## Introduction

Sonic Healthcare Limited (SHL) is a leading medical service provider headquartered in Sydney, Australia. The company specializes in laboratory medicine/pathology, radiology, and primary healthcare services. Founded in 1987, SHL operates across multiple countries, including Australia, New Zealand, the United States, the United Kingdom, Germany, Switzerland, Belgium, and Ireland.

As a publicly listed company on the Australian Securities Exchange (ASX), Sonic Healthcare is traded under the stock code SHL.

This report analyses SHL's key market data for 2024 using various data visualization techniques. By comparing and evaluating different visualization methods, the report aims to present a clear and structured analysis of the data and market trends. The insights derived from these visualizations will help potential investors gain a quick yet comprehensive understanding of SHL, supporting informed decision-making.

## Solution approach

1. **Data collection.**

All data used in this study is sourced from DatAnalysis Premium. The stock information was retrieved using the stock code SHL, and the 2024 full-year price history was downloaded. Additionally, key financial metrics, including PE ratio and dividend information, were obtained from the Key Data and Dividend History sections.
To ensure 100% accuracy, the following measures were taken:
Raw data is protected on the first sheet of the Excel file to prevent accidental modifications. The second sheet contains the processed dataset used for analysis. Any potential errors can be identified by comparing both sheets.

**Key Calculations:**
Dividend Calculation: Dividend = Final Dividend + Interim Dividend
Yield Calculation: Yield = Dividend/ Close Price
Yield represents the dividend return relative to the stock price, indicating the income an investor earns from dividends as a percentage of the stock price.
PE Value Calculation: PE Value = Previous Close / PE
Daily EPS Calculation: EPS = Close Price / PE Value

2. **Exploratory Data Analysis**

**Data Types and Characteristics**
The dataset includes both quantitative and categorical data types:
Quantitative Interval-Scale Data: Stock prices (Open, High, Low, Close), Date column (used for time series analysis)
Quantitative Ratio-Scale Data: Volume, Market Capitalization, Earnings Per Share (EPS), Dividend Yield, These variables have absolute zero values and support ratio comparisons.

Categorical Nominal Data: ASX Code, Company Name, These are labels without an inherent order.

**Data Cleaning and Formatting**

To enable proper visualization and analysis, the following modifications were made:
The Date column was converted to the date data type and sorted in ascending order.
Monetary amount columns were formatted as currency, keeping two decimal places.
The yield column was formatted as a percentage, retaining three decimal places.
Volume and Shares on Issue were formatted as integer numbers.

**Initial Data Inspection**

Using Jupyter Notebook, an initial data exploration was performed:
Data types were verified to ensure correctness.
No missing values were detected in the dataset.
A preliminary trend analysis of Close Price was conducted.

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
df = pd.read_excel("D:\desktop\dataforanalysis.xlsx", engine="openpyxl")
print(df.head(5))
```

```
  ASX Code            Company Name       Date   Open    High    Low  Close  \
0      SHL  Sonic Healthcare Limited  02/01/2024  32.20  32.285  31.99  32.21
1      SHL  Sonic Healthcare Limited  03/01/2024  32.12  32.220  31.88  31.89
2      SHL  Sonic Healthcare Limited  04/01/2024  31.50  31.780  31.35  31.51
3      SHL  Sonic Healthcare Limited  05/01/2024  31.45  31.790  31.35  31.69
4      SHL  Sonic Healthcare Limited  08/01/2024  31.36  31.660  31.30  31.45

    Volume  Market Capitalisation($m)  Shares on Issue  Earning Pre share  \
0   359741                  15357.51        476793310          32.073832
1   633488                  15204.94        476793310          31.755184
2  1198596                  15023.76        476793310          31.376791
3   553252                  15109.58        476793310          31.556030
4   733536                  14995.15        476793310          31.317045

      Yield        PE  Dividend
0  0.032909  1.004245      1.06
1  0.033239       NaN       NaN
2  0.033648       NaN       NaN
3  0.033449       NaN       NaN
4  0.033784       NaN       NaN
```

```
print(df.info())
print(df.isnull().sum())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 254 entries, 0 to 253
Data columns (total 14 columns):
 #   Column                      Non-Null Count  Dtype
---  ------                      --------------  -----
 0   ASX Code                    254 non-null    object
 1   Company Name                254 non-null    object
 2   Date                        254 non-null    object
 3   Open                        254 non-null    float64
 4   High                        254 non-null    float64
 5   Low                         254 non-null    float64
 6   Close                       254 non-null    float64
 7   Volume                      254 non-null    int64
 8   Market Capitalisation($m)   254 non-null    float64
 9   Shares on Issue             254 non-null    int64
 10  Earning Pre share           254 non-null    float64
 11  Yield                       254 non-null    float64
 12  PE                          1 non-null      float64
 13  Dividend                    1 non-null      float64
dtypes: float64(9), int64(2), object(3)
memory usage: 27.9+ KB
None
ASX Code                      0
Company Name                  0
Date                          0
Open                          0
High                          0
Low                           0
Close                         0
Volume                        0
Market Capitalisation($m)     0
Shares on Issue               0
Earning Pre share             0
Yield                         0
PE                          253
Dividend                    253
dtype: int64
```

