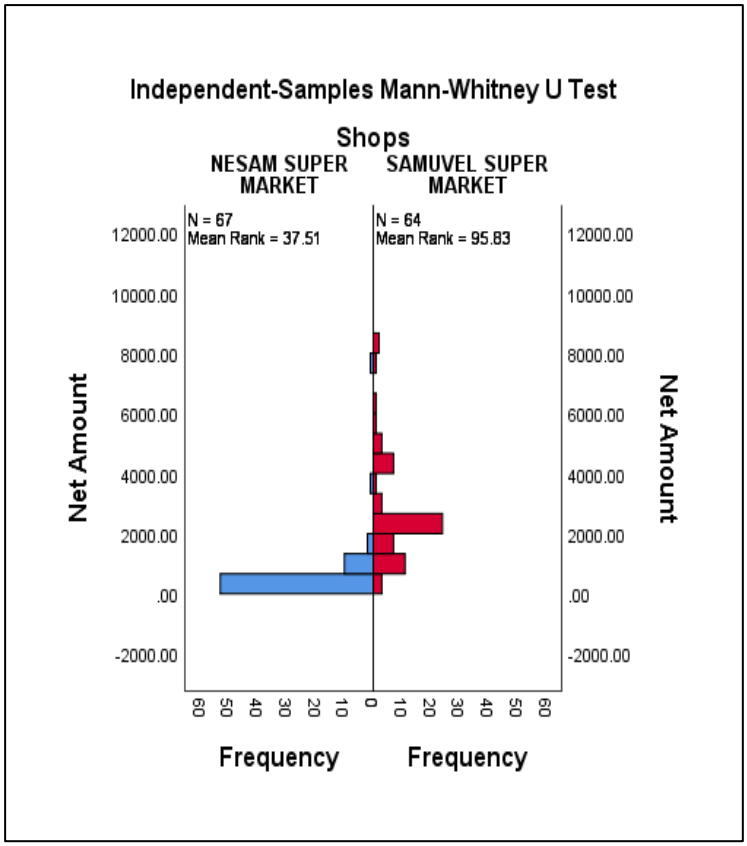
SPSS TEST:

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Shops	Statistic	df	Sig.	Statistic	df	Sig.
Net Amount	NESAM SUPER MARKET	.321	67	.000	.381	67	.000
	SAMUVEL SUPER MARKET	.236	64	.000	.856	64	.000

a. Lilliefors Significance Correction

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Net Amount is the same across categories of Shops.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Independent-Samples Mann-Whitney U Test Summary	
Total N	131
Mann-Whitney U	4053.000
Wilcoxon W	6133.000
Test Statistic	4053.000
Standard Error	217.136
Standardized Test Statistic	8.792
Asymptotic Sig.(2-sided test)	.000



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001, which is less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Mann Whitney U test.

It is observed that the significant value is 0.001, which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is a significant difference between the Net Amounts generated from Nesam Super Market and Samuvel Super Market. Also, since the mean rank of Samuvel Super Market is higher than Nesam Super Market, we could say that the Net Amounts generated from Samuvel Super Market is higher than Nesam Super Market.

5.4.2 AIM:

Under the Mann-Whitney U test, to find the mean difference between the Net Amounts generated from Muthu Medical and Selva Meera Medicals.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the Net Amounts generated from Muthu Medical and Selva Meera Medicals.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is a significant difference between the Net Amounts generated from Muthu Medical and Selva Meera Medicals.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

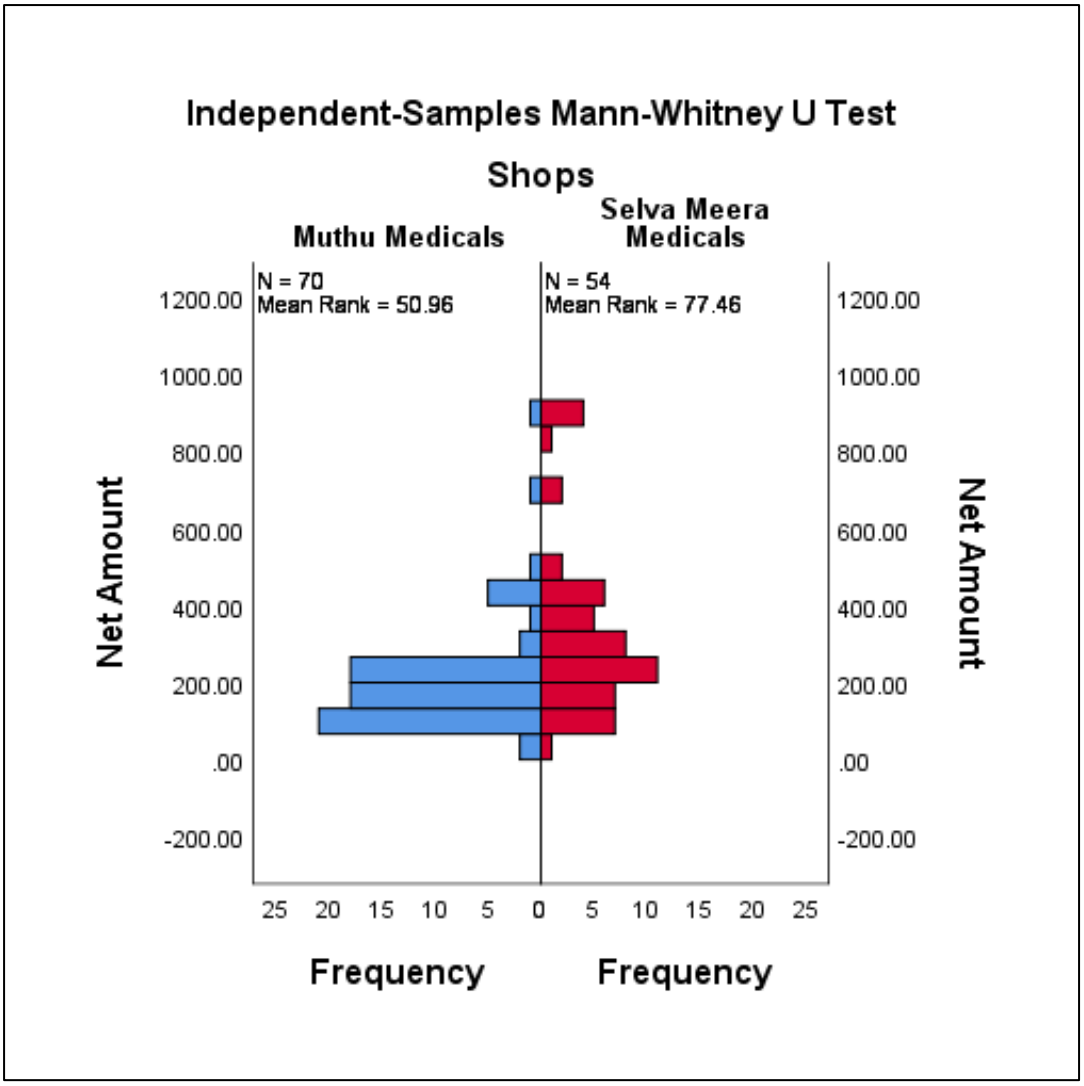
SPSS TEST:

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Shops	Statistic	df	Sig.	Statistic	df	Sig.
Net Amount	Muthu Medicals	.228	70	.000	.751	70	.000
	Selva Meera Medicals	.172	54	.000	.834	54	.000

a. Lilliefors Significance Correction

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Net Amount is the same across categories of Shops.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Independent-Samples Mann-Whitney U Test Summary	
Total N	124
Mann-Whitney U	2698.000
Wilcoxon W	4183.000
Test Statistic	2698.000
Standard Error	198.396
Standardized Test Statistic	4.073
Asymptotic Sig.(2-sided test)	.000



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001, which is less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Mann Whitney U test.

