








# Pallmall Bikes - Data Visualization and Analysis in Power BI

Uncovering insights into the performance of a bike-sharing company through data integration, SQL queries, and advanced data visualization techniques. This project showcases a comprehensive Power BI dashboard to facilitate actionable business decisions.










## Project Overview

This project aims to provide a detailed analysis of Pallmall Bikes' performance over two years (2021 and 2022). By integrating data from multiple sources and using SQL for data preparation, we've created an interactive and insightful Power BI dashboard that highlights key performance indicators (KPIs), trends, and revenue analysis.

## Highlights

-  **Interactive Dashboard:** A dynamic Power BI dashboard with essential KPIs.
-  **SQL Queries:** SQL queries for calculating revenue and order metrics.
-  **Data Visualization:** Various charts, including donut and funnel charts, for insights.
-  **Performance Analysis:** Analyze best and worst sellers to optimize business strategies.
-  **Trend Analysis:** Visualize daily and monthly trends for better decision-making.
-  **Data Preparation:** Modify and enhance data with custom columns and DAX functions.
-  **Comprehensive Learning:** Aimed at beginners and intermediates for practical skills development.

## Key Insights

-  **Data Integration:** Combining SQL and Power BI enhances analytical capabilities, offering a complete view of business performance. 
-  **Trend Visualization:** Daily and monthly trends provide crucial insights into sales performance and customer behavior. 
-  **Custom Calculations:** Adding custom columns like total revenue and quantity streamlines data analysis. 
-  **Visual Storytelling:** Effective use of charts and KPIs helps communicate data findings clearly to stakeholders. 
-  **Interactive Filters:** Interactive features in dashboards allow users to explore data dynamically.

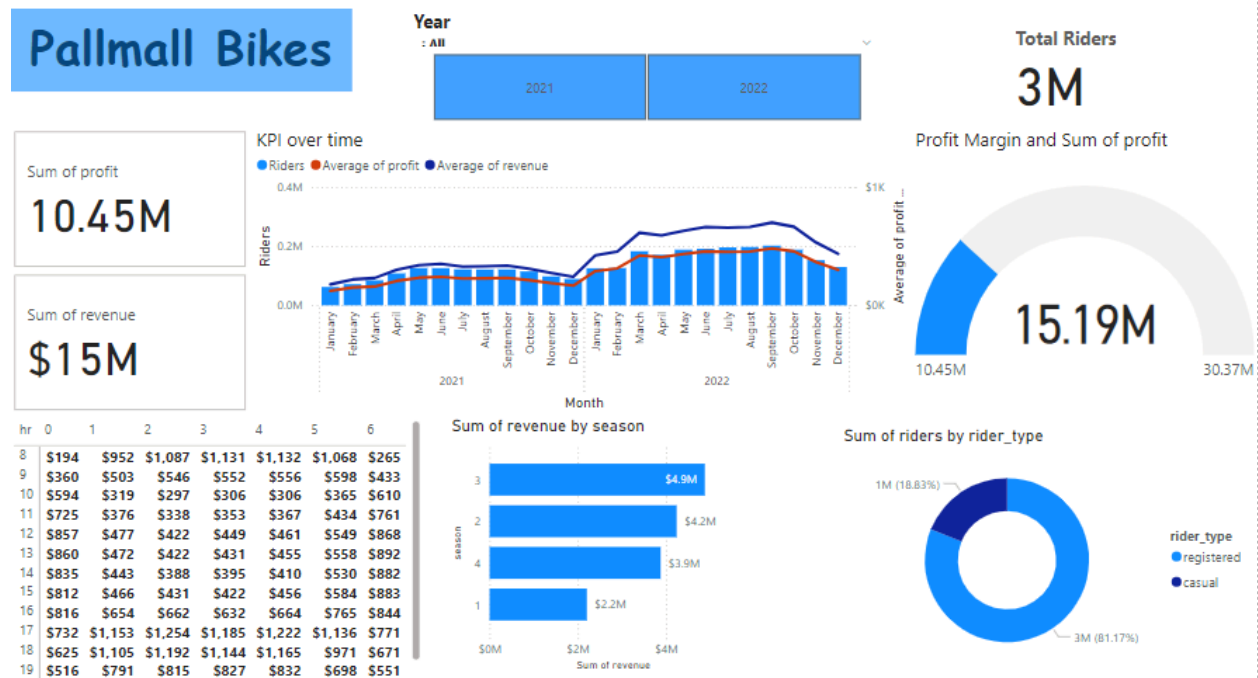
## Data Sources

The data for this analysis comes from two CSV files containing revenue reports for 2021 and 2022. These were exported into MSSQL Server for further processing.

