DATA VISUALISATION

PROJECT PHASE III

FINAL REPORT

Team Number	: 12
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Introduction

In the complex world of finance, it's crucial to understand how different industries are doing. That's why our visualisation focuses on examining stocks from various categories. By closely studying how these industries rise and fall, we aim to find valuable information to help investors understand the stock market better. Through careful analysis of how companies perform in their specific industries, our visualisation becomes a useful tool for spotting trends, finding opportunities, and making smart investment choices.

Phase I : Overview

Phase 1 represented the beginning of our project aimed at developing a user-friendly visualisation tool for understanding company finances in the stock market. We initiated this phase by selecting a stock market dataset known for its relevance and demand, allowing us to delve into company spending and profitability.

Our target audience, including investors, analysts, and business leaders, was identified for insights into company finances. The objective was to simplify complex financial data into easily understandable visualisations, highlighting aspects such as resource allocation, spending breakdowns, and overall profitability. During this phase we gathered the data.

Phase II : Overview

In phase - 2 we showed the expenditure and profit analysis for 3 categories each containing 4 companies each.

The goal of phase-2 was to visualise the correlation between the profits generated by certain categories of companies and their fund allocations in various domains.
Keeping the aim in mind, we are using the following rows of data from the report for the visualisation:

1. Net Profit/(Loss) For the Period
2. Consumption of Raw Materials
3. Purchase of Traded Goods
4. Employees Cost
5. Other Expenses

The expenditure is extrapolated from the rows “Consumption of Raw Materials”, “Purchase of Traded Goods”, “Employees Cost” and “Other Expenses”.
The columns from the report being used are the columns representing the years 2018-2022 corresponding to the above-mentioned rows.

In the visualisation there were 3 tiers:

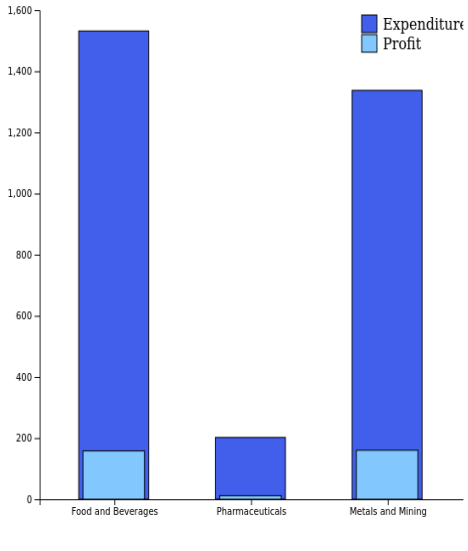
TIER-1:
Overlapping bar chart
Displays the average profit and average expenditure for the years 2018 -2022 for each category of companies in one plot

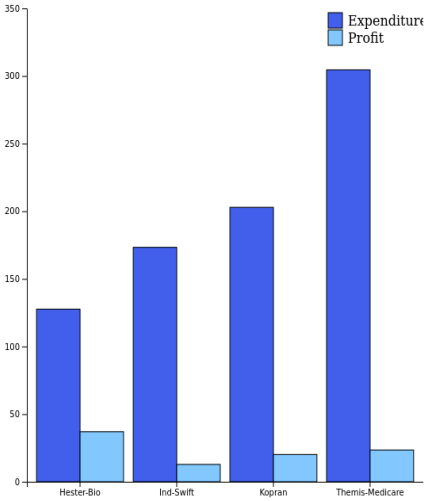
TIER-2:
Grouped bar chart
Displays the average profit and average expenditure (for the years 2018 - 2022) for all the companies under a specific category in one plot per category. This grouping facilitates an inspection of the relation between the profits generated and funds allocation.

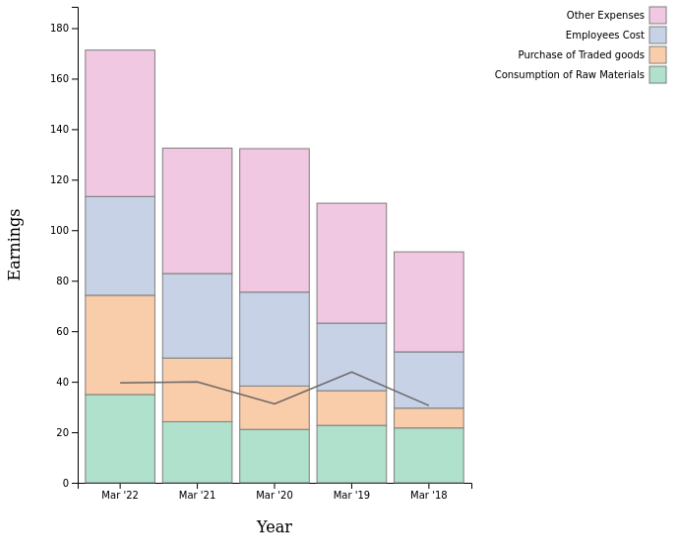
TIER-3:

Stack bar chart

Displays the profit and the domains of expenditure per year per company using a combination of a stacked bar chart for the domains of expenditure and a line plot for the profits.



