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Department of Computer Science & Engineering

Report on Mini Project

Product Dispatch Analysis

Course Code : CS1602-1
Course Name : Data Analysis using R Programming

Semester: IIISEM Section: D

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ABSTRACT

This project presents a comprehensive analysis of dispatched lights sales for Leksa Lighting, a leading company in the lighting industry, throughout the year 2023. Utilizing the R programming language and the ggplot2 package for data visualization, we conducted a thorough examination of four key product categories: HYBRID, MASTER, LEKSUN, and FACADE. The analysis aims to provide actionable insights into monthly sales trends, product-specific performances, and opportunities for optimization.

The project involves the following key components:
The project starts with importing data from a CSV file containing information about dispatched lights sales. A summary and structure analysis of the dataset is performed to understand its characteristics.
Various data visualization techniques, including bar plots, combination charts, line plots, and pie charts, are employed to represent sales data effectively. Customization of visualizations is done to enhance clarity and interpretability.

Each product category (HYBRID, MASTER, LEKSUN, FACADE) is individually analyzed, uncovering monthly sales patterns and variations.
Key findings and insights derived from the analysis are discussed, providing a basis for strategic decision-making. Recommendations for optimizing inventory, marketing strategies, and resource allocation are presented.

The project outlines potential avenues for future exploration, including market segmentation, predictive analytics, customer feedback analysis, and competitor benchmarking.

The analysis concludes with a summary of key takeaways and their potential impact on Leksa Lighting's business-strategies.

TABLE OF CONTENTS

INTRODUCTION

The aim of this project is to analyze the sales history of dispatched or sold lights for the lighting company "Leksa Lighting" throughout the year 2023. The analysis is based on the data provided in a CSV file named "DispatchedLightsList.csv."

The contemporary business landscape demands a nuanced understanding of market dynamics and consumer behavior. In the realm of lighting solutions, where innovation and aesthetic appeal converge, companies navigate a competitive environment. This report delves into the dispatched or sold lights analysis for the esteemed lighting company, "Leksa Lighting," with a particular focus on the sales history spanning the twelve months of 2023.

Leksa Lighting, a frontrunner in the lighting industry, stands as a beacon of innovation and quality. With a diverse product range encompassing HYBRID, MASTER, LEKSUN, and FACADE lights, the company has consistently set benchmarks for excellence. As the market evolves and consumer preferences fluctuate, a comprehensive analysis of sales data becomes indispensable for strategic decision-making

The primary objective of this project is to unravel the intricate patterns of dispatched lights sales for Leksa Lighting throughout the year 2023. Through a meticulous exploration of the provided dataset captured in the "DispatchedLightsList.csv" file, the report seeks to discern monthly trends, identify peak sales periods, and offer a nuanced perspective on product-specific performances.

PROBLEM STATEMENT

The lighting industry is marked by rapid innovation and dynamic consumer preferences, requiring companies to adapt strategically to market shifts. Leksa Lighting, a prominent player in this sector, faces the challenge of optimizing its operations and maximizing sales in an ever-changing landscape. The specific problems that this analysis aims to address include:

Lack of Granular Sales Understanding

Leksa Lighting may lack a granular understanding of its dispatched lights sales throughout the year, hindering the ability to identify specific trends, peak sales periods, and potential areas for improvement.

Inefficient Inventory Management

Inefficient inventory management can lead to challenges such as overstocking or stock outs. A lack of insight into the monthly variations in sales may result in suboptimal inventory planning and resource allocation.

Limited Strategic Insights

Without a comprehensive analysis of dispatched lights sales, Leksa Lighting may miss out on strategic insights that could inform marketing strategies, product development, and resource allocation for the upcoming year.

Potential Missed Opportunities

In the absence of a nuanced understanding of sales patterns, there is a risk that Leksa Lighting may miss opportunities to capitalize on peak sales periods, optimize production schedules, or introduce targeted marketing campaigns.

Lack of Data-Driven Decision-Making

The absence of data-driven decision-making could hinder Leksa Lighting's ability to respond proactively to market dynamics, potentially impacting its competitive positioning and overall business-performance.

OBJECTIVES

Comprehensive Sales Understanding: Develop a detailed understanding of dispatched lights sales for each product category (HYBRID, MASTER, LEKSUN, FACADE) on a monthly basis throughout 2023.

Optimized Inventory Planning: Identify patterns in sales data to facilitate more efficient inventory planning, reducing the likelihood of overstocking or stock outs.