```
import matplotlib.pyplot as plt

plt.figure(figsize=(10,5))
plt.plot(df['Date'], df['Close'], label="Close Price", color='b')
plt.xlabel("Date")
plt.ylabel("Close Price")
plt.legend()
plt.grid()
plt.show()
```

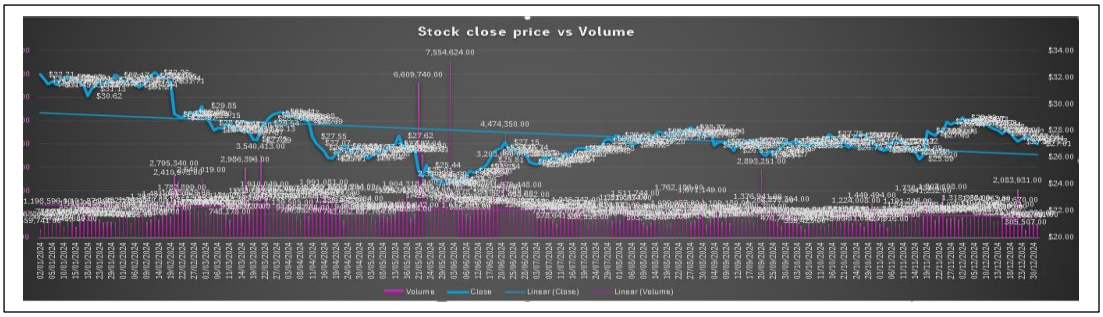

**Preliminary Data Insights**

Stock Price Trend Analysis
Initial Trend: At the beginning of 2024, the Close Price remained volatile at high levels.

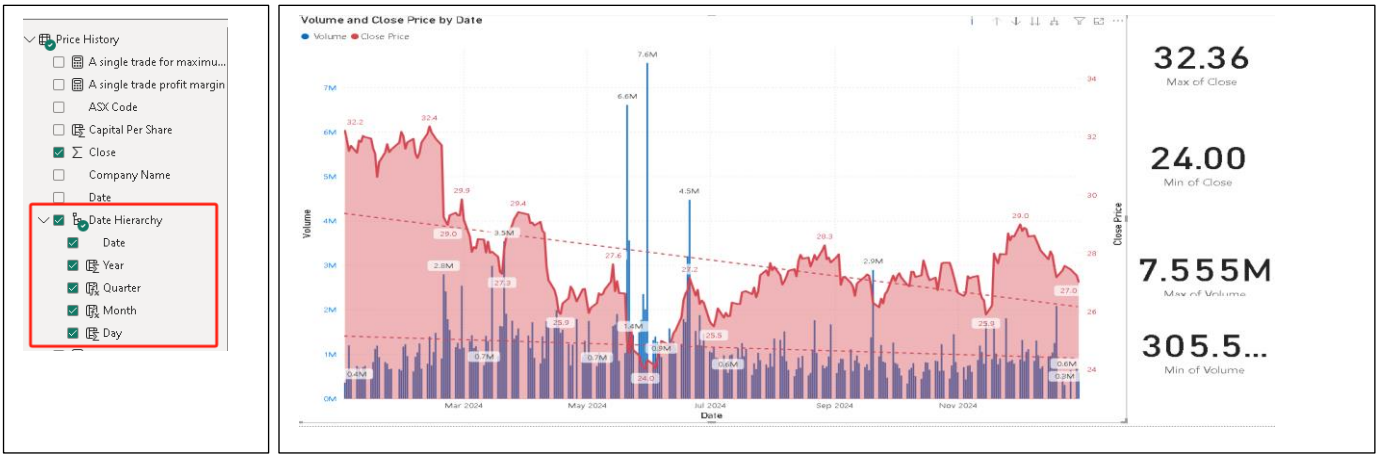
### 3. Data visualization and analysis

### I. Stock close price vs Volume analysis:

To analyze the relationship between stock price trends and trading volume, a Combo Chart was created in Excel. Close Price was set as a Line Chart and mapped to the Secondary Axis. Volume was set as a Column Chart to visualize trading activity. A Trend Line was added, and the Secondary Axis range was adjusted to 30-34 for better readability. The resulting chart effectively highlights the correlation between price movements and trading volume throughout 2024. However, due to a large number of data points, adding Data Labels caused overcrowding, making it difficult to interpret precise values.




To address this issue, the data was imported into Power BI Desktop, where a Date Hierarchy was created using the Date column. This hierarchical approach enabled interactive exploration of stock performance across different time levels (Year, Quarter, Month, Day). Users could drill down to lower timeframes for granular analysis or drill up for broader trends.




**Key Insights from the Visualization:**

The Power BI dual-axis chart presents a comprehensive stock market overview, combining: Trading Volume (blue bars), Closing Price (red line), and Trend Line (dashed red line).

**Price & Volume Correlation**: Volume spikes align with major price fluctuations, indicating periods of high trading activity. The highest trading volume (7.56M shares) coincides with significant price movements.

**Price Trend Analysis:** Stock prices fluctuated between $32.36 (high) and $24.0 (low) throughout 2024. A downward trend is observed in early 2024, followed by a gradual recovery in the latter half of the year. The trend line (dashed red) confirms an overall declining trend.

**Strategic Investment Insights:** A low price of $24.0 in May 2024 suggests a potential buying opportunity. A high price of $32.36 in early 2024 could indicate a selling point for investors seeking profit.

**Advantages of the Visualization Approach:**

Power BI's Date Hierarchy: Enhances trend detection and makes patterns more visible and actionable.

Dual-Axis Chart: Enables simultaneous comparison of volume and price movements, improving market insight.

Trend Line Analysis: Supports long-term performance evaluation for investors.

Colour-coded Labels: Increase readability and help highlight key price fluctuations.

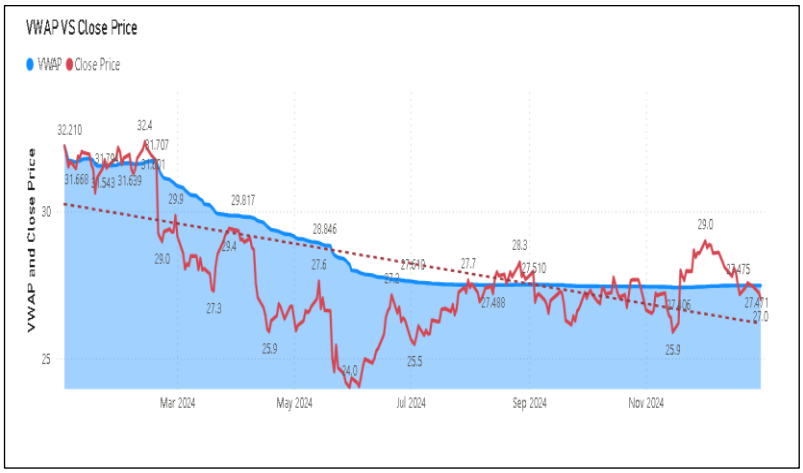
By integrating Excel and Power BI visualizations, this analysis delivers clear, data-driven insights to support investment decision-making.

**Power BI Enhancement: Date Hierarchy and VWAP**

To overcome visualization limitations in Excel, the dataset was imported into Power BI, where a Date Hierarchy was created to allow drill-down analysis at various levels (Year, Quarter, Month, Day).

Additionally, Volume Weighted Average Price (VWAP) was calculated to provide a more accurate representation of the average traded price over time. VWAP was computed using the following DAX formula:

```
VWAP = VAR CumulativePriceVolume =
    CALCULATE(
        SUMX('Price History', 'Price History'[Close] * 'Price History'[Volume]),
        FILTER(ALL('Price History'), 'Price History'[Date] <= EARLIER('Price History'[Date]))
    )
VAR CumulativeVolume =
    CALCULATE(
        SUM('Price History'[Volume]),
        FILTER(ALL('Price History'), 'Price History'[Date] <= EARLIER('Price History'[Date]))
    )
RETURN
    IF(CumulativeVolume > 0, CumulativePriceVolume / CumulativeVolume, BLANK())
```



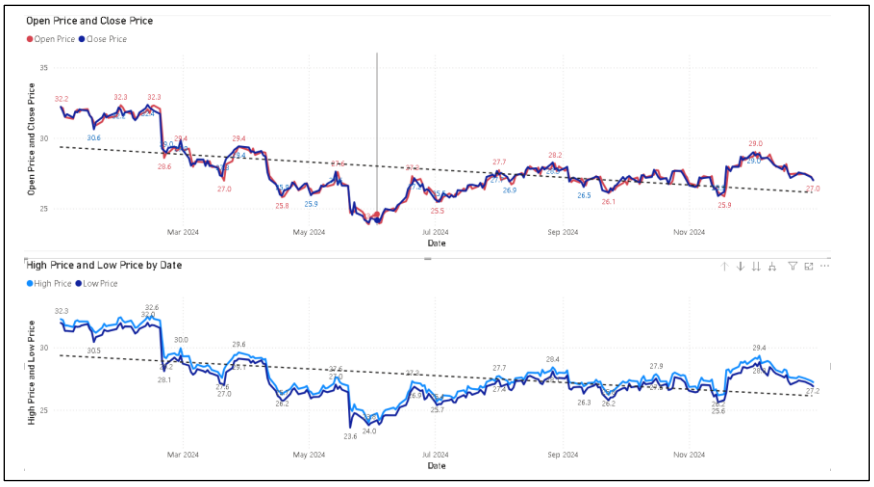

Key Insights from VWAP vs Close Price Comparison

VWAP as a Benchmark: The VWAP (blue line) represents the average price weighted by trend Analysis: The Close Price (red line) fluctuates above and below VWAP, highlighting market inefficiencies and momentum shifts. Volume, provides a more reliable indicator of actual trading activity.

By integrating Date Hierarchy and VWAP Analysis, Power BI enhances financial analysis by offering a clearer and more structured visualization of stock price movements relative to volume.

**II. Stock movement analysis:**

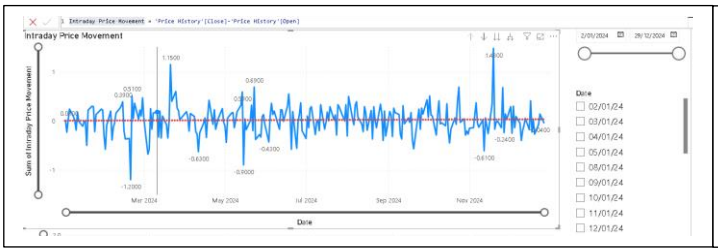
This section examines Stock movement using five key elements: Date (X-axis), Open Price, Close Price, High Price, and Low Price (Y-axis)
The analysis follows a structured approach:
Comparing Open and Close Prices to assess intraday volatility.
Comparing High and Low Prices to evaluate daily price spreads.
Visualizing stock movement trends using Power BI metrics like Intraday Price Movement and High-Low Spread.
The trend line helps visualize overall stock price movement, while key data labels highlight important price points. By marking only essential data, the chart remains clear and readable, preventing overlapping values.

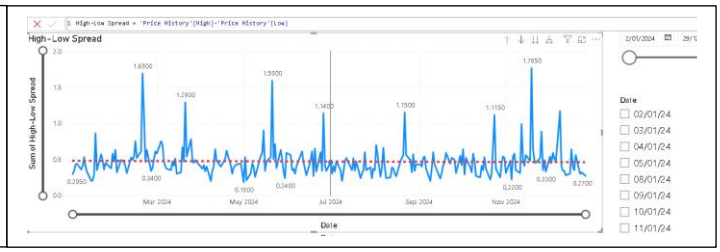



**Key Observations from the Visualizations**:
Open Price vs. Close Price (First Chart): Initially, Open and Close Prices remain close, indicating low volatility. A sharp decline is observed at a certain point, where both prices drop significantly, suggesting a major market event or sentiment shift. After the decline, the stock stabilizes at a lower level, showing fluctuations without immediate recovery, indicating a bearish trend.
High Price vs. Low Price (Second Chart): Daily price spreads are relatively stable until a sharp drop occurs. The gap between High and Low Prices remains consistent for most of the period, reflecting steady trading conditions. The drop in both High and Low Prices confirms a bearish trend, likely due to increased selling pressure or a market sentiment shift.
Intraday Price Movement (Left Chart Below): The blue line represents daily price changes, while the red dashed trend line highlights overall movement trends. Frequent spikes and drops are observed, such as a sharp fall in March 2024 (-1.2). A significant increase in mid-2024 (1.15). The flat trend line indicates no strong pattern of increasing or decreasing volatility over time.
High-Low Spread Analysis (Right Chart Below): The spread typically ranges between 0.3 and 1.5, but certain days show extreme spikes. March 2024: Spread reaches 1.69, indicating high volatility. Late 2024: Spread increases to 1.76, suggesting unusual price movements. Since the trend line remains stable, it suggests that overall market volatility hasn't significantly changed.

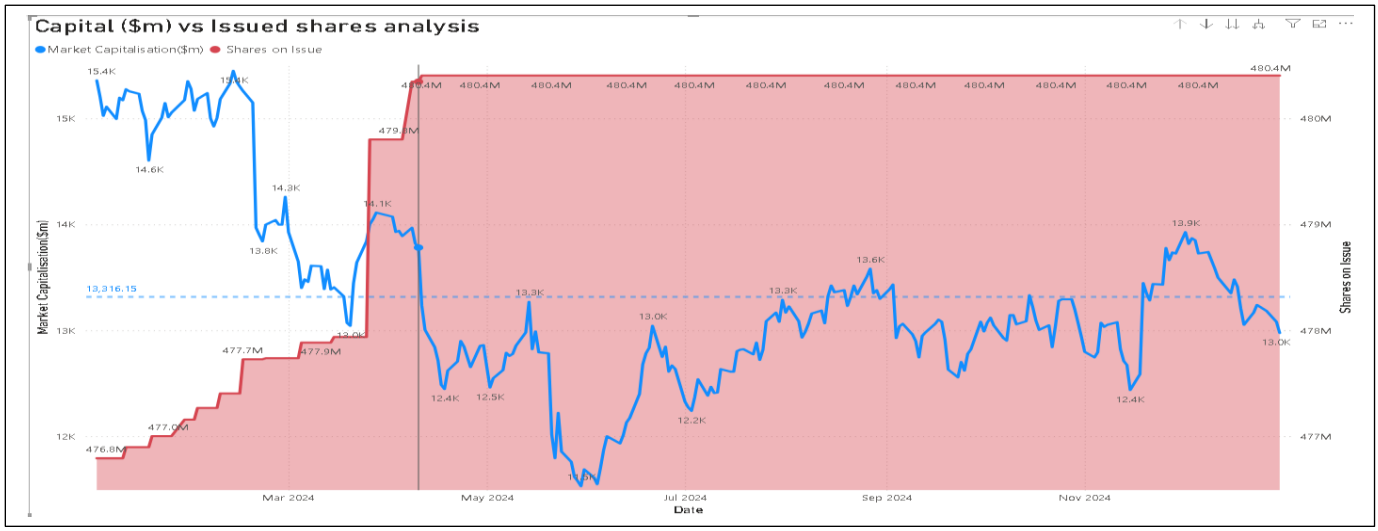
**For Investors**, movements are unpredictable, with occasional high-volatility days. Large daily price spreads may indicate market uncertainty or major trading events. Flat trend lines suggest that long-term volatility remains stable, even if daily

fluctuations occur. Investors should monitor extreme price changes as they present both trading opportunities and risks.