It is observed that the significant value is 0.001, which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is a significant difference between the Net Amounts generated from Muthu Medical and Selva Meera Medicals. Also, since the mean rank of Selva Meera Medicals is higher than Muthu Medical, we could say that the Net Amounts generated from Selva Meera Medicals is higher than Muthu Medical.

5.4.3 AIM:

Under the Mann-Whitney U test, to find the difference between the Net Amounts generated from Jeya Murugan Stores and Murugan Stores.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the Net Amounts generated from Jeya Murugan Stores and Murugan Stores.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is a significant difference between the Net Amounts generated from Jeya Murugan Stores and Murugan Stores.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Tests of Normality

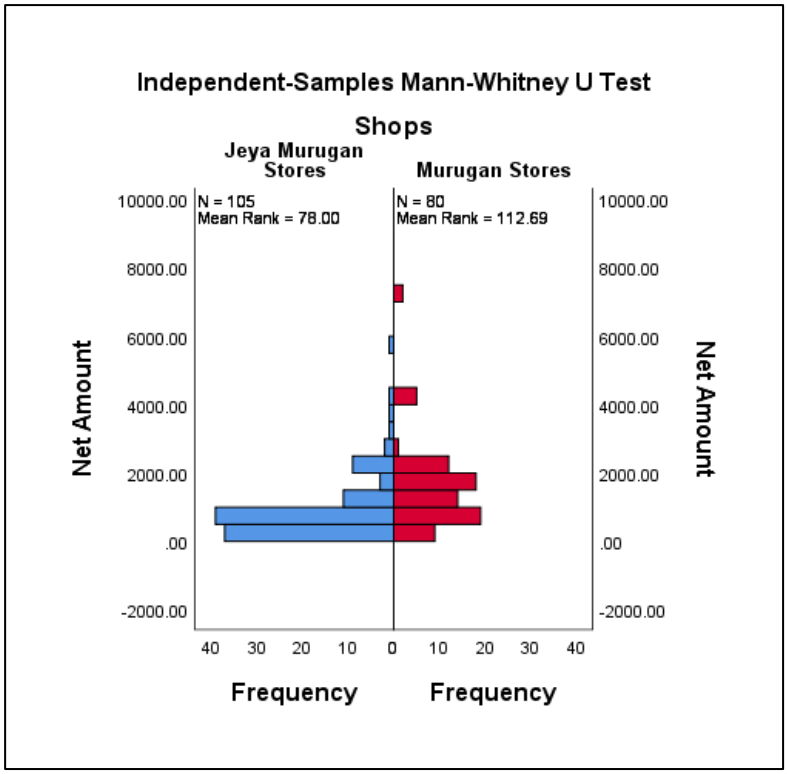
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Shops	Statistic	df	Sig.	Statistic	df	Sig.
Net Amount	Jeya Murugan Stores	.235	105	.000	.726	105	.000
	Murugan Stores	.198	80	.000	.782	80	.000

a. Lilliefors Significance Correction

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Net Amount is the same across categories of Shops.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Independent-Samples Mann-Whitney U Test Summary	
Total N	185
Mann-Whitney U	5775.000
Wilcoxon W	9015.000
Test Statistic	5775.000
Standard Error	360.754
Standardized Test Statistic	4.366
Asymptotic Sig.(2-sided test)	.000



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001, which is less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Mann Whitney U test.

It is observed that the significant value is 0.001, which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is a significant difference between the Net Amounts generated from Jeya Murugan Stores and Murugan Stores. Also, since the mean rank of Murugan Stores is higher than Jeya Murugan Stores, we could say that the Net Amounts generated from Murugan Stores is higher than Jeya Murugan Stores.

5.4.4 AIM:

Under the Mann-Whitney U test, to find the difference in the No.of.Quantities sold between Amurtanjan White and Amurtanjan Yellow.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference in the No.of.Quantities sold between Amurtanjan White and Amurtanjan Yellow.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is a significant difference in the No.of.Quantities sold between Amurtanjan White and Amurtanjan Yellow.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

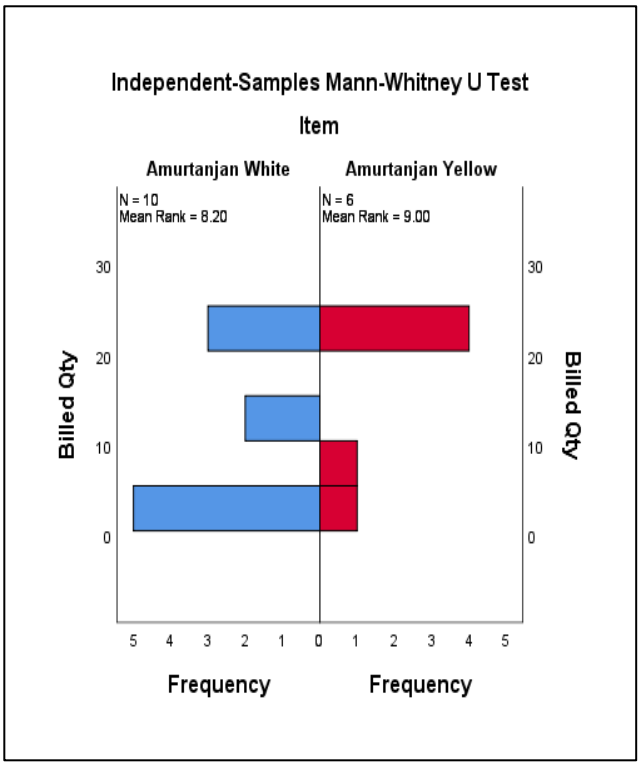
Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Item	Statistic	df	Sig.	Statistic	df	Sig.
Billed Qty	Amurtanjan White	.308	10	.008	.756	10	.004
	Amurtanjan Yellow	.406	6	.002	.673	6	.003

a. Lilliefors Significance Correction

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Billed Qty is the same across categories of Item.	Independent-Samples Mann-Whitney U Test	.792[a]	Retain the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

a. Exact significance is displayed for this test.

Independent-Samples Mann-Whitney U Test Summary	
Total N	16
Mann-Whitney U	33.000
Wilcoxon W	54.000
Test Statistic	33.000
Standard Error	8.979
Standardized Test Statistic	.334
Asymptotic Sig.(2-sided test)	.738
Exact Sig.(2-sided test)	.792



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.004 and 0.003, which are less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Mann Whitney U test.

It is observed that the significant value is 0.792, which is greater than the probability value p=0.05. Hence, it is found that there is no sufficient evidence to reject the null hypothesis and conclude that there is no significant difference in the No.of.Quantities sold between Amurtanjan White and Amurtanjan Yellow.

5.4.5 AIM:

Under the Mann-Whitney U test, to find the difference in the No.of.Quantities sold between HIT Spray Black and HIT Spray Red.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference in the No.of.Quantities sold between HIT Spray Black and HIT Spray Red.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is a significant difference in the No.of.Quantities sold between HIT Spray Black and HIT Spray Red.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