## SQL Query

The following SQL query was used to combine and calculate the necessary metrics:

```
WITH cte AS (  
    SELECT * FROM bike_share_yr_0  
    UNION ALL  
    SELECT * FROM bike_share_yr_1  
)  
  
SELECT  
    dteday,  
    season,  
    a.yr,  
    weekday,  
    hr,  
    rider_type,  
    riders,  
    price,  
    COGS,  
    riders * price AS revenue,  
    riders * price - COGS AS profit  
FROM cte a  
LEFT JOIN cost_table b ON a.yr = b.yr
```



Year	Sum of riders	Sum of revenue	Sum of profit	Average of price
2021	1243103	\$4,959,981	3,418,533.25	3.99
2022	2049576	\$10,227,384	7,030,045.68	4.99
Total	3292679	\$15,187,365	10,448,578.93	4.49

## Yearly Performance Summary

- **2021:**
  - Sum of Riders: 1,243,103
  - Sum of Revenue: \$4,959,981
  - Sum of Profit: \$3,418,533.25
  - Average Price: \$3.99
- **2022:**
  - Sum of Riders: 2,049,576
  - Sum of Revenue: \$10,227,384
  - Sum of Profit: \$7,030,045.68
  - Average Price: \$4.99
- **Total:**
  - Sum of Riders: 3,292,679
  - Sum of Revenue: \$15,187,365
  - Sum of Profit: \$10,448,578.93
  - Average Price: \$4.49

## Analysis and Predictions

### Analysis

- **Rider Growth:** There was a significant increase in the number of riders from 2021 to 2022, with a 64.9% growth rate (from 1,243,103 to 2,049,576 riders). This indicates a growing popularity and usage of Pallmall Bikes.
- **Revenue Increase:** The revenue almost doubled from 2021 to 2022, increasing from \$4,959,981 to \$10,227,384. This substantial increase is likely driven by both the rise in the number of riders and the increase in the average price per ride.
- **Profit Surge:** The profit saw a remarkable increase, from \$3,418,533.25 in 2021 to \$7,030,045.68 in 2022, showing a 105.7% growth. This indicates efficient cost management and a successful pricing strategy.
- **Price Adjustment:** The average price per ride increased from \$3.99 in 2021 to \$4.99 in 2022. This 25% increase in price likely contributed to the higher revenue and profit margins.

### Predictions

- **Continued Growth:** If the current trends continue, Pallmall Bikes can expect further growth in ridership, revenue, and profit. Strategic marketing and expansion into new regions could amplify these trends.
- **Seasonal Insights:** The data indicates that certain seasons are more profitable. Focusing on promotional activities during these peak times could maximize revenue.
- **Rider Type Distribution:** Understanding the distribution between registered and casual riders can help tailor services and promotions to different user segments, potentially increasing overall user engagement and retention.

## Steps Undertaken

1. **Data Import and Integration:** Imported CSV files into MSSQL Server.
2. **SQL Query Execution:** Wrote SQL queries to calculate revenue and profit metrics.
3. **Power BI Data Modeling:** Loaded data into Power BI and created relationships between tables.
4. **Custom Calculations:** Added columns for total revenue and profit using DAX.
5. **Dashboard Design:** Designed an interactive Power BI dashboard with various visualizations.
6. **Analysis and Insights:** Analyzed data to identify key trends and performance metrics.

## Conclusion

This project demonstrates the power of combining SQL and Power BI for comprehensive data analysis and visualization. By leveraging these tools, we can gain valuable insights into business performance, identify trends, and make data-driven decisions. The analysis and predictions provide a roadmap for strategic planning and growth for Pallmall Bikes.