**ThunderGlide Motors**

# Project Overview

“ThunderGlide Motors" is a multinational automobile industrial company that is famous for motorcycles. The Chief Executive Officer “Aidan Gallagher” asked the sales team to work on a project for the past two years 2003, 2004 and the first two quarters of 2005 to analyze key trends and insights with a focus on market preferences and future investment opportunities. By analyzing customer purchasing behavior, sales growth, and product performance. The project aimed to enhance revenue generation and improve customer satisfaction. Data Preprocessing was conducted using Python especially “pandas” library. Data initial analysis was conducted using Microsoft SQL Server. Data exploration, analysis and forecasting were performed using Python (pandas, numpy, matplotlib, Scikit-learn) time-series models, leveraging historical data to project future trends. The analysis focused on customer segmentation, product performance, and regional sales patterns.

# Objectives

* Analyze sales growth by years, product category, and customer demographics.
* Identify high-performing and underperforming products.
* Examine seasonal trends and their impact on sales.
* Forecast future sales performance using historical data.
* Provide recommendations for improving sales strategies and customer targeting.

**Data source :**

(<https://www.kaggle.com/datasets/kyanyoga/sample-sales-data>)

# Methodology

## First Step:

* Dataset was extracted from the company’s sales database for the past three years.

## Second Step:

* Data cleaning and preprocessing was conducted using python and pandas.
* Incomplete and null sales data was resolved through careful data cleaning and validation processes.

## Third Step:

* Data initial exploration was conducted using Microsoft SQL Server.

## Fourth Step:

* Deep – dive data analysis and sales forecasting was performed using time-series models, leveraging historical data to project future trends.
* The analysis focused on customer segmentation, product performance, and regional sales patterns.

## Fifth Step:

* Data Visualization was conducted using Tableau using SQL Server data source.

# Business Questions and Key Findings

## Market Preferences and Trends:

* What were the popular trends in motorcycle usage in each country over the last few years?
* How do motorcycles compare in popularity with other modes of transport, such as classic cars, trucks, or buses in these regions?

## Manufacturing and Supply Chain Decisions:

* Should the company prioritize local manufacturing, importing from a central hub, or collaborating with existing manufacturers in each target country?

## Sales and Consumer Behavior:

* Which year recorded the highest motorcycle sales in each country?
* What model or brand of motorcycle is commonly considered the most expensive across different markets?

## Automobile Consumption and Investment Capacity:

* Which country has been the highest consumer of cars, and what is this country’s potential for increasing investments in motorcycles and related industries?

## City-Level Insights:

* How do sales patterns and commuting preferences vary at the city level, based on data from local transportation departments or industry reports?

## Financial Performance:

* What is the average annual sales performance for motorcycles in the target markets over the past three years?

# Key Findings

* We have the data of 2 years (2003, 2004) and the first two quarters of 2005 and during theses 3 years the company has sold 2823 Item according to the descriptive analysis on python.
* Sales Average during the 3 years is 3553.89 and 93.2% of the orders were shipped successfully.
* Statistics shows that 50% of our customers order 35 item or less, and the majority (75%) order 43 Piece or less, and MAX amount ordered is 97 item
* It is evident that the company is performing well, as sales have shown a consistent increase from 2003 to 2004 with a slight growth rate = 0.34% and further into 2005."
* Sales and the quantity ordered typically increase normally in the first Quarter and tend to decrease in the second quarters, followed by an upward trend in the third and fourth quarters.
* Although we lack data for the third and fourth quarters in 2005, the observed sales growth in the first two quarters of 2005, compared to the same periods in 2004 and 2003, suggests that a sales increase in the remaining quarters can be expected.
* Our best Sellers product lines are the classic cars and vintage cars comes in the second place, with 39.07% and 18.97% contribution to the total sales
* Sales increase with Deal size up till Medium and from there, it became a downward trend.
* Most of our customers especially those in the EMEA territory prefer Medium and small Deal sizes to large Deal size.
* The EMEA territory, which has more countries than other territories has the highest number of sales but individually, the sales from USA dwarfs every other country and Spain comes in the second place.

# Challenges

Challenges in the project included dealing with incomplete and null sales data, which was resolved through careful data cleaning and validation processes. Additionally, forecasting sales trends during periods of market uncertainty required the use of multiple forecasting models to ensure accuracy.

# Recommendations

* Increase promotional activities for underperforming products in specific regions.
* Strengthen inventory management for products in high demand during seasonal spikes.
* Local Manufacturer construction is recommended for countries’ sales exceeding 150,000 dollars.
* Use advanced predictive models to optimize stock levels and ensure product availability during peak times.

# Tools & Technologies Used

* Data Extraction and Cleaning: Python (pandas, numpy, matplotlib, scikit-learn)
* Statistical analysis: Python (NumPy, SciPy) , Microsoft SQL Server
* Data visualization: Tableau