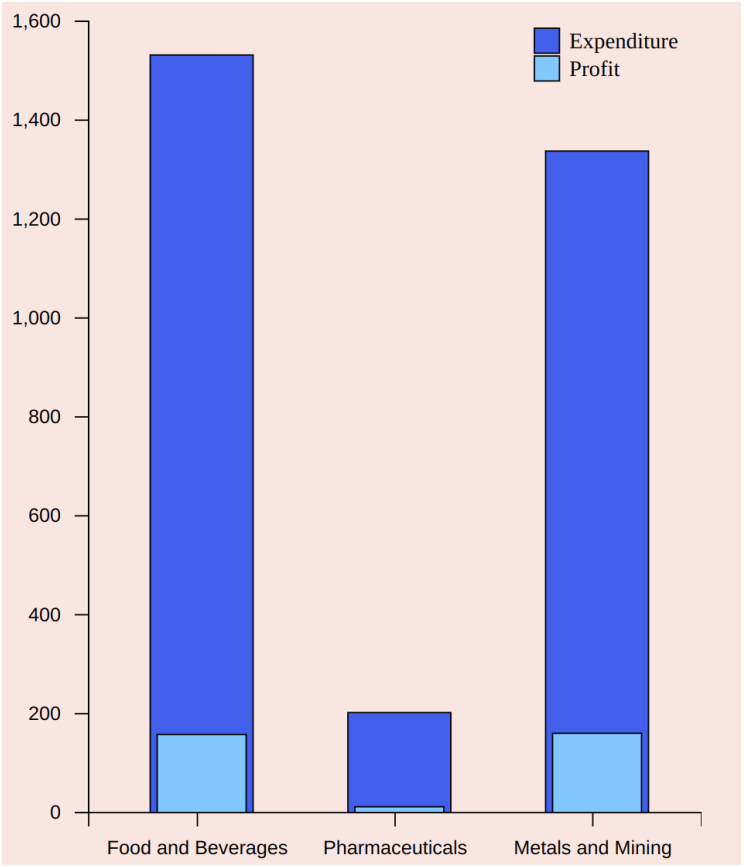




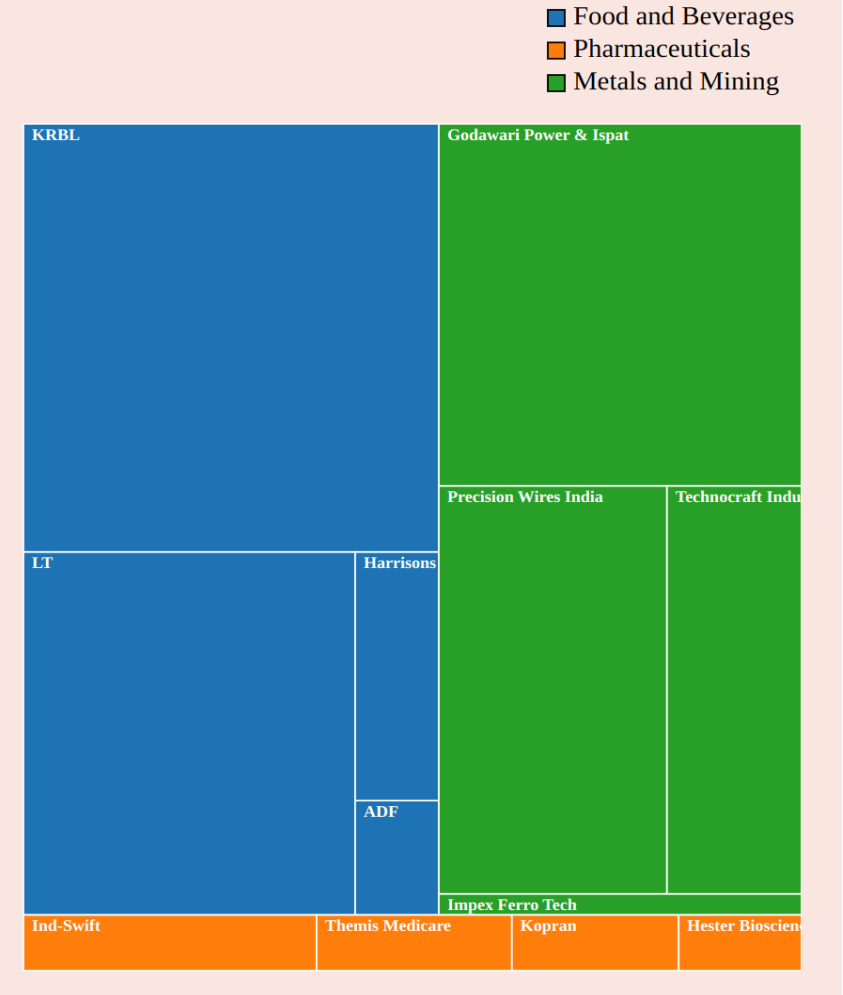
Tools Used : D3.js, HTML and CSS

Visualisation Design in Phase III

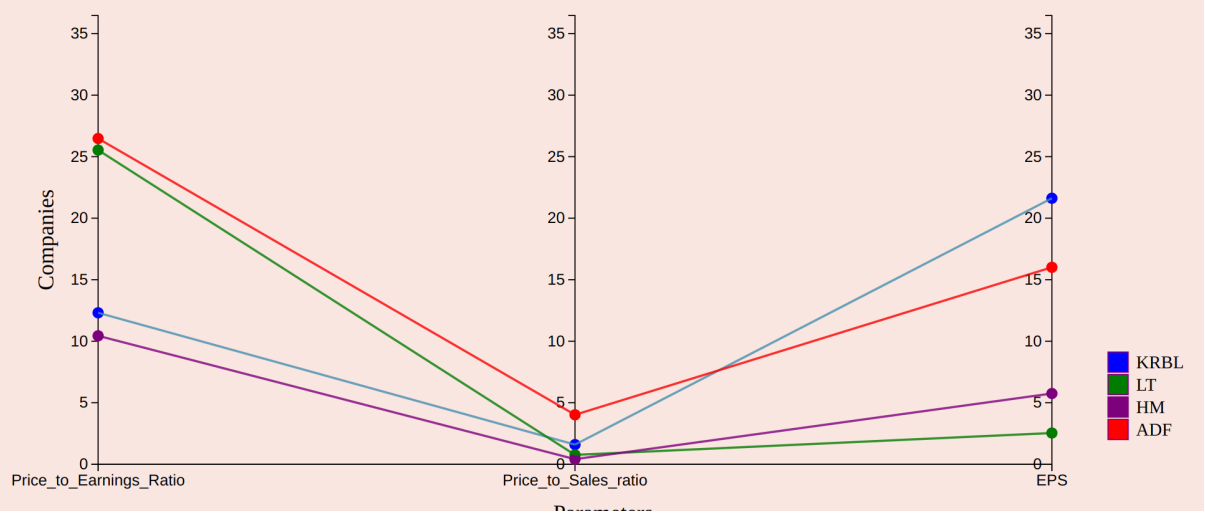
1. **Grouped Bar Chart**:
    - *Visual Encoding:* Bar lengths represent average expenditure and profit for each category.
    - *Navigation:* Users can navigate to the parallel coordinates plot for a category by clicking on that specific category.
    - *Interaction:* On hovering over the expenditure bar, the average expenditure is displayed. Similarly, on hovering over the profit bar, the average profit is shown
    - *Animation:* Transition animation is applied to the bars, causing them to smoothly move upwards to their final positions.
    - *Colours:* Two different shades of blue are used to differentiate between profit and expenditure.
    - *Purpose:* This visualisation is utilised to compare financial performance trends between different categories of companies.



2. **Treemap**:
    - *Visual Encoding:* Color-coded rectangles represent companies by category, sized by average expenditure.
    - *Navigation:* Users can navigate to the pie chart, line plot and heatmap of a specific company by clicking on that company.
    - *Interaction:* On hovering over a cell, the company name, average expenditure, and average profit are displayed, providing users with detailed information about each company.
    - *Animation:* No animations are applied to the treemap.
    - *Colours:* The Food and Beverages category is represented by blue, Pharmaceuticals by orange, and Metals and Mining by green.
    - *Purpose:* This visualisation offers a visual representation of expenditure distribution across companies, facilitating comparative analysis. The colour-coded rectangles and sizing based on average expenditure allow for easy differentiation and comparison between categories and individual companies.