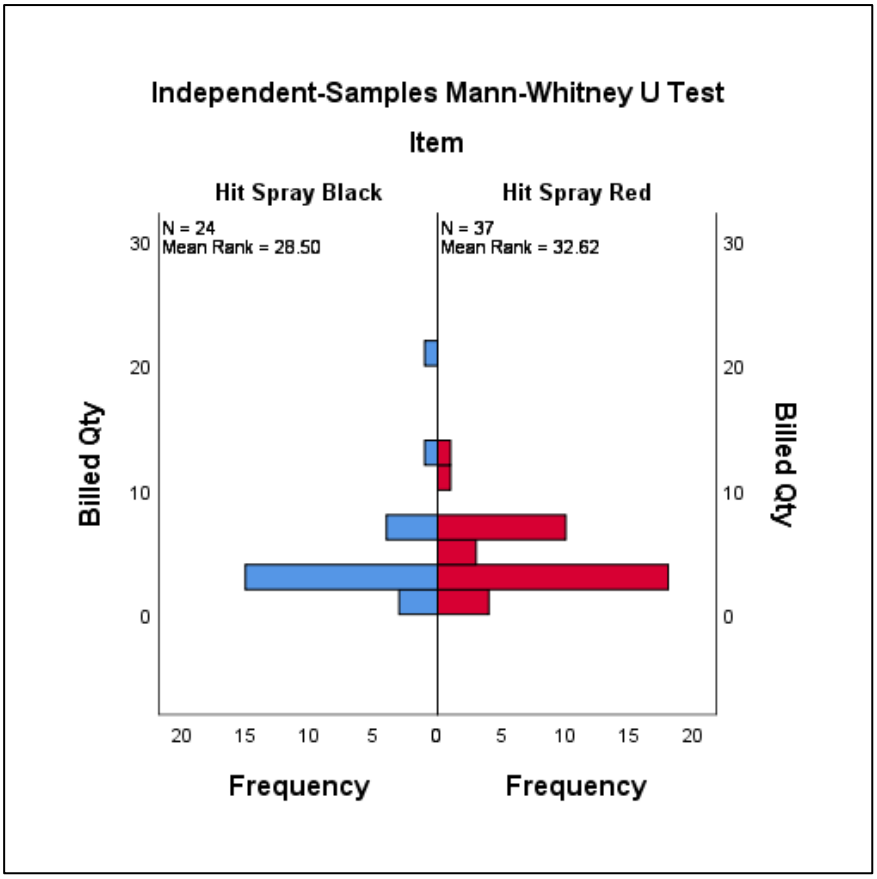
Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Item	Statistic	df	Sig.	Statistic	df	Sig.
Billed Qty	Hit Spray Black	.349	24	.000	.623	24	.000
	Hit Spray Red	.249	37	.000	.851	37	.000

a. Lilliefors Significance Correction

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Billed Qty is the same across categories of Item.	Independent-Samples Mann-Whitney U Test	.362	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .050.

Independent-Samples Mann-Whitney U Test Summary	
Total N	61
Mann-Whitney U	504.000
Wilcoxon W	1207.000
Test Statistic	504.000
Standard Error	65.820
Standardized Test Statistic	.912
Asymptotic Sig.(2-sided test)	.362



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001, which is less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Mann Whitney U test.

It is observed that the significant value is 0.362, which is greater than the probability value p=0.05. Hence, it is found that there is no sufficient evidence to reject the null hypothesis and conclude that there is no significant difference in the No.of.Quantities sold between HIT Spray Black and HIT Spray Red.

5.4.6 AIM:

Under the Mann-Whitney U test, to find the difference in the No.of.Quantities sold between Iodex 8gm and Iodex 4gm.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference in the No.of.Quantities sold between Iodex 8gm and Iodex 4gm.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is a significant difference in the No.of.Quantities sold between Iodex 8gm and Iodex 4gm.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

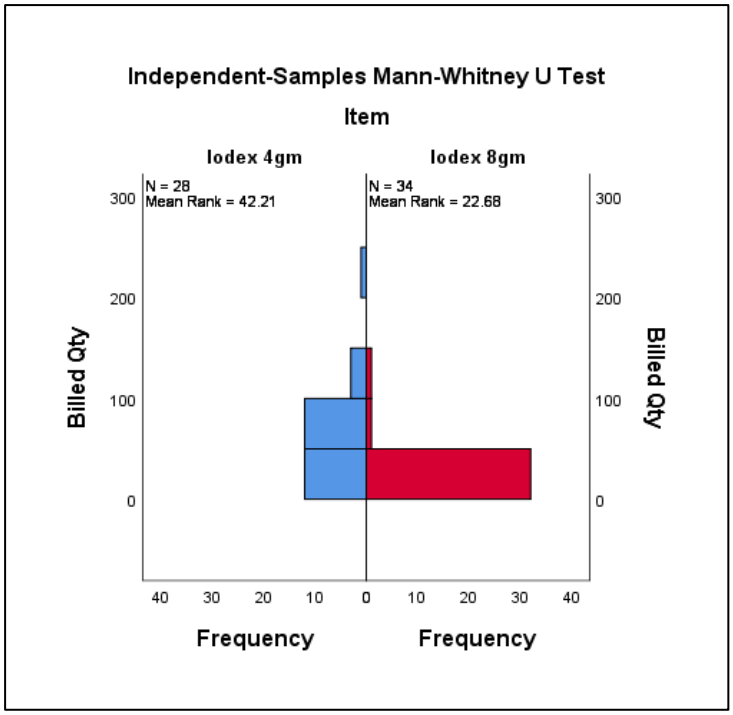
SPSS TEST:

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Item	Statistic	df	Sig.	Statistic	df	Sig.
Billed Qty	Iodex 8gm	.331	34	.000	.666	34	.000
	Iodex 4gm	.243	28	.000	.795	28	.000

a. Lilliefors Significance Correction

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Billed Qty is the same across categories of Item.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

Independent-Samples Mann-Whitney U Test Summary	
Total N	62
Mann-Whitney U	776.000
Wilcoxon W	1182.000
Test Statistic	776.000
Standard Error	69.759
Standardized Test Statistic	4.301
Asymptotic Sig.(2-sided test)	.000



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001, which is less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Mann Whitney U test.

It is observed that the significant value is 0.001, which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is significant difference in the No.of.Quantities sold between Iodex 8gm and Iodex 4gm. Also, since the mean rank of Iodex 4gm is higher than the Iodex 8gm, we could say that the Iodex 4gm is sold more no.of.quantities when compared to Iodex 8gm.

5.4.7 AIM:

Under the Mann-Whitney U test, to find the difference between the Net Amounts generated from Godrej Items and Himalaya Items.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the Net Amounts generated from Godrej Items and Himalaya Items.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is a significant difference between the Net Amounts generated from Godrej Items and Himalaya Items.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

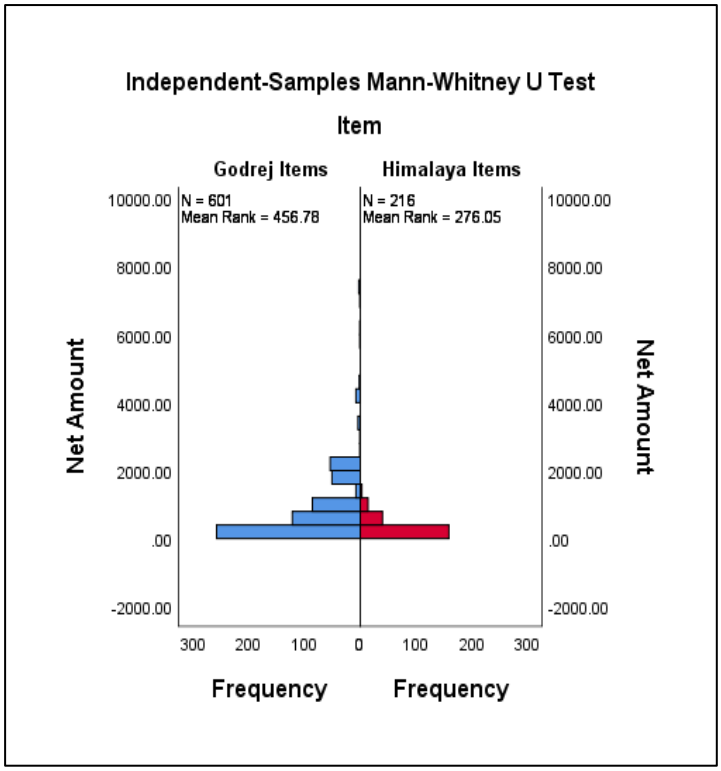
SPSS TEST:

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Item	Statistic	df	Sig.	Statistic	df	Sig.
Net Amount	Godrej Items	.211	601	.000	.699	601	.000
	Himalaya Items	.187	216	.000	.810	216	.000
a. Lilliefors Significance Correction							

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Net Amount is the same across categories of Item.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .050.