## III. Capital vs Issued shares analysis




This chart effectively visualizes the relationship between market capitalization (blue line) and issued shares (red shaded area) using a dual-axis approach. It addresses common visualization challenges such as data overlap, data crossing, and axis scaling, ensuring both metrics are distinguishable.

Market Capitalization ($m) is plotted on the left axis, and Issued Shares (millions) are represented by the right axis. The red-shaded area highlights the total issued shares, making it visually distinct from market capitalization movements. The shaded area allows for a quick visual assessment of issued shares relative to market capitalization trends.

**Key Trends & Insights:**

Early 2024: A Correlation Between Issued Shares and Market Cap: Issued shares increased (red area), leading to sharp rises and falls in market cap. This suggests that new share issuances directly influenced stock value.

Mid-2024 Onward: Market Cap Fluctuations Despite Stable Issued Shares: Issued shares remained constant at 480.4M, yet market capitalization continued to fluctuate. This indicates that external factors had a greater impact on stock value than share issuance alone.

The red-shaded area remains stable in the latter half of 2024, confirming that market cap changes were not driven by additional share issuances but by broader market dynamics.

**For Investors**

For Short-Term Traders, tracking market cap reactions to new share issuances may provide trading opportunities, as dilution effects can cause temporary price swings.

For Long-Term Investors, a stable number of issued shares combined with a rising

market cap suggests that external market conditions drive price movements rather than share supply.

**Advantages of the Visualization Approach:**

Enhances Data Interpretation: The shaded area allows for an immediate understanding of issued share trends without needing to analyze numerical values separately.

Supports Trend Analysis: By highlighting changes in issued shares, the red area makes it easier to detect periods of dilution or expansion.

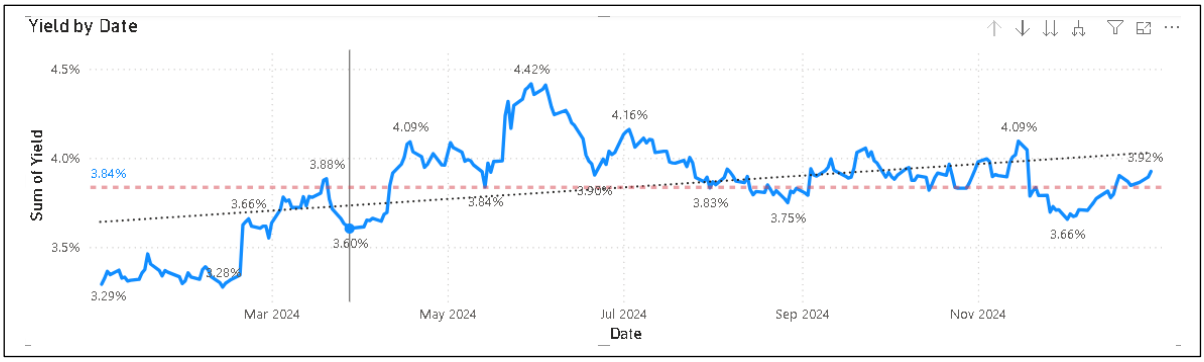
Improves Readability & Comparison: Investors can quickly compare the relationship between share issuance and market cap movements, identifying whether market fluctuations are linked to dilution effects or external forces.

## IV. Dividend Yield analysis

The Yield value is calculated by dividing the daily dividend by the daily Close Price: Yield = Dividend / Close Price. Yield represents the dividend return relative to the stock price, helping investors assess the income potential of a stock compared to its market price.

A higher Yield indicates a stronger income-generating stock or a lower stock price.

A lower Yield indicates lower dividend payouts or a higher stock price.




**Key Insights from the Visualization**

The chart visualizes yield fluctuations (blue line) over the year, making trend tracking easier. Two reference lines help contextualize yield trends: The red average line (3.84%) is the baseline for determining whether yields are above or below average.

The black dotted trend line → Highlights the overall yield growth trend.

**Major Trends in Dividend Yield**

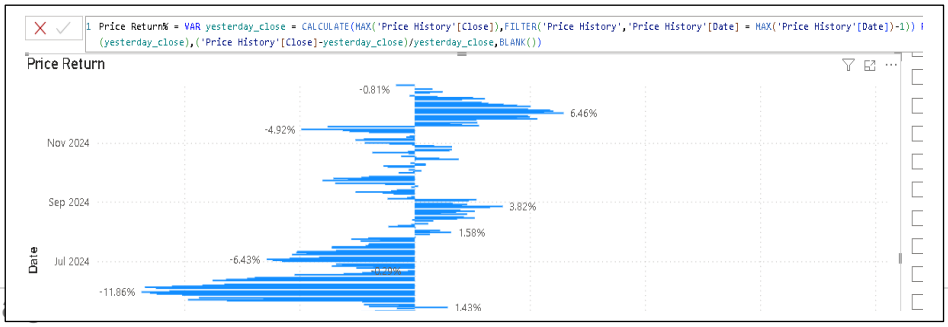
Mid-Year Yield Peak (May 2024, 4.42%). A significant increase in yield suggests strong performance and higher investor returns.

Stable Long-Term Upward Trend. Despite fluctuations, the trend remains upward, indicating sustained market performance.

Temporary Declines (November 2024, 3.66%). Need more investment.

**For investment:**

Short-Term Investors Should monitor yield peaks and dips to optimize trading decisions. Long-term investors may benefit from gradual yield growth, ensuring stable returns over time.