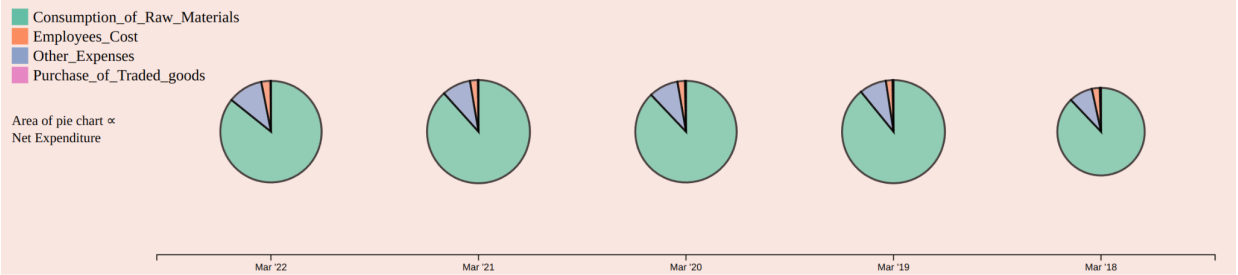


3. **Parallel Plots**:
    - *Visual Encoding:* Lines represent financial ratios (P/E ratio, P/S ratio, EPS) for each company within a category.
    - *Navigation:* Users can observe the parallel plots to compare financial health and market valuation across companies within each category.
    - *Interaction:* No interaction is applied to the parallel plots.
    - *Animation* : No animation is there for this plot
    - *Colours:* Blue, green, purple, and red lines are used for the companies, providing differentiation and aiding in visual comparison.
    - *Purpose:* This visualisation allows for a concise comparison of financial health and market valuation across companies within each category. By representing financial ratios for each company averaged over 5 years, users can evaluate investment opportunities and assess performance, aiding in investment decision-making and performance evaluation

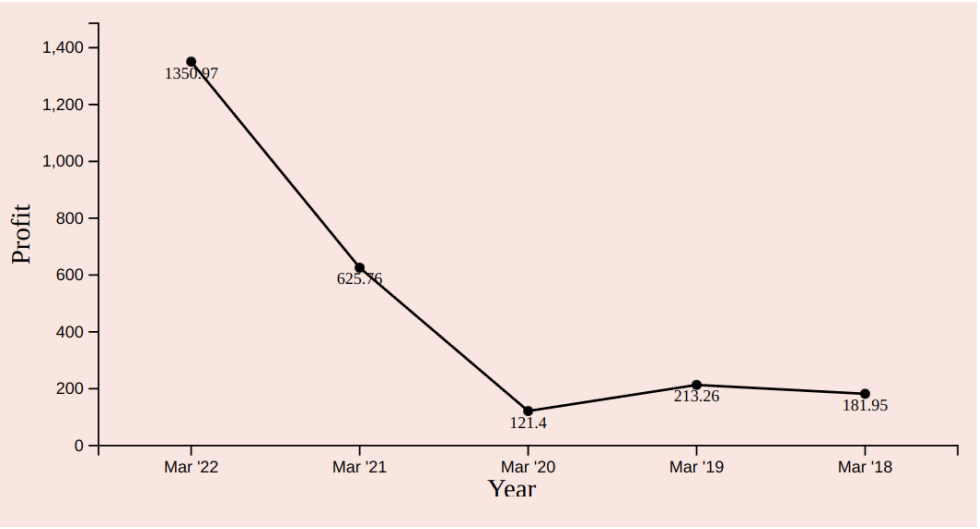


4. **Pie Chart**:
    - *Visual Encoding*: Slices of the pie represent expenditure domains for each company, disaggregated by year.
    - *Interaction*: On hover, the value of that arc and its category gets displayed.
    - *Navigation*: Users can observe the pie chart to navigate through different expenditure domains and visually compare their distributions.

