

# REPORT ON ADVERTISING AND SALES ANALYSIS

## INTRODUCTION

This report discusses the analysis of the Advertisement Sales dataset, which consists of data on advertising expenditures across various media types and their corresponding impact on product sales. The dataset includes 200 unique observations, with each entry providing details on spending on TV, Radio, and Newspaper advertising, along with sales figures. The goal of this analysis is to explore the relationships between advertising spend and sales performance, aiding in data-driven decision-making for marketing strategies.

## PREPROCESSING AND CLEANING OF DATA

The initial stage of data analysis involved preprocessing and cleaning the dataset to ensure accurate and valid results. The dataset comprised four main columns: TV, Radio, Newspaper (all representing advertising spent in thousands of dollars), and Sales (representing sales in thousands of units). Since the dataset was clean and complete, no significant missing data issues were encountered. Therefore, all 200 entries were retained for further exploration.

## EXPLORATORY DATA ANALYSIS

Following data cleaning, exploratory data analysis (EDA) was conducted to gain insights into the dataset's structure and characteristics. Key summary statistics were computed to understand the distribution of advertising expenditures and sales:

- **TV Advertising:** The spending ranged from \$0.7k to \$296.4k, with an average spend of \$147.03k.
- **Radio Advertising:** The spending ranged from \$0k to \$49.6k, with an average spend of \$23.29k.
- **Newspaper Advertising:** The spending ranged from \$0.3k to \$114k, with an average spend of \$30.55k.
- **Sales:** The sales figures ranged from 1.6k to 27k units, with an average of 14.04k units.

Visualisations were created to explore the relationship between advertising expenditures and sales, particularly focusing on the top 10 sales observations:

- **TV Advertising vs. Sales (Top 10):** A bar plot was generated to compare the TV advertising budget against the top 10 sales figures. This plot highlights the influence of high TV advertising budgets on sales performance, showing a

direct relationship where higher TV spending often correlates with higher sales.

- **Radio Advertising vs. Sales (Top 10):** Another bar plot was produced to analyse the relationship between Radio advertising budgets and the top 10 sales figures. The results demonstrated a more varied impact, with some high sales figures associated with moderate Radio spending.
- **Newspaper Advertising vs. Sales (Top 10):** A similar bar plot was created for Newspaper advertising budgets versus the top 10 sales figures. The data suggested that while Newspaper advertising can contribute to sales, its impact might be less pronounced compared to TV and Radio.

## KEY INSIGHTS

1. **TV Advertising:** TV advertising appears to have a substantial spread in terms of expenditure, with some companies investing significantly more in this medium. The high variability suggests that businesses consider TV a major channel for reaching their target audiences.
2. **Radio Advertising:** Although the spending on radio advertising is generally lower than TV, there is still a considerable range, indicating its importance for specific markets or demographics.
3. **Newspaper Advertising:** Newspaper advertising exhibits a smaller range of spending, suggesting that this medium may be used more conservatively or targeted at specific customer segments.
4. **Sales Distribution:** Sales figures show a wide range, with some observations reporting very high sales, potentially correlating with higher advertising expenditures.

## CONCLUSION

This analysis of the Advertisement Sales dataset provides a foundational understanding of the relationships between different advertising channels and sales outcomes. The insights indicate that businesses are diversifying their advertising spend across TV, Radio, and Newspapers, with varying degrees of investment in each. TV appears to be the most heavily invested medium, likely due to its broad reach and impact.

Further analysis could involve deeper exploration into how these advertising strategies impact specific segments of the market or how external factors (like economic conditions) might influence the effectiveness of these advertising channels. This dataset serves as a valuable resource for businesses looking to optimise their advertising budgets and maximise their return on investment.