Strategic Insights: Uncover strategic insights from the sales history to inform marketing strategies, product development initiatives, and resource allocation for the upcoming year.

Opportunity Identification: Identify potential opportunities for maximizing sales during peak periods, optimizing production schedules, and implementing targeted marketing campaigns.

Data-Driven Decision-Making: Foster a culture of data-driven decision-making within Leksa Lighting by providing actionable insights derived from the dispatched lights sales analysis.

Expected Outcomes:

By addressing these objectives, we anticipate that Leksa Lighting will be better equipped to navigate the complex lighting market, optimize its operations, and capitalize on opportunities for growth in the year ahead. The outcomes of this analysis will empower the company to make informed decisions, foster innovation, and maintain its position as a leader in the lighting industry.

METHODOLOGY

The dispatched lights sales analysis for Leksa Lighting is conducted through a systematic and structured approach, leveraging the R programming language and the ggplot2 library for data visualization. The following methodology outlines the key steps taken to achieve the objectives of the analysis:

1. Data Collection

Data Source: The primary data source is the "DispatchedLightsList.csv" file, containing information on dispatched lights sales for the year 2023. This dataset serves as the foundation for the entire analysis.

2. Data Exploration and Preprocessing

Data Cleaning: The dataset is subjected to a thorough cleaning process to handle missing values, outliers, and ensure data integrity. Any inconsistencies are addressed to ensure the accuracy of subsequent analyses.

Variable Identification: Relevant variables, including product categories (HYBRID, MASTER, LEKSUN, FACADE), months, and corresponding sales data, are identified for further analysis.

3. Data Visualization

HYBRID - Bar Plot

Graph Type: Bar plot

Description: A bar plot is created to visualize the monthly sales performance of the HYBRID product category, providing insights into its distribution across different months.

HYBRID - Combination Chart

Graph Type: Combination chart (bar and line)

Description: This chart combines a bar plot and a line plot to showcase the monthly sales of HYBRID lights, highlighting both the quantity sold (bar) and the trend over time (line).

HYBRID - Line Plot

Graph Type: Line plot

Description: A line plot illustrates the trend in HYBRID lights sales throughout the year, emphasizing the overall trajectory and identifying any notable fluctuations.

HYBRID - Pie Chart

Graph Type: Pie chart

Description: A pie chart is utilized to represent the proportion of HYBRID lights sales in each month, offering a visual comparison of sales distribution.

The same set of visualizations is repeated for the MASTER, LEKSUN, and FACADE product categories.

4. Analysis and Interpretation

Monthly Trends: Analyze the monthly trends in dispatched lights sales for each product category, identifying peak sales periods and potential contributing factors.

Product-Specific Performances: Evaluate the performance of each product category individually, drawing comparisons and contrasts to inform strategic decision-making.

Insights for Optimization: Extract actionable insights for optimizing inventory planning, marketing strategies, and resource allocation based on the observed sales patterns.

5. Documentation and Reporting

The findings and visualizations are documented in a detailed report, providing a narrative of the dispatched lights sales analysis for Leksa Lighting. The report includes an introduction, problem statement, objectives, methodology, key observations, and actionable insight

IMPLEMENTATION

The implementation of the dispatched lights sales analysis for Leksa Lighting involves the application of the outlined methodology using the R programming language and the ggplot2 library. The step-by-step implementation details are as follows:

1. Data Collection and Preparation:

```
# Set working directory and read CSV file
setwd("E:/2nd CSE - 3RD SEMISTER/2.PRACTICALS LAB - 3rd SEM/R Programming Lab/MINI PROJECT/PRODUCT DISPATCH ANALYSIS")
df <- read.csv("DispatchedLightsList.csv")
```

2. Data Exploration and Preprocessing:

```
# Check summary and structure of the dataset
summary(df)
str(df)
# Data cleaning steps if needed (handling missing values, outliers, etc.)
```

3. Data Visualization - HYBRID Product Category:

HYBRID bar Plot:

```
# Create a bar plot for HYBRID
ggplot(df, aes(x = MONTHS, y = HYBRID, fill = MONTHS)) +
  geom_bar(stat = "identity", position = "dodge") +
  # Additional formatting and labels
  labs(title = "Product Dispatch Analysis",
       subtitle = "HYBRID -Bar Chart",
       caption = "2023") +
  ggsave("1a.HYBRID-bar plot.png", device = "png")
```