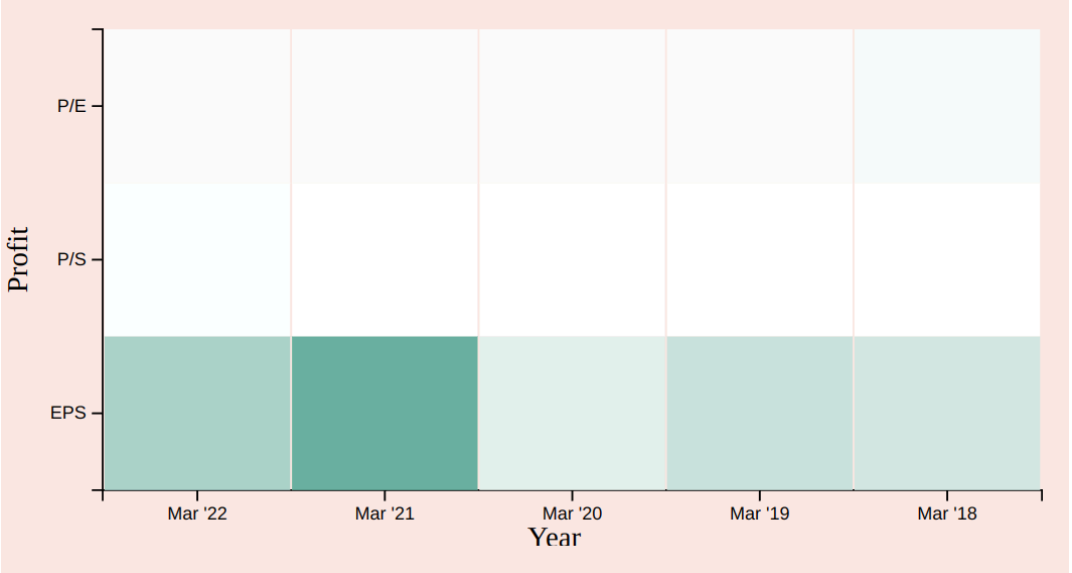
- *Animation*: No animation applied.
- *Colours*: Consumption of Raw Materials represented in green, Employees Cost in orange, Other Expenses in blue, and Purchase of Traded goods in pink.
- *Purpose*: Illustrates the distribution of expenditure across different domains, enabling tracking of expenditure trends and informing budget allocation strategies.



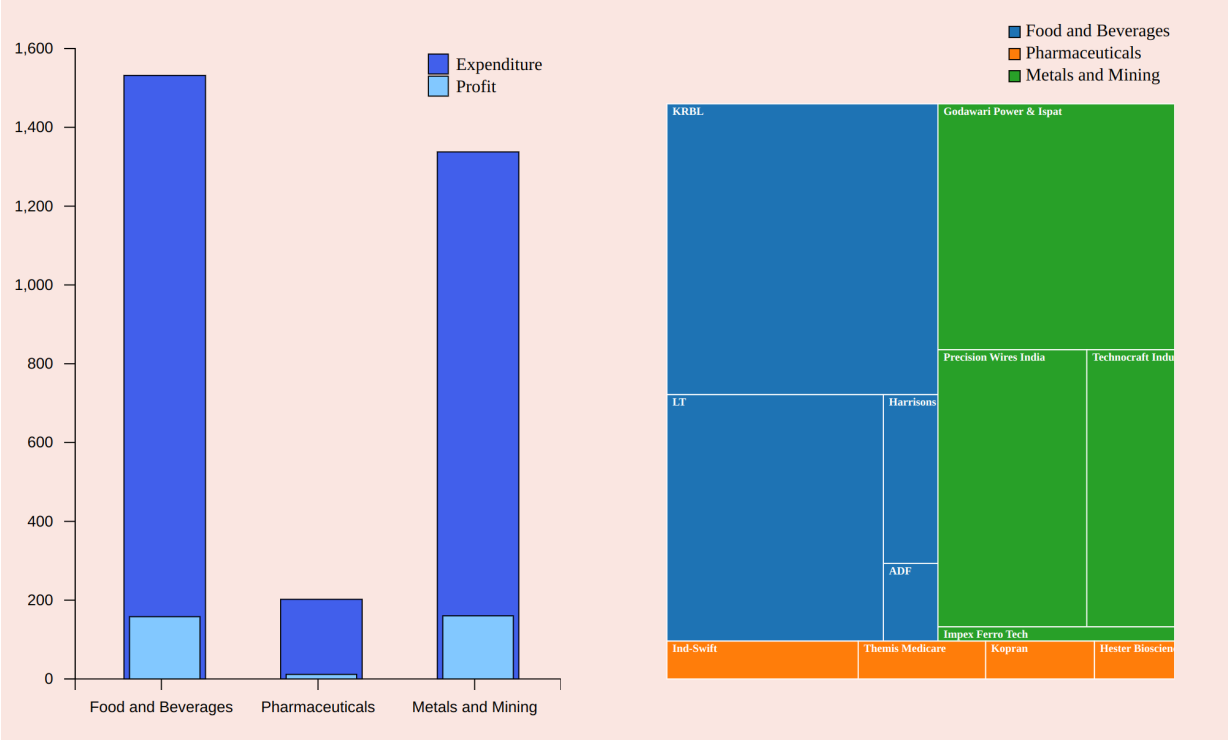
5. **Line Plot**:
    - *Visual Encoding* : Lines represent year-on-year growth for each company.
    - *Purpose* : Offers a longitudinal view of performance trends over time, aiding assessment of companies' vitality, competitiveness, and sustainability.
    - *Navigation* : Users can observe the line plot to track the year-on-year growth of each company.
    - *Interaction* : No interaction is applied to the line plot.
    - *Animation* : No animation is applied.
    - *Colour* : No specific colour scheme is used
    - *Purpose* : Offers a longitudinal view of performance trends over time, aiding assessment of companies' vitality, competitiveness, and sustainability