Independent-Samples Mann-Whitney U Test Summary	
Total N	817
Mann-Whitney U	36191.000
Wilcoxon W	59627.000
Test Statistic	36191.000
Standard Error	2974.618
Standardized Test Statistic	-9.654
Asymptotic Sig.(2-sided test)	.000



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001, which is less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Mann Whitney U test.

It is observed that the significant value is 0.001, which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is a significant difference between the Net Amounts generated from Godrej Items and Himalaya Items. Also, since the mean rank of Godrej Items is higher than Himalaya Items, we could say that the Net Amounts generated from Godrej Items is higher than Himalaya Items.

5.4.8 AIM:

Under the Mann-Whitney U test, to find the difference between the Net Amounts generated in Authoor-North and Authoor-South.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the Net Amounts generated in Authoor-North and Authoor-South.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is a significant difference between the Net Amounts generated in Authoor-North and Authoor-South.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

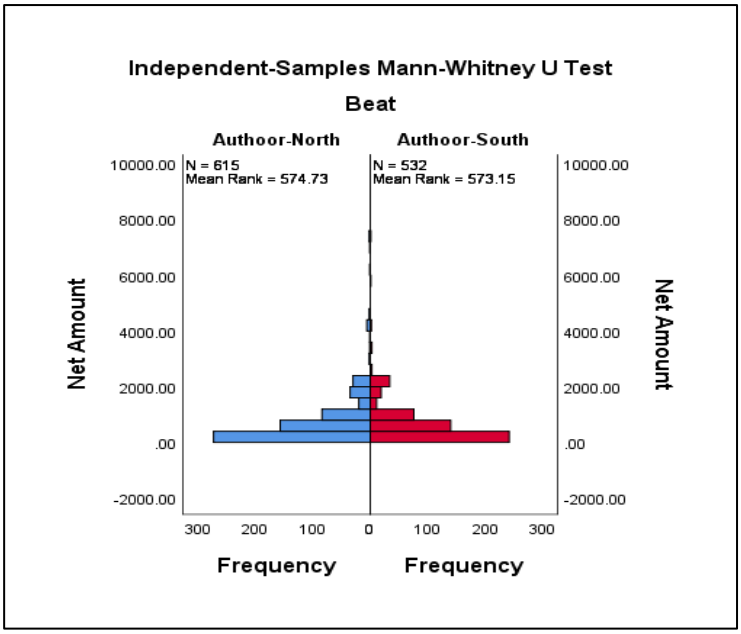
SPSS TEST:

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Beat	Statistic	df	Sig.	Statistic	df	Sig.
Net Amount	1	.214	615	.000	.652	615	.000
	2	.211	532	.000	.697	532	.000
a. Lilliefors Significance Correction							

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Net Amount is the same across categories of Beat.	Independent-Samples Mann-Whitney U Test	.936	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .050.

Independent-Samples Mann-Whitney U Test Summary	
Total N	1147
Mann-Whitney U	163138.500
Wilcoxon W	304916.500
Test Statistic	163138.500
Standard Error	5594.552
Standardized Test Statistic	-.081
Asymptotic Sig.(2-sided test)	.936



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001, which is less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Mann Whitney U test.

It is observed that the significant value is 0.936, which is greater than the probability value p=0.05. Hence, it is found that there is no sufficient evidence to reject the null hypothesis and conclude that there is no significant difference between the Net Amounts generated in Authoor-North and Authoor-South.

5.5 WILCOXON SIGNED RANK TEST

5.5.1 AIM:

Under the Wilcoxon test, to find the difference between the Net Amounts amount before and after the rate per unit change for the specified products.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the net amount before and after the rate per unit change for the products.

$H_0: \mu_1 = \mu_2$

Alternative Hypothesis:

There is significant difference between the net amount before and after the rate per unit change for the products.

$H_1: \mu_1 \neq \mu_2$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

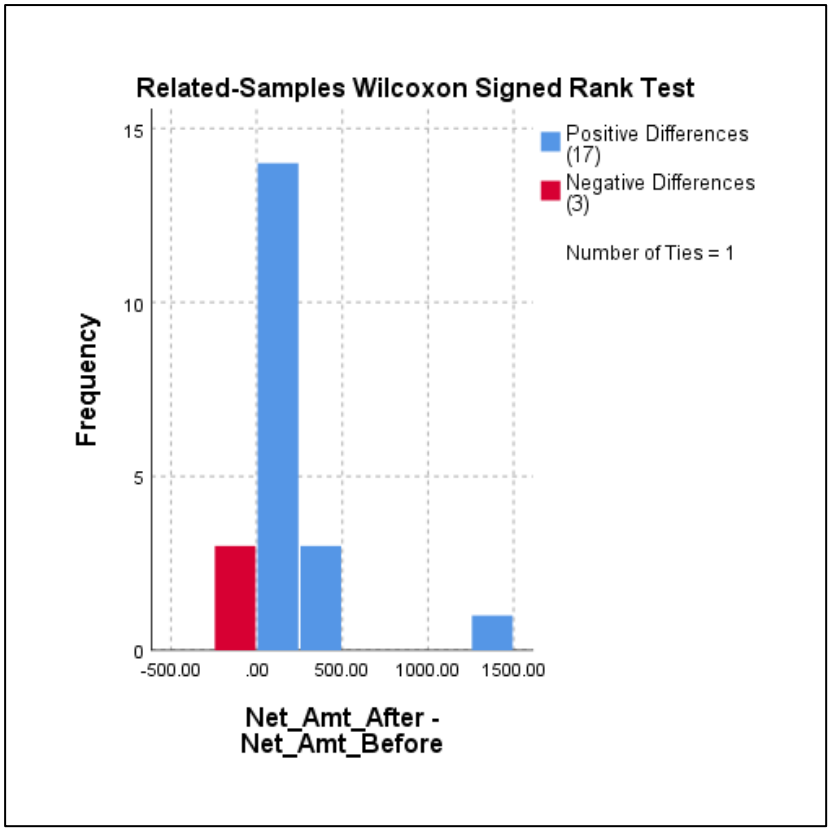
SPSS TEST:

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Net_Amt_Before	.235	21	.004	.788	21	.000
Net_Amt_After	.190	21	.046	.862	21	.007

a. Lilliefors Significance Correction

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The median of differences between Net_Amt_Before and Net_Amt_After equals 0.	Related-Samples Wilcoxon Signed Rank Test	.023	Reject the null hypothesis.

Related-Samples Wilcoxon Signed Rank Test Summary	
Total N	21
Test Statistic	166.000
Standard Error	26.777
Standardized Test Statistic	2.278
Asymptotic Sig.(2-sided test)	.023



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001 and 0.007, which are less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., Wilcoxon-Signed Rank test.

It is observed that the significant value is 0.023, which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is significant difference between the net amount before and after the rate per unit change for the product

5.6 KRUSKAL-WALLIS TEST

5.6.1 AIM:

Under the Kruskal-Wallis test, to find the difference in the No.of.Quantities sold between different hair care products.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference in the No.of.Quantities sold between Chik Shampoo, Karthika Powder and Meera Powder.

$H_0: \mu_1 = \mu_2 = \mu_3$

Alternative Hypothesis:

There is significant difference in the No.of.Quantities sold between Chik Shampoo, Karthika Powder and Meera Powder.