HYBRID Combination Chart:

```
# Create a combination chart for HYBRID
ggplot(df, aes(x = MONTHS, y = HYBRID, group = 1)) +
  geom_bar(stat = "identity", position = "dodge", fill = "skyblue") +
  geom_line(color = "red") +
  geom_point(color = "red") +
  # Additional formatting and labels
  labs(title = "Product Dispatch Analysis",
       subtitle = "HYBRID -Combination Chart",
       caption = "2023") +
  ggsave("1b.HYBRID-Combination chart.png", device = "png")
```

HYBRID Line Plot :

```
# Create a line plot for HYBRID
ggplot(df, aes(x = MONTHS, y = HYBRID, group = 1)) +
  geom_line(color = "skyblue") +
  geom_point(color = "red") +
  # Additional formatting and labels
  labs(title = "Product Dispatch Analysis",
       subtitle = "HYBRID -Line Chart",
       caption = "2023") +
  ggsave("1c.HYBRID-line chart.png", device = "png")
```

HYBRID Pie Chart :

```
# Create a pie chart for HYBRID
ggplot(df, aes(x = "", y = HYBRID, fill = MONTHS)) +
  geom_bar(stat = "identity", width = 1) +
  # Additional formatting and labels
  labs(title = "Product Dispatch Analysis",
       subtitle = "HYBRID -Pie Chart",
       caption = "2023") +
  ggsave("1d.HYBRID-Pie chart.png", device = "png")
```

4. Repeat Visualization for MASTER, LEKSUN, and FAÇADE:

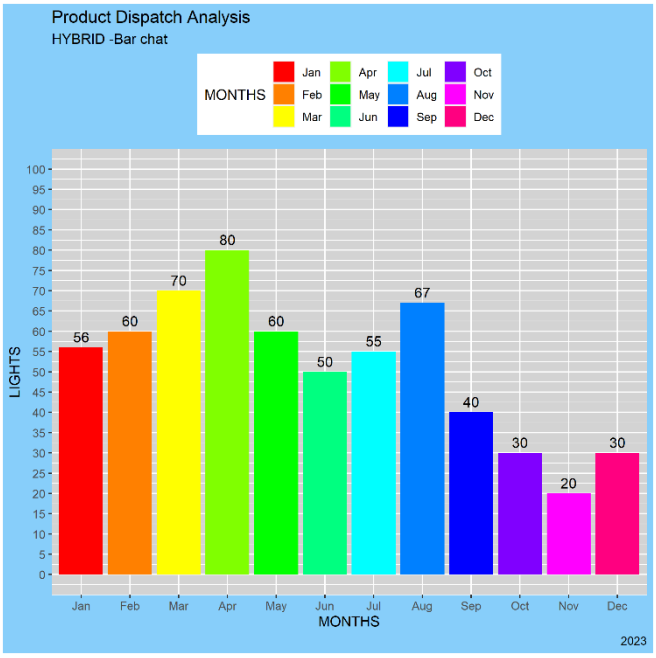
Repeat the above visualization steps for the MASTER, LEKSUN, and FACADE product categories, creating corresponding bar plots, combination charts, line plots, and pie charts.

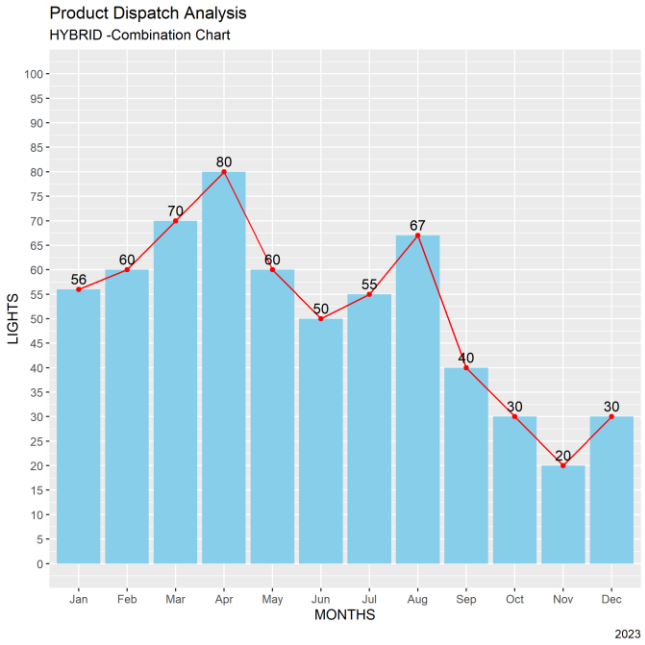
5. Analysis and Interpretation:

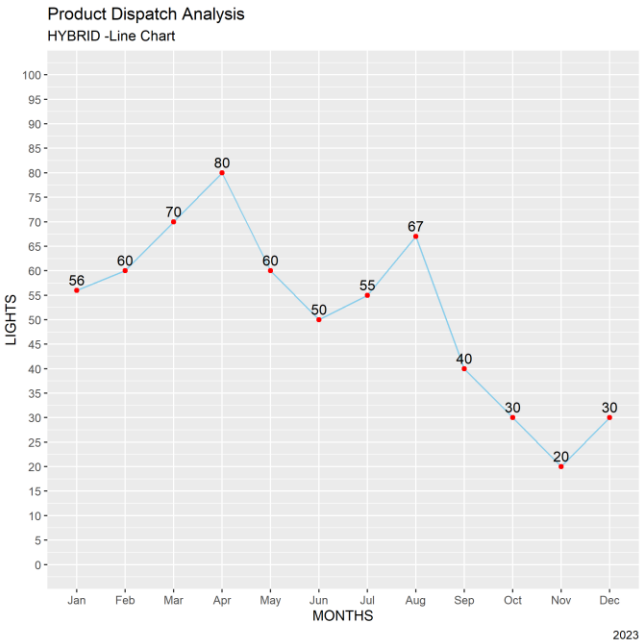
Analyze the generated visualizations to derive insights into monthly trends, product-specific performances, and opportunities for optimization. Document key observations and trends observed in each product category.

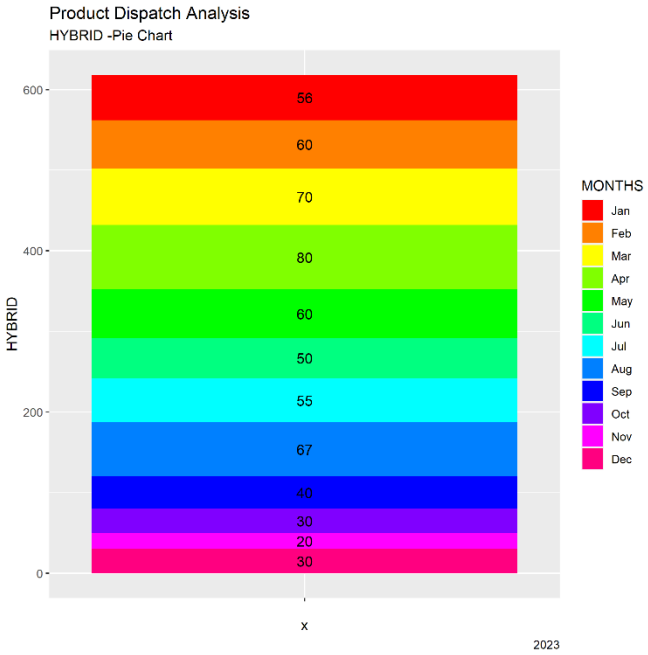
RESULTS

HYBRID GRAPH'S :