While Yield measures long-term passive income, Price Return is used to assess short-term price fluctuations:

$$\text{Price Return (\%)} = \frac{\text{Closing Price on Day}_t - \text{Closing Price on Day}_{t-1}}{\text{Closing Price on Day}_{t-1}} \times 100\%$$

**Key Interpretations:**

A positive Return indicates an upward price trend. A negative Return signals a declining market. Large Price Swings reflect high volatility and risk. Stable Returns suggest a predictable market.

**Key Insights from the Visualization**

The Price Return chart effectively visualizes daily percentage price changes, making it a valuable tool for financial analysis. Significant Market Movements in May & July 2024. Highest positive return (18.84%) and largest negative return (-11.86%) suggest high volatility. Stable Returns from September to November 2024. This indicates lower volatility, making this period ideal for long-term investors.

**For investment**:

Short-term investors should focus on high-volatility months like May and July for potential gains.

Long-term investors should prioritize stable periods to minimize risk exposure.

Yield Analysis helps investors assess long-term passive income potential. Price Return Analysis is essential for short-term trading decisions. Combining both metrics allows for a comprehensive understanding of stock performance. This data-driven approach helps investors make better-informed financial decisions, balancing income generation with capital appreciation.

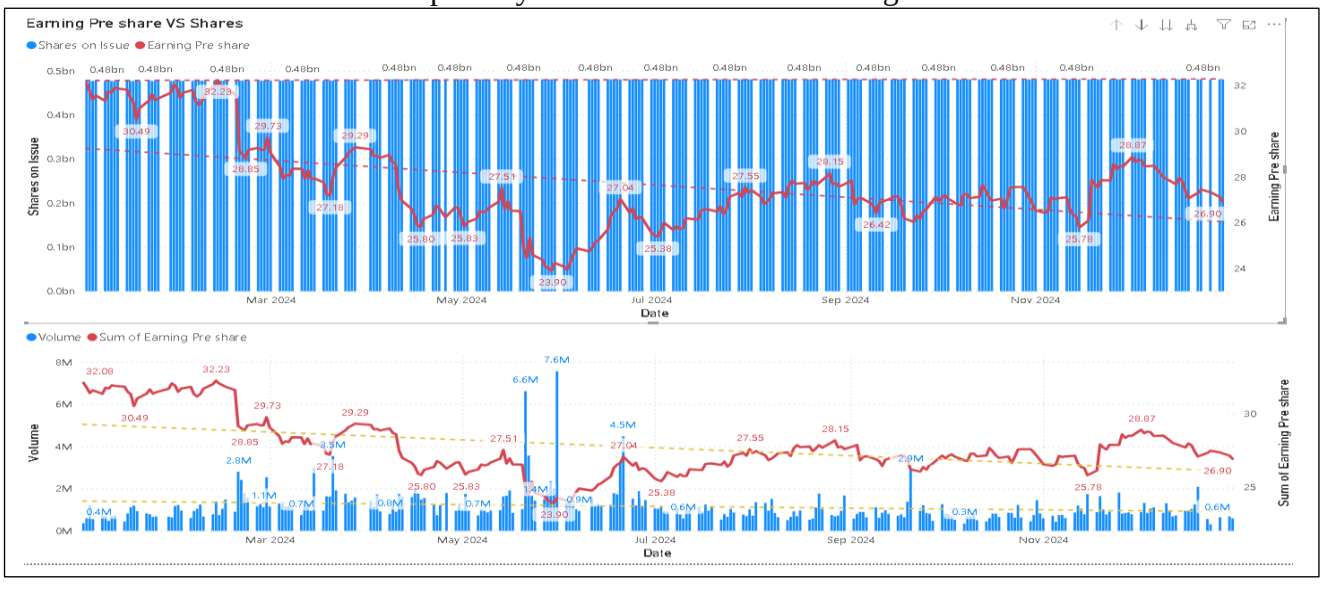
**Advantages of the Visualization Approach**: Clearly explains the role of both yield and price return in investment strategy. Provides well-structured analysis of major market trends. Delivers actionable insights for both short-term and long-term investors.

## V. PE analysis:

Earnings Per Share (EPS) is a key measure of a company's financial health and directly affects stock valuation metrics like the P/E (Price-to-Earnings) ratio.

$$Earning\ Pre\ share(EPS) = \frac{Close\ Price}{PE}$$

Higher EPS indicates strong profitability, meaning the company generates more earnings per share. Lower EPS could be a sign of weaker earnings, higher costs, or market downturns. EPS trends help investors evaluate a stock's long-term growth potential and profitability. Since EPS is directly tied to the closing price, its trend closely follows the stock price trend. However, for a more targeted analysis, it is more effective to visualize EPS separately to shares issued and trading volume.



**Key Insights from the Visualization：**

To analyze EPS effectively, two dual-axis charts were created: EPS vs. Shares Issued (Top Chart) and EPS vs. Trading Volume (Bottom Chart).

For EPS vs. Shares Issued: Blue bars represent shares issued, while the red line represents EPS. EPS follows a downward trend, while the number of issued shares remains stable. This suggests that EPS decline is not driven by dilution but rather by external factors like earnings declines or market conditions.

For EPS vs. Trading Volume: Blue bars represent trading volume, while the red line represents EPS. Notable spikes in trading volume often align with EPS declines, indicating that investors react to market sentiment shifts.

**Analysis of EPS Trends**

EPS Decline Despite Stable Issued Shares. EPS Drops Aligning with Trading Volume Spikes. Clear Trend Lines highlight the gradual downward EPS trend.

**For investment:**

Short-term investors should focus on high trading volume periods, as these could indicate potential price movements driven by earnings reports.

Long-term investors should analyze whether declining EPS is temporary.