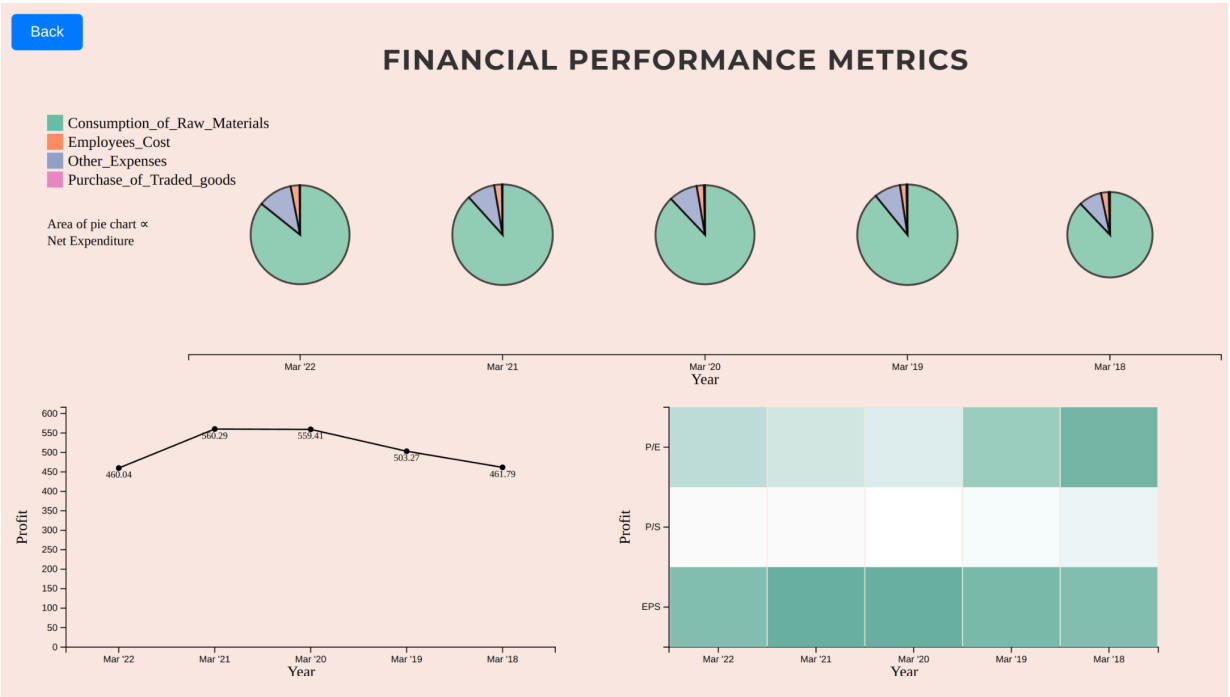
6. **Heat Map**:
    - Visual Encoding: Colour saturation represents the magnitude of P/E ratio, P/S ratio, and EPS for each company.
    - Navigation: Users can observe the heatmap to analyse the valuation metrics for each company.
    - Interaction: On hovering over a cell, the year, category, and value are shown.
    - Animation: No animation is applied.
    - Colours: Colours range from white to green to represent varying levels of the valuation metrics.
    - Purpose: Aids in identifying undervalued or overvalued stocks and enhances understanding of companies' valuation dynamics and market positioning.