$H_0: \mu_1 \neq \mu_2 \neq \mu_3$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Items	Statistic	df	Sig.	Statistic	df	Sig.
No_of_Qts	Chik Shampoo	.231	7	.200*	.822	7	.067
	Karthika Powder	.298	7	.060	.797	7	.038
	Meera Powder	.277	10	.028	.722	10	.002
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of No_of_Qts is the same across categories of Items.	Independent-Samples Kruskal-Wallis Test	.036	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

Independent-Samples Kruskal-Wallis Test Summary	
Total N	24
Test Statistic	6.644[a]
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	.036
a. The test statistic is adjusted for ties.	

Pairwise Comparisons of Items					
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Meera Powder-Chik Shampoo	6.443	3.468	1.858	.063	.190
Meera Powder-Karthika Powder	8.300	3.468	2.393	.017	.050
Chik Shampoo-Karthika Powder	-1.857	3.762	-.494	.622	1.000
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

INTERPRETATION:

By normality test, it is observed that p value for Karthika Powder and Meera Powder are 0.038 and 0.002, which are less than probability value p=0.05 and so it is founded as non-normal. But, the p value for Chik shampoo is 0.067 which is greater than p=0.05 and so it is founded as normal. Here, since two of them follow non-normal distribution, we are using non parametric test. ie, Kruskal Wallis test.

By Kruskal-Wallis test, it is observed that the significant value is 0.036, which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is significant difference in the No.of.Quantities sold between Chik Shampoo, Karthika Powder and Meera Powder.

By using Pair-wise comparison results, we see that the adjusted significant value for Meera Powder and Chik shampoo is 0.190 which is greater than the p value=0.05 and hence there is no sufficeint evidence to reject the null hypothesis and so we conclude that there is no significant difference between the No.of.Quantities sold between Chik Shampoo and Meera Powder.

Similarly, we see that the adjusted significant value for Meera Powder and Karthika Powder is 0.05 which is equal to the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between the No.of.Quantities sold between Karthika Powder and Meera Powder.

Similarly, we see that the adjusted significant value for Karthika Powder and Chik shampoo is 1 which is greater than the p value=0.05 and hence there is no sufficeint evidence

to reject the null hypothesis and so we conclude that there is no significant difference between the No.of.Quantities sold between Karthika Powder and Meera Chik Shampoo.

5.6.2 AIM:

Under the Kruskal-Wallis test, to find the difference in the No.of.Quantities sold between different products of Z.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference in the No.of.Quantities sold between Z powder 100gm, Z Talc 25gm, Z Talc 50gm.

$H_0: \mu_1 = \mu_2 = \mu_3$

Alternative Hypothesis:

There is significant difference in the No.of.Quantities sold between Z powder 100gm, Z Talc 25gm, Z Talc 50gm.

$H_0: \mu_1 \neq \mu_2 \neq \mu_3$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Items	Statistic	df	Sig.	Statistic	df	Sig.
No_of_Qts	Z Powder 100gm	.383	34	.000	.631	34	.000
	Z Talc 25gm	.385	3	.	.750	3	.000
	Z Talc 50gm	.333	30	.000	.668	30	.000

a. Lilliefors Significance Correction

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of No_of_Qts is the same across categories of Items.	Independent-Samples Kruskal-Wallis Test	.165	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .050.

Independent-Samples Kruskal-Wallis Test Summary	
Total N	67
Test Statistic	3.608[a,b]
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	.165
a. The test statistic is adjusted for ties.	
b. Multiple comparisons are not performed because the overall test does not show significant differences across samples.	

INTERPRETATION:

By normality test, it is observed that p value is 0.001, which is less than probability value p=0.05. From this, it is found that non-normal and hence we are using non parametric test. ie, Kruskal Wallis test.

By Kruskal-Wallis test, it is observed that the significant value is 0.165 which is greater than the probability value p=0.05. Hence, it is found that there is no sufficient evidence to reject the null hypothesis and conclude that there is no significant difference in the No.of.Quantities sold between Z powder 100gm, Z Talc 50gm, Z Talc 25gm.

5.6.3 AIM:

Under the Kruskal-Wallis test, to find the difference between the Discount amounts given to different shops.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the Discount amounts given to

Jeya Murugan Stores, Murugan Stores and Samuvel Super Market.

$H_0: \mu_1 = \mu_2 = \mu_3$

Alternative Hypothesis:

There is significant difference between the Discount amounts given to

Jeya Murugan Stores, Murugan Stores and Samuvel Super Market.

$H_0: \mu_1 \neq \mu_2 \neq \mu_3$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Shops	Statistic	df	Sig.	Statistic	df	Sig.
Discount	Jeya Murugan Stores	.247	105	.000	.610	105	.000
	Murugan Stores	.219	80	.000	.795	80	.000
	Samuvel Super Market	.257	64	.000	.617	64	.000
a. Lilliefors Significance Correction							

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Discount is the same across categories of Shops.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

Independent-Samples Kruskal-Wallis Test Summary	
Total N	249
Test Statistic	17.248[a]
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	.000
a. The test statistic is adjusted for ties.	

Pairwise Comparisons of Shops					
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
JEYA MURUGAN STORE.-SAMUVEL SUPERMARKET	-36.956	11.419	-3.236	.001	.004
JEYA MURUGAN STORE.-MURUGAN STORE.	-39.429	10.686	-3.690	.000	.001
SAMUVEL SUPERMARKET-MURUGAN STORE.	2.473	12.076	.205	.838	1.000
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

INTERPRETATION:

By normality test, it is observed that p value is 0.001, which is less than probability value p=0.05. From this, it is found that non-normal and hence we are using non parametric test. ie, Kruskal Wallis test.

By Kruskal-Wallis test, it is observed that the significant value is 0.001,which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is significant difference between the Discount amounts given to Jeya Murugan Stores, Murugan Stores and Samuvel Super Market.

By using Pair-wise comparison results, we see that the adjusted significant value for Jeya Murugan Stores and Samuvel Super Market is 0.004, which is less than the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between the Discount amounts given to Jeya Murugan Stores and Samuvel Super Market.

Similarly, we see that the adjusted significant value for Jeya Murugan Stores and Murugan Stores is 0.001, which is less than the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between the Discount amounts given to Jeya Murugan Stores and Murugan Stores.

Similarly, we see that the adjusted significant value for Murugan Stores and Samuvel Super Market is 1, which is greater than the p value=0.05 and hence there is no sufficeint

evidence to reject the null hypothesis and so we conclude that there is no significant difference between the Discount amounts given to Murugan Stores and Samuvel Super Market

5.6.4 AIM:

Under the Kruskal-Wallis test, to find the difference between the Tax amounts charged to different shops.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the Tax Amounts charged to Jeya Murugan Stores, MS Mani Stores and Siva Sakthi Stores.

$H_0: \mu_1 = \mu_2 = \mu_3$

Alternative Hypothesis:

There is significant difference between the Tax Amounts charged to Jeya Murugan Stores, MS Mani Stores and Siva Sakthi Stores.

$H_0: \mu_1 \neq \mu_2 \neq \mu_3$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Shops	Statistic	df	Sig.	Statistic	df	Sig.
Tax	Jeya Murugan Stores	.258	105	.000	.681	105	.000
	MS Mani Stores	.225	68	.000	.689	68	.000
	Siva Sakthi Stores	.167	100	.000	.842	100	.000

a. Lilliefors Significance Correction

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Tax is the same across categories of Shops.	Independent-Samples Kruskal-Wallis Test	.028	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .050.

Independent-Samples Kruskal-Wallis Test Summary	
Total N	273
Test Statistic	7.178[a]
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	.028
a. The test statistic is adjusted for ties.	

Pairwise Comparisons of Shops					
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
SIVA SAKTHI STORE-JEYA MURUGAN STORE.	7.572	11.031	.686	.492	1.000
SIVA SAKTHI STORE-M.S.MANI STORE/AUT	32.490	12.409	2.618	.009	.027
JEYA MURUGAN STORE.-M.S.MANI STORE/AUT	-24.919	12.289	-2.028	.043	.128
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

INTERPRETATION:

By normality test, it is observed that p value is 0.001, which is less than probability value p=0.05. From this, it is found that non-normal and hence we are using non parametric test. ie, Kruskal Wallis test.