**Advantages of the Visualization Approach**: This visualization effectively connects EPS trends with market factors, helping investors assess the impact of issued shares and trading activity. The dual-axis approach, clear labels, and trend lines make it easy to interpret key relationships.

By separating EPS analysis into two distinct visualizations, the report avoids confusion and presents clear, actionable insights for investors to evaluate trends, identify risks, and make informed financial decisions.

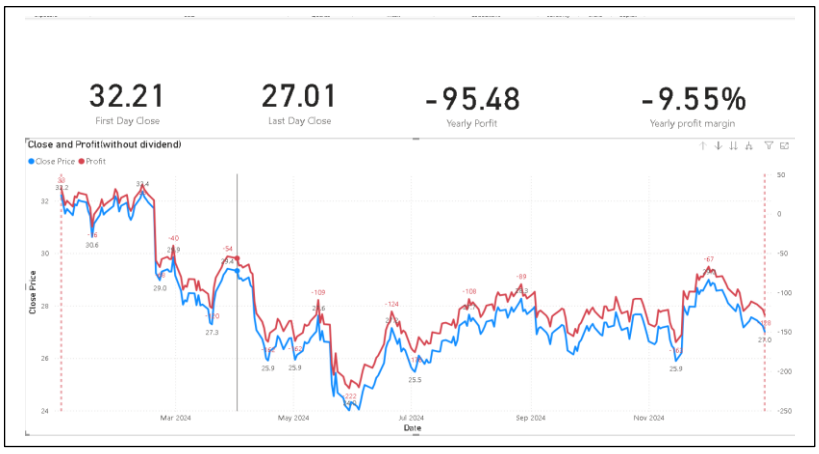
## VI. Yearly Portfolio

By analyzing the trend of Close Price, it is evident that the overall stock price declined in 2024. If an initial investment of $1000 was made at the beginning of the year, it would result in a loss by the last trading day, assuming dividends are not considered.

**Portfolio Calculation Methodology:**

Step 1 Determine Initial Shares:

Determine Initial Shares: Initial Shares = $1000 ÷ (Integer part of First Trading Day's Close Price). In this case, the investor purchases 31 shares based on the first-day stock price.



Step 2 Daily Market Value Calculation:
Initial Shares = $1000 ÷ (Integer part of First Trading Day's Close Price). In this case, the investor purchases 31 shares based on the first-day stock price.
Step 3 Calculate Cash on Hold: Cash on Hold = $1000 - Market Value on First Trading Day. This remains fixed since all funds were used for share purchases.
Step 4 Compute Total Investment Value: Total Investment Value = Market Value + Cash on Hold
Step 5 Compute Profit: Total Profit = Total Investment Value - Initial Investment ($1000) Final Year-End Profit = Total Profit + (Shares × Dividend)

**Key Insights from the Visualization**

The dual-line chart below tracks the relationship between closing price and profit over time.
First-Day vs. Last-Day Price Decline: First-Day Close = 32.21, Last Day Close = 27.01, Stock Price Drop = -5.2 points (~16.1% decline).
Yearly Profit & Profit Margin: Yearly Profit: -$95.48, Yearly Profit Margin: -9.55%.
Correlation Between Stock Price & Profit Trends: The blue line represents closing price movements. The red line represents profit trends. The profit trend mirrors stock price movements, confirming a direct correlation between the two.

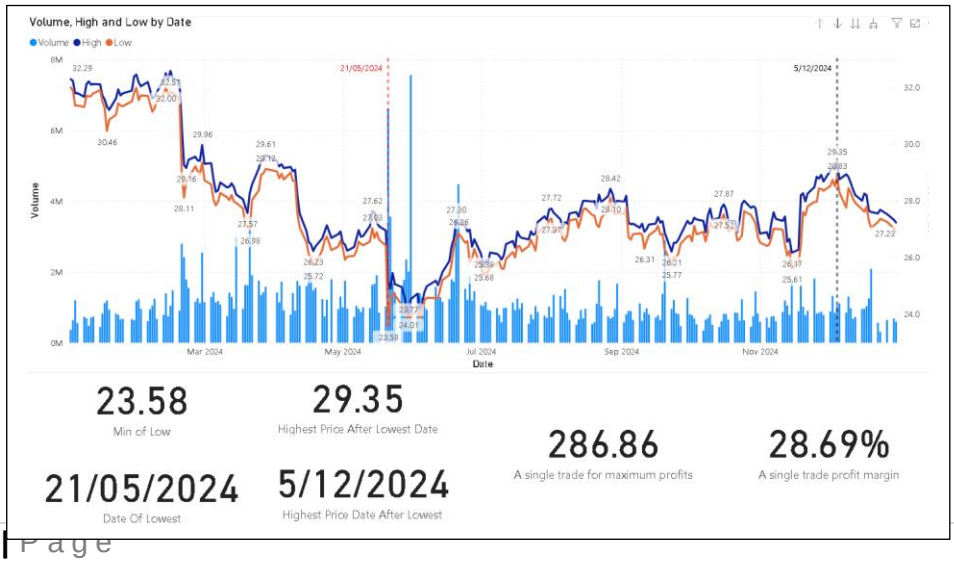
**Investment Performance Analysis**

Stock Decline Impact on Profitability: Stock price fell throughout 2024, leading to a negative portfolio return. No major recovery was observed, even with slight price rebounds mid-year.
Dual-Axis Chart for Trend Comparison: The closing price is mapped on the left axis (blue line). Profit is mapped on the right axis (red line). Colour coding enhances readability, ensuring clear differentiation between stock movement and profitability.

**For investment:**

Short-term investors identifying price volatility patterns can help time trades effectively. Future investment decisions should consider external market factors influencing stock movement.
For Long-Term Investors, the declining stock trend indicates a higher-risk investment. Dividend payouts (if any) should be factored in to assess overall return.
**Advantages of the Visualization Approach**: A simple buy-and-hold strategy in 2024 resulted in a loss. Using Power BI & Excel calculations ensures accurate profit tracking. Dual-line charting enables clear trend identification & investor decision-making.

## VII. A single trade for maximum profits:



The challenge of achieving maximum profit from a single trade lies in determining the optimal buy and sell timing. The best strategy is to buy at the lowest price point and sell after reaching the maximum price increase. Data visualization plays a crucial role in solving this problem by intuitively identifying the best entry and exit points for trading.