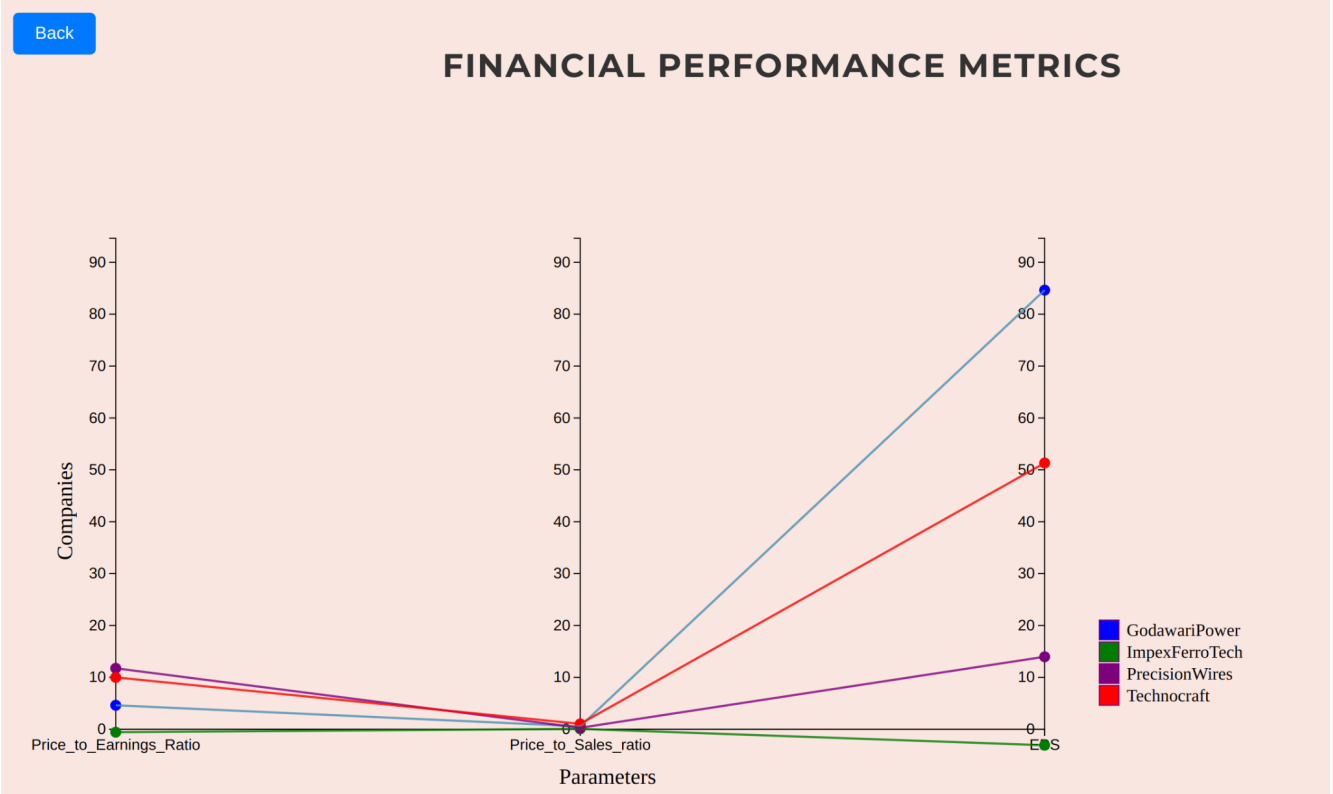


First page :



Other pages :





Purpose Of Visualisation

1. **Comparative Analysis**: Visualisation allows for easy comparison of financial performance metrics across different companies and sectors. This is essential for identifying trends, strengths, and weaknesses, aiding in strategic decision-making and resource allocation.

2. **Correlation Analysis**: Visualising the correlation between profit and expenditure helps identify patterns and relationships that drive financial success. Understanding these correlations can inform budget allocation strategies, optimise resource utilisation, and improve overall profitability.

3. **Trend Identification**: Visualisation enables the identification of trends in year-on-year growth rates for each company. Recognizing growth patterns over time is crucial for assessing company vitality, competitiveness, and long-term sustainability, guiding strategic planning and investment decisions.

4. **Ratio Analysis**: Visualisation of valuation ratios like P/E and P/S ratios and EPS over time provides insights into market sentiment and investment potential. Analysing these ratios helps assess company valuation, attractiveness to investors, and potential risks, facilitating informed investment decisions and capital allocation strategies.

5. **Sector Comparison**: Visualising financial performance metrics across different sectors allows for benchmarking and identifying sector-specific trends and opportunities. Comparative analysis aids in understanding sector dynamics, competitive positioning, and market trends, informing industry-specific strategies and investment decisions.