By Kruskal-Wallis test, it is observed that the significant value is 0.028,which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is significant difference between the Tax Amounts charged to Jeya Murugan Stores, MS Mani Stores and Siva Sakthi Stores.

By using Pair-wise comparison results, we see that the adjusted significant value for Jeya Murugan Stores and Siva Sakthi Stores is 1, which is greater than the p value=0.05 and hence there is no sufficeint evidence to reject the null hypothesis and so we conclude that there is no significant difference between the Tax Amounts charged to Jeya Murugan Stores and Siva Sakthi Stores.

Similarly, we see that the adjusted significant value for Siva Sakthi Stores and MS Mani Stores is 0.027, which is less than the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between the Tax Amounts charged to MS Mani Stores and Siva Sakthi Stores.

Similarly, we see that the adjusted significant value for Jeya Murugan Stores and MS Mani Stores is 0.128, which is greater than the p value=0.05 and hence there is no sufficeint evidence to reject the null hypothesis and so we conclude that there is no significant difference between the Tax Amounts charged to Jeya Murugan Stores and MS Mani Stores.

5.6.5 AIM:

Under the Kruskal-Wallis test, to find the difference between the Net amounts generated from different beats.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no significant difference between the Net amounts generated from the beats Eral, Kurumbur and Mukkani.

$H_0: \mu_1 = \mu_2 = \mu_3$

Alternative Hypothesis:

There is significant difference between the Net amounts generated from the beats Eral, Kurumbur and Mukkani.

$H_0: \mu_1 \neq \mu_2 \neq \mu_3$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Beats	Statistic	Df	Sig.	Statistic	df	Sig.
Net_Amt	Eral	.270	265	.000	.634	265	.000

	Kurumbur	.312	26	.000	.603	26	.000
	Mukkani	.251	121	.000	.651	121	.000
a. Lilliefors Significance Correction							

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Net_Amt is the same across categories of Beats.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

Independent-Samples Kruskal-Wallis Test Summary	
Total N	412
Test Statistic	19.421[a]
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	.000
a. The test statistic is adjusted for ties.	

Pairwise Comparisons of Beats					
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
MUKKANI-KURUMBUR	41.143	25.739	1.598	.110	.330
MUKKANI-ERAL	57.567	13.064	4.406	.000	.000
KURUMBUR-ERAL	16.424	24.471	.671	.502	1.000
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

INTERPRETATION:

By normality test, it is observed that p value is 0.001, which is less than probability value p=0.05. From this, it is found that non-normal and hence we are using non parametric test. ie, Kruskal Wallis test.

By Kruskal-Wallis test, it is observed that the significant value is 0.001,which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is significant difference between the Net amounts generated from the beats Eral, Kurumbur and Mukkani.

By using Pair-wise comparison results, we see that the adjusted significant value for beats Kurumbur and Mukkani is 0.330, which is greater than the p value=0.05 and hence there is no sufficeint evidence to reject the null hypothesis and so we conclude that there is no significant difference between the Net amounts generated from the beats Kurumbur and Mukkani.

Similarly, we see that the adjusted significant value for beats Mukkani and Eral is 0.001, which is less than the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between the Net amounts generated from the beats Eral and Mukkani.

Similarly, we see that the adjusted significant value for beats Kurumbur and is 1, which is greater than the p value=0.05 and hence there is no sufficeint evidence to reject the null hypothesis and so we conclude that there is no significant difference between the Net amounts generated from the beats Kurumbur and Eral.

5.7 ONE SAMPLE WILCOXON SIGNED RANK TEST

5.7.1 AIM:

Under the One Sample Wilcoxon Signed Rank test, to find out whether the no.of.quantities sold to the shops in a month is 180.

HYPOTHESIS DECLARATION:

Null Hypothesis:

The no.of.quantities sold to the shops in a month is 180.

$H_0: \mu = 180$

Alternative Hypothesis:

The no.of.quantities sold to the shops in a month is not equal to 180.

$H_0: \mu \neq 180$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

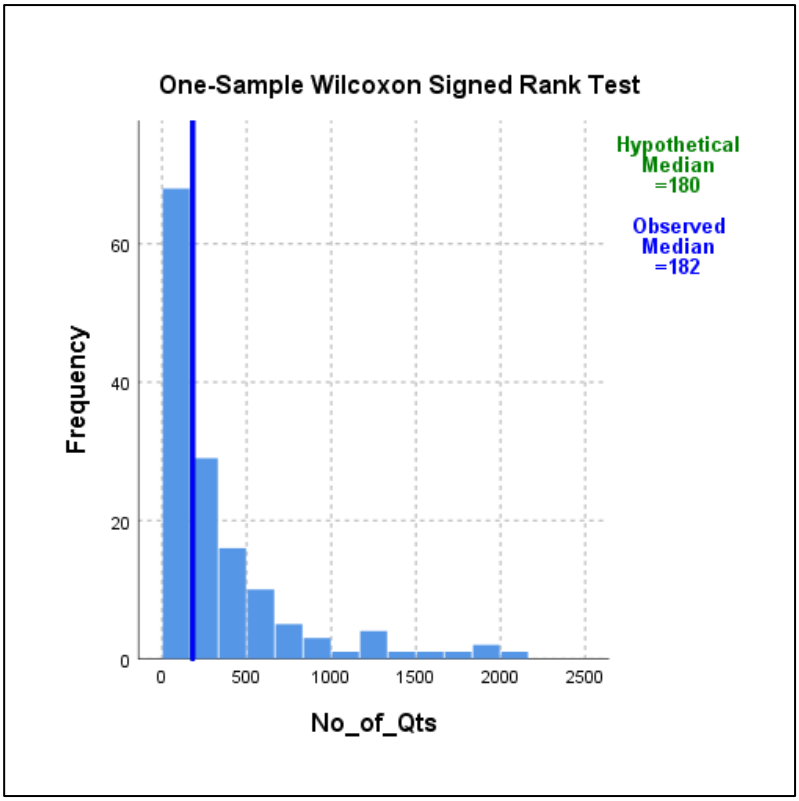
SPSS TEST:

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
No_of_Qts	.215	142	.000	.722	142	.000
a. Lilliefors Significance Correction						

Statistics	
No_of_Qts	
Mean	328.73
Median	**181.50**
Std. Deviation	413.630
Range	2004
Minimum	2
Maximum	2006
Sum	46679

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The median of No_of_Qts equals 180.	One-Sample Wilcoxon Signed Rank Test	.031	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

One-Sample Wilcoxon Signed Rank Test Summary	
Total N	142
Test Statistic	6136.500
Standard Error	491.048
Standardized Test Statistic	2.159
Asymptotic Sig.(2-sided test)	.031



INTERPRETATION:

By Shapiro-Wilk test, it is observed that the significant value is 0.001, which is less than the probability value p=0.05. From this, it is found that it is non-normal and hence we are using non-parametric test i.e., One sample Wilcoxon Signed Rank test.

It is observed that the significant value is 0.031, which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that the no.of.quantities sold to the shops in a month is not equal to 180.

5.8 FRIEDMAN TEST

5.8.1 AIM:

Under Friedman test, to find the difference between Gross Amount, Net Gross amount and Net amount across incense stick products.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no signficant difference between Gross Amount, Net Gross amount and Net amount across incense stick products.

$H_O: \mu_1 = \mu_2 = \mu_3$

Alternative Hypothesis:

There is signficant difference between Gross Amount, Net Gross amount and Net amount across incense stick products.