**Key Observations from the Stock Price Trend**

Analyzing the stock price movement in 2024 reveals key price patterns:

1. Early 2024: High Price Volatility: The highest stock price of the year ($32.57) occurred on February 15. The earlier lowest price ($30.46) on January 18 shows a small price gap (~$2), limiting profit potential. The earlier lowest price ($30.46) on January 18 shows a small price gap (~$2), limiting profit potential.
2. May 2024: Lowest Price of the Year: The stock reached its lowest price ($23.58) on May 21. This marked a strong buying opportunity.
3. December 2024: Highest Price After Lowest Point: The stock peaked at $29.35 on December 5, showing a price increase of ~$6 from May's lowest point. Selling at this point maximizes profit.

**Single Trade Strategy:**

Based on this analysis, the best single trade strategy is: Buy at $23.58 (May 21) and Sell at $29.35 (December 5).

Following the previously established calculation method: Investment: $1000 was used to purchase 42 shares at $23.58, leaving $9.64 in cash. Sale: The 42 shares were sold at $29.35, generating a total return including remaining cash and dividend payout on June 31.

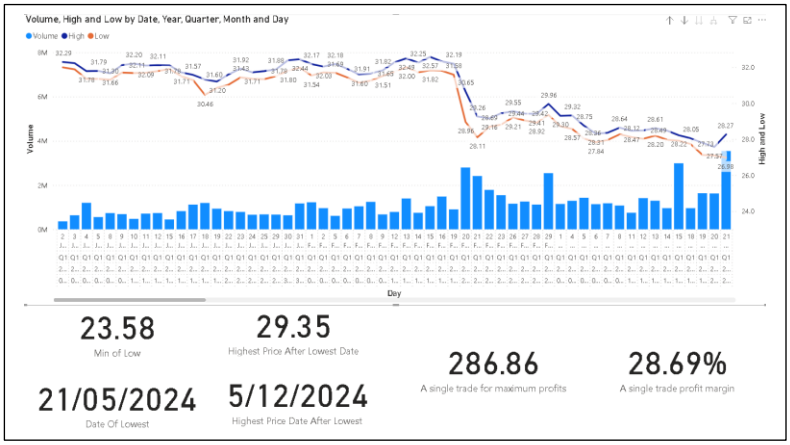
**Final Results:** Total Profit: $286.86, Profit Margin: 28.69%

**Visualization Insights**

Using Date Hierarchy to Identify Key Patterns: The stock price and volume trend chart below demonstrates the advantage of using Date Hierarchy. Analyzing data at different levels makes it easier to identify key trends.

Comparing Low & High Data Points for Maximum Profits: May 21 (Lowest Price: $23.58) to December 5 (Highest Price: $29.35). A clear price increase is visible after the lowest point.

Drilling Up for Clearer Insights: At the lowest level of data (chart below), individual data points may be difficult to interpret. Drilling up allows for a clearer understanding of long-term trends and key characteristics.




**For investment:**

Short-term investors: The May 21 low and December 5 high highlight the importance of timing trades. Investors should identify similar low-to-high price shifts in future trading periods.
For Long-Term Investors: This analysis confirms that even in a declining market, strategic buying and selling can generate positive returns. Using Date Hierarchy & Trend Analysis helps optimize long-term stock strategies.

## VIII. Multiple trades for maximum profits.

The key challenge in maximizing profit through multiple trades is identifying optimal buy and sell points at different time intervals. Unlike a single trade strategy, multiple trades require continuous price monitoring and strategic entry and exit points to capture multiple profit opportunities within a given price range.

**Solution Approach:**

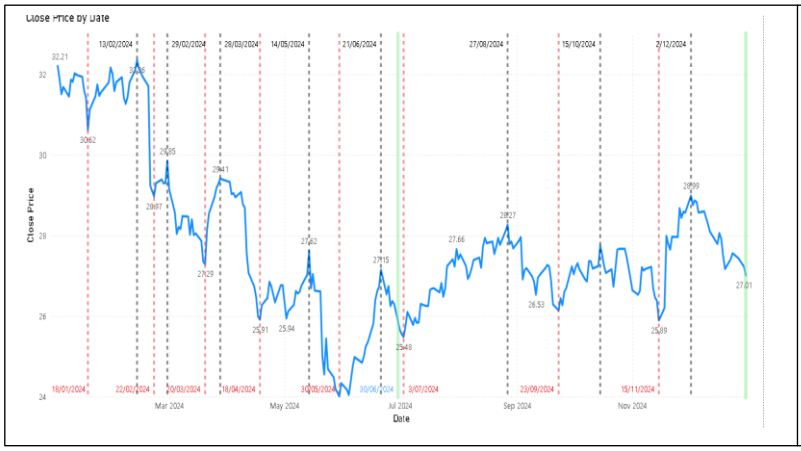
To solve this problem, the same data visualization approach was applied: Marking key price points on the stock price chart. Identifying price lows for buy signals (red lines) and Identifying price peaks for sell signals (black lines). Marking dividend payout dates (green lines) for additional income consideration This allows for a structured trading strategy, ensuring that buy and sell decisions align with market fluctuations.

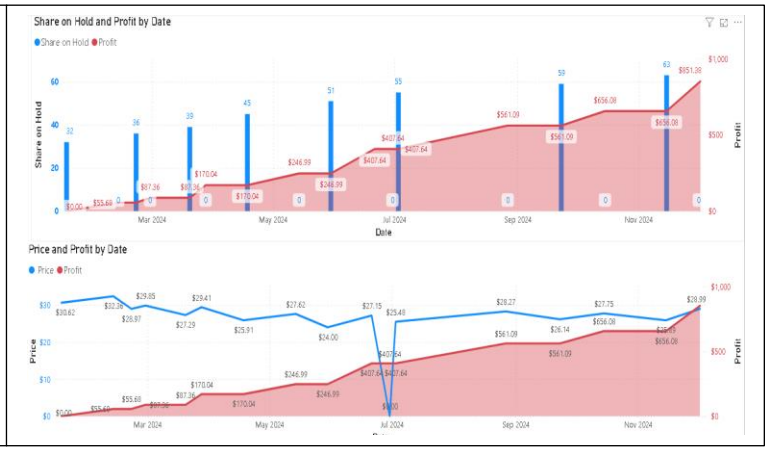
**Key Observations & Trading Strategy Execution**

Identifying Buy & Sell Points； Low points represent buying opportunities, ensuring shares are purchased at lower prices. High points indicate selling opportunities, locking in gains before a price decline.