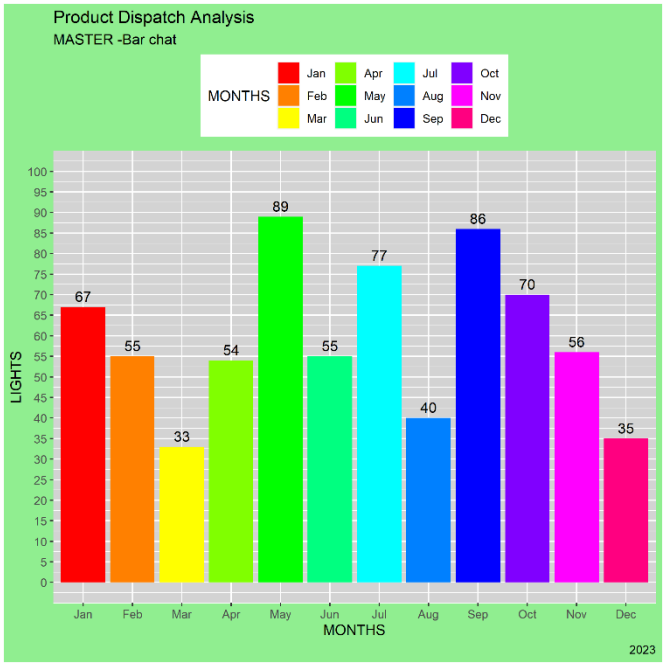


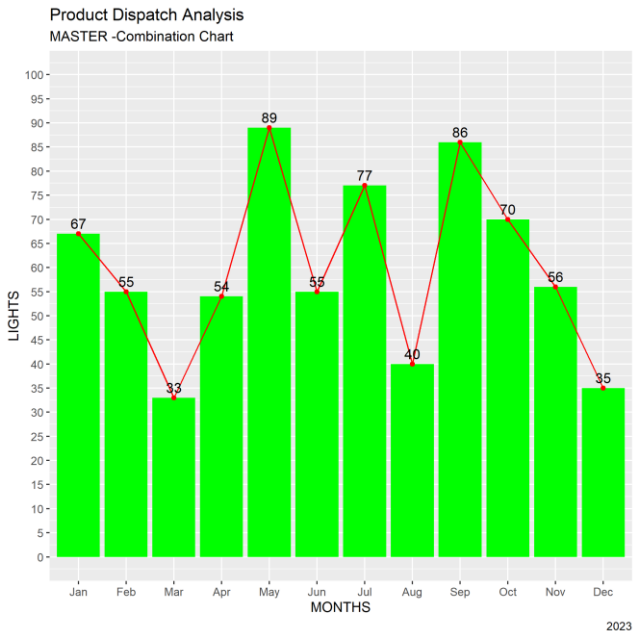


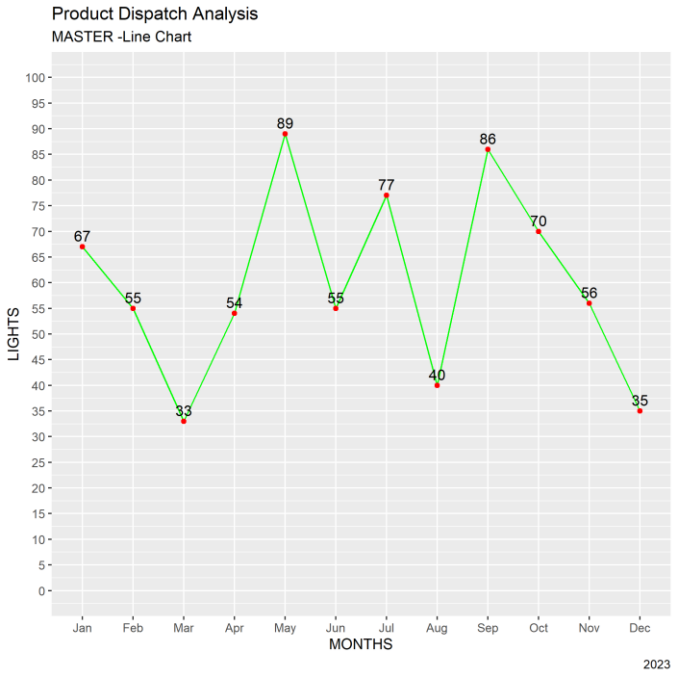


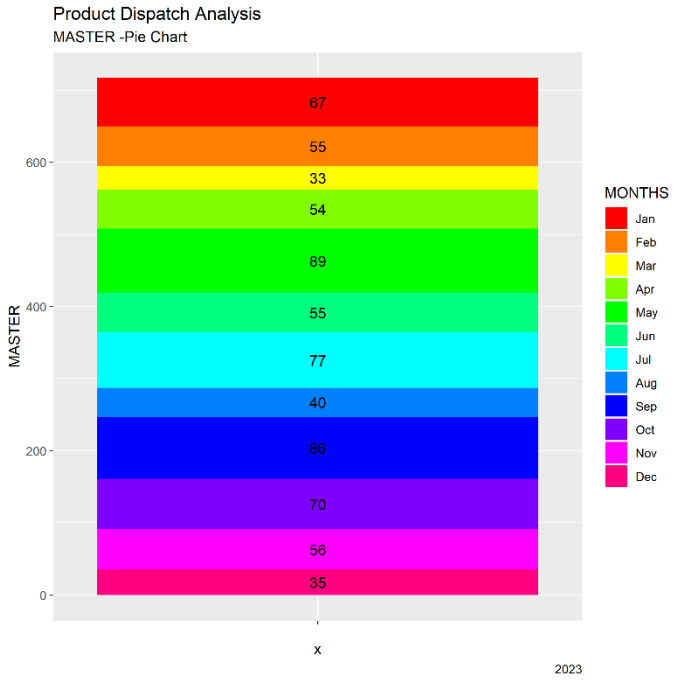


MASTER GRAPH'S :