Users

- **CFO/Financial Managers**:
    - Task: Budget Allocation
    - Reason: CFOs and financial managers need visualisation to optimise budget allocation across different domains and departments within the company. Visualisation enables them to identify areas of overspending or underinvestment, align budget priorities with strategic objectives, and ensure efficient resource utilisation, ultimately maximising profitability and financial performance.

- **Financial Analysts**:
    - Task: Profit Prediction based on Budget Allocation
    - Reason: Financial analysts rely on visualisation to predict profitability based on budget allocation decisions. Visualisation helps them analyse historical spending patterns, identify correlations between budget allocation and profitability metrics, and develop predictive models to forecast future profitability. By visualising budget allocation and profit data, analysts can provide valuable insights to management for informed decision-making and strategic planning.

- **Entrepreneurs**:
    - Task: Make Early Financial Decisions
    - Reason: Entrepreneurs need visualisation to make early financial decisions that can have a significant impact on the success of their ventures. Visualisation allows entrepreneurs to quickly assess the financial health of their companies, identify potential areas for cost-saving or investment, and make informed decisions to optimise resource allocation and drive business growth. By visualising key financial metrics and trends, entrepreneurs can proactively manage financial risks and capitalise on emerging opportunities.

- **Executives and Management:**
    - Task: Strategic Planning and Resource Allocation
    - Reason: Executives and management teams require visualisation to conduct strategic planning and allocate resources effectively. Visualisation enables them to analyse financial performance metrics, sector trends, and competitive landscapes, identify growth opportunities, and align business strategies with organisational goals. By visualising key data, executives can make informed decisions to drive business growth, optimise performance, and maximise shareholder value.

- **Financial Analysts and Investors**:
    - Task: Investment Analysis and Portfolio Management
    - Reason: Financial analysts and investors use visualisation to analyse company financials, assess investment opportunities, and manage investment portfolios. Visualisation helps them identify undervalued stocks, track market trends, and evaluate the financial health and growth potential of companies. By visualising key financial metrics and ratios, analysts and investors can make informed investment decisions, mitigate risks, and achieve their investment objectives.

Data Description

The dataset utilised for visualisation comprises the annual financial reports of companies spanning the years 2018 to 2022. This dataset encompasses three categories of companies. The annual financial reports, provided in CSV format, pertain to the following companies within their respective categories:

Food and Beverages

- ADF Foods
- Harrisons Malayalam
- LT Foods
- KRBL

Pharmaceuticals

- Hester Biosciences
- Ind-Swift
- Kopran
- Themis Medicare

Metals and Mining

- Godawari Power
- Impex Ferro Tech
- Precision Wires
- Techno craft

The following rows of data from the annual financial reports of the companies have been selected for visualisation:

1. Net Profit/(Loss) For the Period
2. Consumption of Raw Materials
3. Purchase of Traded Goods
4. Employees Cost
5. Other Expenses
6. Basic EPS
7. Revenue operations per share
8. Price/Net Operating Revenue

Total expenditure is derived from the cumulative values of "Consumption of Raw Materials," "Purchase of Traded Goods," "Employees Cost," and "Other Expenses" rows. The data spans the years 2018 to 2022, represented by corresponding columns in the financial reports.

Limitations of Visualisation

1. **Complexity**: Some visualisations, such as parallel plots and heat maps, may be complex for users without a strong background in finance or data analysis to interpret. This complexity could lead to misinterpretation of the data or difficulty in deriving actionable insights.
2. **Data Overload**: The abundance of visualisations and the inclusion of multiple metrics may overwhelm users with too much information. This can make it challenging for users to focus on key insights or trends, leading to information overload and potentially diluting the effectiveness of the analysis.
3. **Lack of Context**: Visualisations may not provide sufficient context or explanation for users to fully understand the significance of the findings. Without proper context, users may misinterpret the data or draw incorrect conclusions, limiting the utility of the visualisations for decision-making purposes.
4. **Static Nature**: While the visualisations offer a snapshot of financial performance at a particular point in time, they may not capture the dynamic nature of markets and businesses. Changes in market conditions, economic factors, or company strategies over time may not be adequately reflected in static visualisations.
5. **Data Quality**: The accuracy and completeness of the underlying data can significantly impact the reliability of the visualisations. Inaccurate or incomplete data may lead to misleading conclusions or erroneous insights, undermining the credibility of the analysis.

Contributions

CONTRIBUTIONS

Isha Borade (2022101024) : Pie Chart
Line Plot
Heat map

Narahari Harshitha (2022101053): Parallel Coordinates Plot
Linking
Report
Presentation

Gadha.R.Warrier (2022101107): Grouped bar chart
Tree Map
Linking
Report
Presentation

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