$H_O: \mu_1 \neq \mu_2 \neq \mu_3$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gross_Amt	.243	169	.000	.747	169	.000
Net_Amount	.228	169	.000	.786	169	.000
Net_Gross_Amt	.228	169	.000	.786	169	.000
a. Lilliefors Significance Correction						

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distributions of Gross_Amt, Net_Gross_Amt and Net_Amount are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

Related-Samples Friedman's Two-Way Analysis of Variance by Ranks Summary	
Total N	169
Test Statistic	186.821
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	.000

Pairwise Comparisons					
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Net_Gross_Amt-Gross_Amt	1.077	.109	9.899	.000	.000
Net_Gross_Amt-Net_Amount	-1.328	.109	-12.211	.000	.000
Gross_Amt-Net_Amount	-.251	.109	-2.312	.021	.062
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

INTERPRETATION:

By normality test, it is observed that p value is 0.001, which is less than probability value p=0.05. From this, it is found that non-normal and hence we are using non parametric test. ie, Friedman test.

By Friedman test, we have it is observed that the significant value is 0.001,which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is significant difference between Gross Amount, Net Gross amount and Net amount across incense stick products.

By using Pair-wise comparison results, we see that the adjusted significant value for Net Gross amount and Gross amount is 0.001, which is less than the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between Gross Amount and Net Gross amount across incense stick products.

Similarly, we see that the adjusted significant value for Net Gross amount and Net amount is 0.001, which is less than the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between Net Amount and Net Gross amount across incense stick products.

Similarly, we see that the adjusted significant value for Gross amount and Net amount is 0.062, which is greater than the p value=0.05 and hence there is no sufficeint evidence to reject the null hypothesis and so we conclude that there is no significant difference between Net Amount and Gross amount across incense stick products.

5.8.2 AIM:

Under Friedman test, to find the difference between Gross Amount, Net Gross amount and Net amount across Samuvel Super Market.

HYPOTHESIS DECLARATION:

Null Hypothesis:

There is no signficant difference between Gross Amount, Net Gross amount and Net amount across the product NO ENTRY MOSQUITO STICKER.

$H_O: \mu_1 = \mu_2 = \mu_3$

Alternative Hypothesis:

There is signficant difference between Gross Amount, Net Gross amount and Net amount across the product NO ENTRY MOSQUITO STICKER.

$H_O: \mu_1 \neq \mu_2 \neq \mu_3$

LEVEL OF SIGNIFICANCE:

The Level of Significance is 5%(0.05)

SPSS TEST:

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gross_Amt	.266	16	.004	.779	16	.001
Net_Gross_Amt	.267	16	.003	.779	16	.001
Net_Amount	.267	16	.003	.779	16	.001
a. Lilliefors Significance Correction						

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distributions of Gross_Amt, Net_Gross_Amt and Net_Amount are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

Related-Samples Friedman's Two-Way Analysis of Variance by Ranks Summary	
Total N	16
Test Statistic	25.677
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	.000

Pairwise Comparisons					
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Net_Gross_Amt-Net_Amount	-1.062	.354	-3.005	.003	.008
Net_Gross_Amt-Gross_Amt	1.750	.354	4.950	.000	.000
Net_Amount-Gross_Amt	.688	.354	1.945	.052	.155
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

INTERPRETATION:

By normality test, it is observed that p value is 0.001, which is less than probability value p=0.05. From this, it is found that non-normal and hence we are using non parametric test. ie, Friedman test.

By Friedman test, we have it is observed that the significant value is 0.001,which is less than the probability value p=0.05. Hence, it is found that there is sufficient evidence to reject the null hypothesis and conclude that there is significant difference between Gross Amount, Net Gross amount and Net amount across the product NO ENTRY MOSQUITO STICKER.

By using Pair-wise comparison results, we see that the adjusted significant value for Net Gross amount and Net amount is 0.008, which is less than the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between Net Amount and Net Gross amount across the product NO ENTRY MOSQUITO STICKER

Similarly, we see that the adjusted significant value for Net Gross amount and Gross amount is 0.001, which is less than the p value=0.05 and hence there is sufficeint evidence to reject the null hypothesis and so we conclude that there is significant difference between Gross Amount and Net Gross amount across the product NO ENTRY MOSQUITO STICKER.

Similarly, we see that the adjusted significant value for Gross amount and Net amount is 0.155, which is greater than the p value=0.05 and hence there is no sufficeint evidence to reject the null hypothesis and so we conclude that there is no significant difference between Net Amount and Gross amount across the product NO ENTRY MOSQUITO STICKER.

.

CHAPTER 6

SUMMMARY AND CONCULUSIONS

The project titled "A Statistical Study on the Sales Record of a Wholesale Distribution Company at Thoothukudi District, Tamilnadu" has generated the following findings.

For this project, secondary data is used and the data is about the sales record of past six months and this consists of about 1630 records which includes 97 items, 26 shops and 6 different beats.

FINDINGS:

- The company has received more no.of.orders(390) during November,2023 and less no.of.orders(201) during September,2023.
- The company has sold more no.of.quantities(9580) during November,2023 and lessno.of.quantities(6538) during February,2024. There is slight increase in no.of.quantities sold in first three months and then there is a sudden decrease in the fourth month and then the trend remains approximately same.
- The Net Amount is higher than the Gross Amount and Net Gross Amount in all the six-month period which implies that the impact of tax amount is greater than the impact of discount. Also, November 2023 has the highest value of amounts and September 2023 has the lowest value of amounts compared to the other months.
- 27% of total discount amount which has been given in November,2023 and this is highest value. Similarly, 25% of total tax amount which has been charged in November,2023 and this is highest value. The discount percentage is lower than tax percentage in Sep 2023, Oct 2023 and Feb 2024. During Nov 2023 and Dec 2023, the discount percentage is higher than the tax percentage. In Jan 2024, the discount percentage and tax percentage are equal.
- The more no.of. orders (117) has been received from R.S. K Maligai & Shopping and less no.of. orders (10) has been received from Buhari Store. The more no.of. items (52) has been preferred by R.R. Store and less no.of. items (9) has been preferred by Buhari Store. And, more no.of. quantities (6350) has been sold to the shop Siva Sakthi Store and less no.of. quantities (66) has been sold to the shop Buhari Store. Buhari Store is the only shop which performs low in these records.

- The high no.of. Free quantities (20) given to ANSARI STORE and high no.of. Free quantities given in the item named “ENO ORANGE RS10” (20) and “HIM BABY SAMBOO 60ML RS65” (20). Also, totally there are 61 free quantities which are given to different shops by the wholesale distribution.
- There are more no.of. shops (11) in the beat Authoor-North and less no.of. shops (1) in the beats Kurumbur and Palayakayal.
- The net amount generated from the beat Authoor-North is higher and the net amount generated from the beat Palaya Kayal is lower. The best performing beats are Authoor-North and Authoor-South and the least performing beats are Kurumbur and Palaya Kayal.
- The no.of. Quantities sold in the beat Authoor-South is higher and the no.of. Quantities sold in the beat Palaya Kayal is lower.
- The average order value in the beat Eral is higher and the average order value in the beat Palaya Kayal is lower.
- The beat Palaya Kayal is the lower performing beat in these sales records.
- Based on net amount, the top 3 best performing shops are Samuvel Supermarket, Murugan Store and Jeya Murugan Stores and the 3 least performing shops are Raja Flower Shop, Uma Medical and Buhari Store.
- Based on no.of. Quantities sold, the top selling products are Cinthol Soap 35gm, Cycle Rs.10, Upsana Rs.10, Karthika Powder, Cinthol Soap 100gm.
- Based on net amount, the top-selling products are GK Flash 45ml, Cinthol Soap 100gm, Gokul Powder 70gm, Gk Red coil, Cinthol Soap 35gm.
- The median value of Net amount, Quantities sold, Discount Amount, Tax Amount are higher in the month of December when compared to other months.
- There is significant relationship between the no.of. orders received and no.of. quantities sold to different shops.
- There is significant relationship between the no.of. orders received and no.of. items sold to different shops.