Multi-Trade Execution Throughout 2024：Instead of a single trade, multiple buy-sell cycles were executed based on price trends. Each trade was designed to capitalize on market fluctuations rather than waiting for one high-profit opportunity.

Incorporating Dividend Distributions： Dividends are included as part of the total returns. Green vertical markers indicate dividend distribution dates, contributing to profit accumulation.




**Final Profit Calculation**

Total Annual Profit: $851.38, Profit Margin: 85.14%, Final Cash Balance: $1.85K. The visual representation confirms that multiple trades significantly increased profitability compared to a single trade strategy.

**Visualization Insights**

Multi-Trade Profitability Analysis: The top chart tracks shares on hold (blue bars) vs. profit (red line). The bottom chart links stock price movements to trading gains. The

profit line consistently trends upward, confirming a strong performance across multiple trades.
Effectiveness of the Dual-Axis Chart: Ensures that different financial aspects (profit, shareholdings, price fluctuations) are presented. Data labels highlight key values, making significant trade points easy to identify.
Holding More Shares During Low Price Periods Increases Profitability: The strategy focused on accumulating more shares during stock price declines. As prices rebounded, higher shareholding translated into greater returns.
**For investment:**
Short-term investors: Market volatility creates multiple trading opportunities. Following stock price fluctuations allows traders to capture quick gains.
For Long-Term Investors: Conclusion A multi-trade approach smooths out market risks and provides higher cumulative returns. Strategic reinvestment maximizes both price gains and dividend yields.
**Conclusion:** Maximizing Returns Through Multi-Trade
Multiple trades significantly outperform a single trade strategy, leading to an 85.14% profit margin. Using price markers and trend analysis enhances decision-making for profitable trade execution. Visualizing multi-trade strategies clarifies risk management and return optimization. Data storytelling effectively highlights critical market movement patterns for informed trading.

**Comparative Analysis of Three Investment Strategies**
**Overview**
Each strategy uses the same stock price trends but applies different decision-making frameworks. The goal is to determine which approach yields the highest return while balancing risk.
**Passive Investment: Holding for One Year：**
**Strategy:** Buy at the beginning of the year and hold until the last trading day.
**Method**: Invest $1000 in January and sell in December.
**Key Metric**: Profit/Loss calculated as final stock value - initial investment.
**Outcome:** Total Year-End Profit (excluding dividends): - $95.48 (Loss). Profit Margin: -9.55%
**Analysis：** Risk: High, as market downturns affected returns. Returns: Negative, proving that holding was not profitable in 2024. A passive strategy is not ideal for volatile markets**.**
**Single Trade for Maximum Profit;**
**Strategy:** Identify one optimal buy and one optimal sell point.
**Method:** Buy at the lowest price and sell at the highest price of the year.
**Key Metric**: Maximum profit from a single transaction.
**Outcome:** Total Profit: $286.86 Profit Margin: 28.69%
**Analysis:**
Risk: Moderate, since trade timing was crucial.
Returns: Higher than passive investing, but opportunity cost exists if more trades were possible.
More profitable than passive investing but still requires strong timing decisions.
**Multiple Trades for Maximum Profit:**
**Strategy:** Execute multiple trades throughout the year to maximize gains.
**Method**: Buy at each significant low and sell at each major high based on price fluctuations.
**Key Metric**: Accumulated profit from multiple transactions over time.