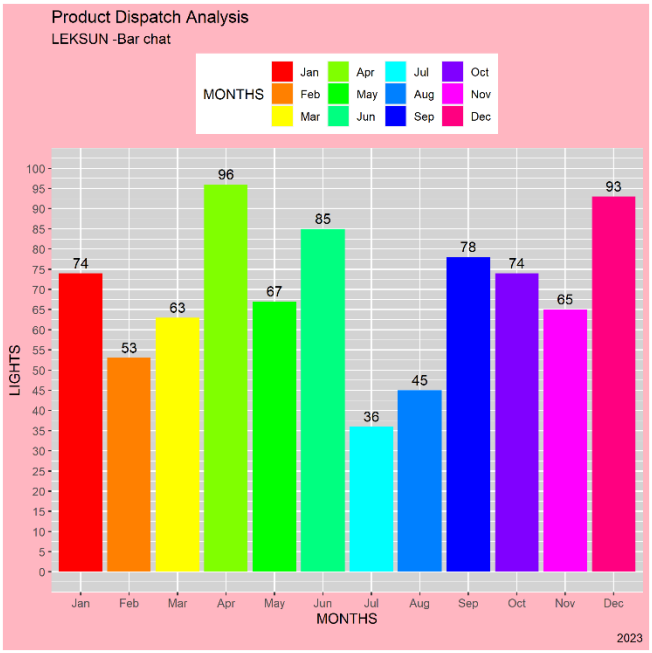


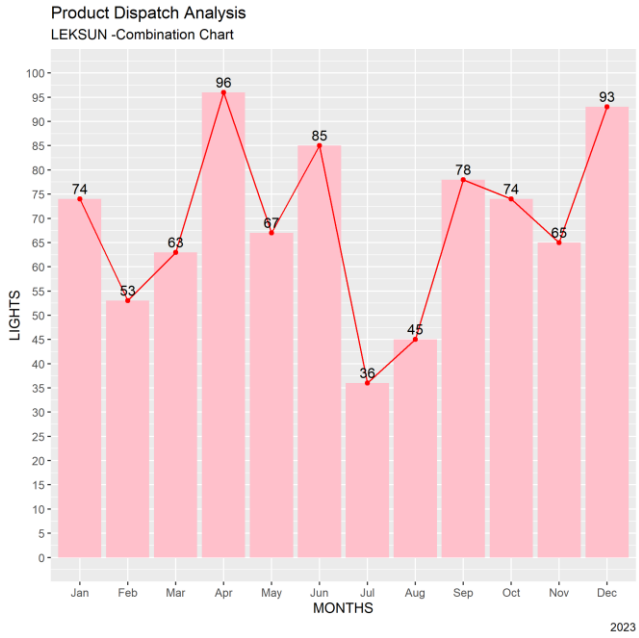


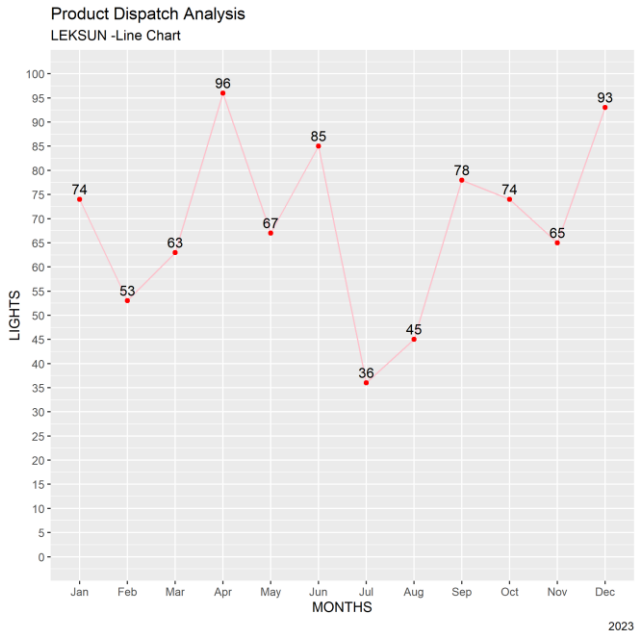


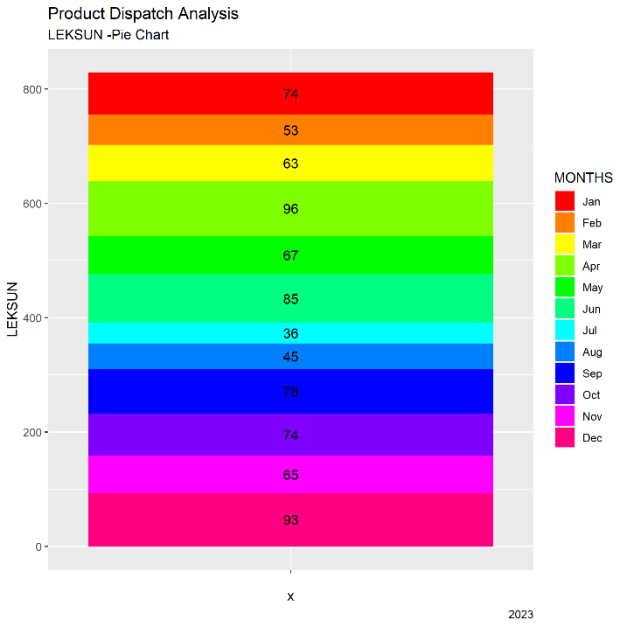


LEKSUN GRAPH'S :