- There is significant relationship between the Gross amounts and Net amounts generated by the company in the past six months.
- There is significant relationship between the gross amounts generated by the company and the no.of. quantities sold.
- There is significant relationship between the gross amounts generated by the company and the Discount amounts given by the company.
- There is a significant relationship between the MRP and Wholesale Price per unit and also this fit is a best linear model.
- The Net Amounts generated from Samuvel Super Market is higher than Nesam Super Market.
- The Net Amounts generated from Selva Meera Medicals is higher than Muthu Medical.
- The Net Amounts generated from Murugan Stores is higher than Jeya Murugan Stores.
- There is no significant difference in the No.of. Quantities sold between Amurtanjan White and Amurtanjan Yellow.
- There is no significant difference in the No.of. Quantities sold between HIT Spray Black and HIT Spray Red.
- The Iodex 4gm is sold more no.of. quantities when compared to Iodex 8gm.
- The Net Amounts generated from Godrej Items is higher than Himalaya Items.
- There is no significant difference between the Net Amounts generated in Authoor-North and Authoor-South.
- There is significant difference between the net amount before and after the rate per unit change for the specified products.
- There is no significant difference between the No.of. Quantities sold between Chik Shampoo and Meera Powder.
- There is significant difference between the No.of. Quantities sold between Karthika Powder and Meera Powder.

- There is no significant difference between the No.of. Quantities sold between Karthika Powder and Meera Chik Shampoo.
- There is no significant difference in the No.of.Quantities sold between Z powder 100gm, Z Talc 50gm, Z Talc 25gm.
- There is significant difference between the Discount amounts given to Jeya Murugan Stores and Samuvel Super Market.
- There is significant difference between the Discount amounts given to Jeya Murugan Stores and Murugan Stores.
- There is no significant difference between the Discount amounts given to Murugan Stores and Samuvel Super Market.
- There is no significant difference between the Tax Amounts charged to Jeya Murugan Stores and Siva Sakthi Stores.
- There is significant difference between the Tax Amounts charged to MS Mani Stores and Siva Sakthi Stores.
- There is no significant difference between the Tax Amounts charged to Jeya Murugan Stores and MS Mani Stores.
- There is no significant difference between the Net amounts generated from the beats Kurumbur and Mukkani which shows that both the beats Kurumbur and Mukkani are equal in generating net amounts.
- There is significant difference between the Net amounts generated from the beats Eral and Mukkani.
- There is no significant difference between the Net amounts generated from the beats Kurumbur and Eral which shows that both the beats Kurumbur and Eral are equal in generating net amounts.
- There is significant difference between Gross Amount and Net Gross amount across incense stick products which shows the impact of Discount across these products.

- There is significant difference between Net Amount and Net Gross amount across incense stick products which shows the impact of tax across these products
- There is no significant difference between Net Amount and Gross amount across incense stick products which implies that the impact of discount and tax are equal for these products.
- There is significant difference between Net Amount and Net Gross amount across the product NO ENTRY MOSQUITO STICKER, which shows the impact of Discount across this product.
- There is significant difference between Gross Amount and Net Gross amount across the product NO ENTRY MOSQUITO STICKER, which shows the impact of Tax across this product.
- There is no significant difference between Net Amount and Gross amount across the product NO ENTRY MOSQUITO STICKER, which implies that the impact of discount and tax are equal for this particular

SUGGESTIONS:

- ✓ Strengthen relationships with top-performing shops such as Samuvel Supermarket, Murugan Store, and Jeya Murugan Stores by offering personalized incentives, discounts, or promotional offers to encourage repeat business.
- ✓ Identify areas of improvement for lower-performing shops like Buhari Store and provide targeted support or incentives to increase their sales and loyalty.
- ✓ Prioritize the sale of top-selling products such as Cinthol Soap 35gm, Cycle Rs.10, Upsana Rs.10, Karthika Powder, and Cinthol Soap 100gm. Ensure sufficient stock availability and visibility for these products.
- ✓ Consider adjusting inventory levels or marketing efforts for slower-moving products to minimize holding costs and maximize profitability.
- ✓ Consider adjusting discount percentages or introducing dynamic pricing strategies to optimize revenue while maintaining competitiveness.
- ✓ Allocate resources and focus marketing efforts on high-performing beats like Authoor-North and Authoor-South.
- ✓ Explore opportunities to improve performance in lower-performing beats such as Kurumbur and Palaya Kayal by identifying and addressing potential challenges or barriers to sales.
- ✓ Focus marketing efforts on top-performing shops and beats, such as Samuvel Supermarket and Authoor-North, to maximize returns. Develop personalized marketing campaigns for lower-performing shops to increase their sales.
- ✓ Offer personalized discounts or promotions to high-value customers to encourage repeat purchases.
- ✓ Investigate the sudden decrease in quantities sold in February 2024 and take corrective actions if needed to prevent similar declines in the future.
- ✓ The company should consider revising its discount and tax strategies. This could involve offering more competitive discounts during slower months or adjusting tax rates to attract more customers while still maintaining profitability.

CONCLUSION:

In conclusion, the statistical study conducted on the sales records of the wholesale company has provided invaluable insights into its performance and potential areas for improvement. Through rigorous analysis of sales data, market trends, and operational metrics, key patterns and opportunities have been identified, offering a clear path forward for enhancing sales effectiveness and operational efficiency. The findings of this study serve as a foundation for informed decision-making, enabling the wholesale company to tailor its strategies and investments to maximize profitability and sustainable growth. By leveraging these insights, the company can refine its sales approach, target lucrative market segments, and allocate resources more effectively to drive revenue generation.

Moreover, the study underscores the importance of adaptability in responding to market dynamics and customer preferences. With a deeper understanding of consumer behavior and market trends, the company can remain profitable, adjusting its strategies and offerings to stay ahead of the competition and capitalize on emerging opportunities. This statistical study equips the wholesale company with actionable recommendations to optimize its sales performance, enhance operational efficiency, and position itself for long-term success in a competitive marketplace. By implementing the insights gained from this study, the company can strengthen its market position, foster customer satisfaction, and achieve sustainable growth in the years to come.

BIBLIOGRAPHY

BIBLIOGRAPHY

BOOKS:

1. Gupta. S. C, Kapoor. V. K (published by Sultan Chand and Sons, New Delhi, 11th Edition, 2018). *Fundamentals of Mathematical Statistics*.
2. Gupta. S. C, Kapoor.V. K (Published by Sultan Chand and Sons, New Delhi, 4th Edition 2019). *Fundamentals of Applied Statistics*.
3. Dr. Gupta. S. L and Hitesh Gupta**.** *SPSS 17.0 for RESEARCHERS*.

SOFTWARE:

1. Statistical Packages for Social Sciences
2. Microsoft Excel

JOURNALS:

1. Chen.Y. and Wang.L.(2017). *Customer Segmentation and Wholesale Sales: A Data Mining Perspective.*
2. Gupta. A. and Patel.R.(2018). *Impact of Inventory Management Practices on Wholesale Sales Performance.*
3. Johnson, L**.** and Smith, J. (2019). *Forecasting Wholesale Sales: A Comparative Analysis of Time Series Models.*
4. Kumar. S. and Sharma.P.(2020). *Analyzing Seasonal Sales Patterns in Wholesale Distribution: A Case Study Approach.*
5. Lee.H. and Kim.M.(2021). *Geospatial Analysis of Wholesale Sales Territories: Optimizing Distribution Networks.*

WEBSITES:

1. https://salesorder.com/
2. https://dealhub.io/glossary/sales-analysis/
3. https://www.polymersearch.com/blog/sales-analysis
4. https://supercatsolutions.com/resource-center/how-to-perform-sales-analysis-for-wholesale-distributors#what-is-sales-analysis
5. https://www.researchgate.net/