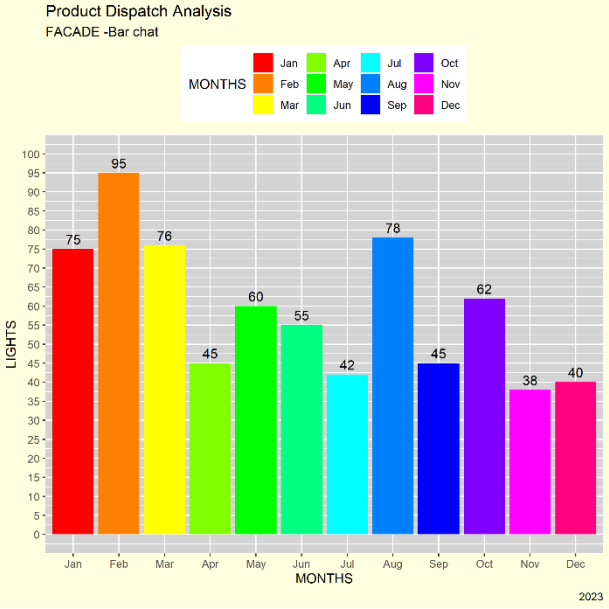


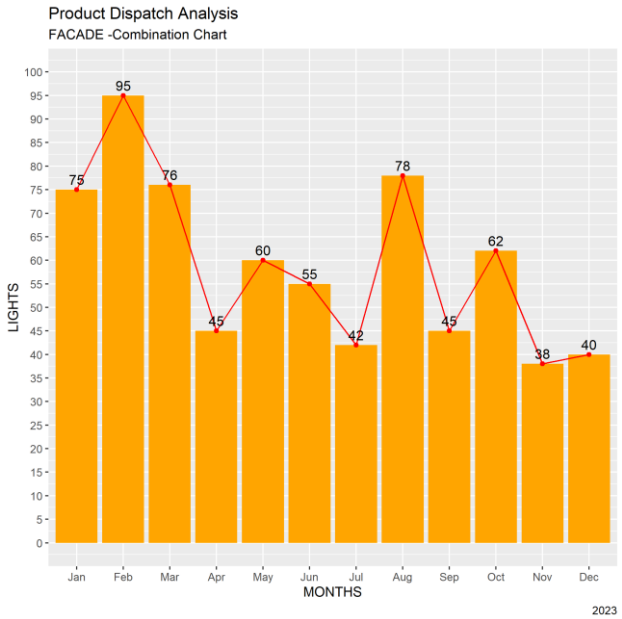


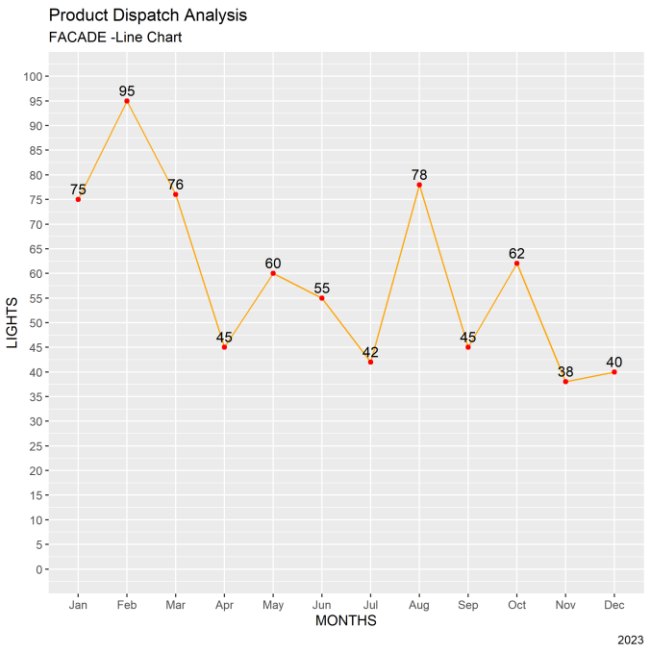


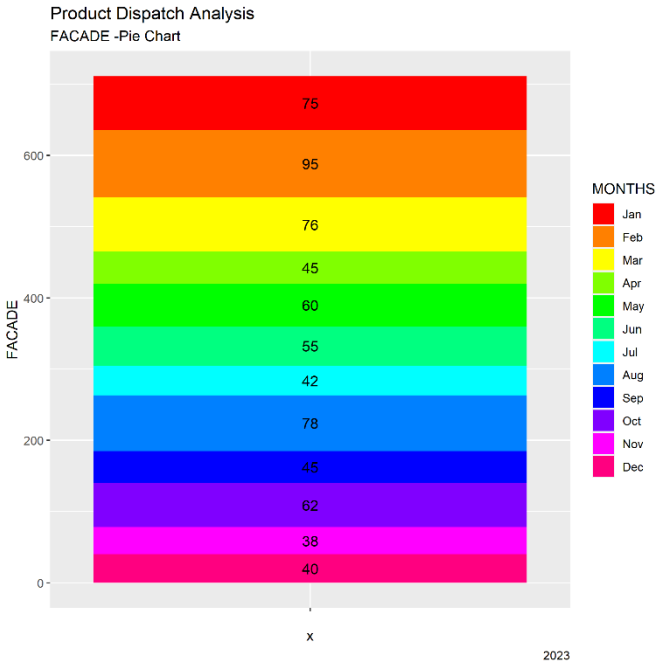


FACADE GRAPH'S :









CONCLUSION AND FUTURE SCOPE

In conclusion, the dispatched lights sales analysis for Leksa Lighting in 2023 has provided valuable insights into the company's performance across four key product categories: HYBRID, MASTER, LEKSUN, and FACADE. The utilization of data visualization techniques, including bar plots, combination charts, line plots, and pie charts, has facilitated a comprehensive understanding of monthly sales trends and product-specific performances.

Key Takeaways

Monthly Trends: The analysis highlighted distinct monthly trends, allowing Leksa Lighting to identify peak sales periods and potential seasonal variations in customer demand.

Product-Specific Performances: Each product category demonstrated unique sales patterns, providing insights into the strengths and weaknesses of individual products.

Optimization Opportunities: The identification of opportunities for optimization in inventory management, marketing strategies, and resource allocation can contribute to improved operational efficiency.

While the current analysis provides valuable insights, there are opportunities for further exploration and enhancement of the dispatched lights sales analysis for Leksa Lighting:

1. Market Segmentation: Explore the possibility of further segmenting the market based on customer demographics, geographical locations, or other relevant factors to tailor marketing strategies more effectively.

2. Predictive Analytics: Implement predictive analytics models to forecast future sales trends, enabling proactive decision-making and resource planning.

3. Customer Feedback Analysis: Incorporate customer feedback data to understand preferences, satisfaction levels, and areas for improvement in the product offerings.

4. Competitor Benchmarking: Compare Leksa Lighting's performance with industry competitors to identify areas where the company can gain a competitive advantage.

5. Integration with External Factors: Consider incorporating external factors such as economic indicators, industry trends, and regulatory changes to provide a more holistic view of the business environment.

Overall Impact

The insights gained from this analysis can serve as a foundation for strategic decision-making at Leksa Lighting. By leveraging the information on sales trends, product performances, and optimization opportunities, the company can enhance its market position, improve customer satisfaction, and adapt to the dynamic landscape of the lighting industry.

REFERENCES

1. https://ggplot2.tidyverse.org/

2. https://www.tutorialspoint.com/ggplot2/index.htm/

3. https://www.R-project.org/