A SQL and Power BI

Case Study

‘Toman Bike Share’ Analysis

This presentation demonstrates a real-world data analysis project combining SQL queries and Power BI for powerful business insights. Being a data analyst at ABC company I was asked show my expertise in SQL and Power Bi to develop a dashboard which displays companies key metrics, to find meaningful interpretation.

----- by Gitanjali Pekamwar

Email Requests

Request for Development of Toman Bike Share Dashboard

Dear Data Analyst

We need your expertise to develop a dashboard for "Toman Bike Share" that displays our key performance metrics for informed decision-making.

Requirements:
- Hourly Revenue Analysis
- Profit and Revenue Trends:
- Seasonal Revenue
- Rider Demographics

Design and Aesthetics: Use our company colors and ensure the dashboard is easy to navigate.

Data Source: Access to our databases will be provided. If no database, please create one

Deadline: We need a preliminary version ASAP.

Please provide an estimated timeline for completion and recommendation on raising prices next year

Best regards,

Project Overview and Objectives

Objective 1

Consolidate data from multiple sources, creating a single, unified dataset.

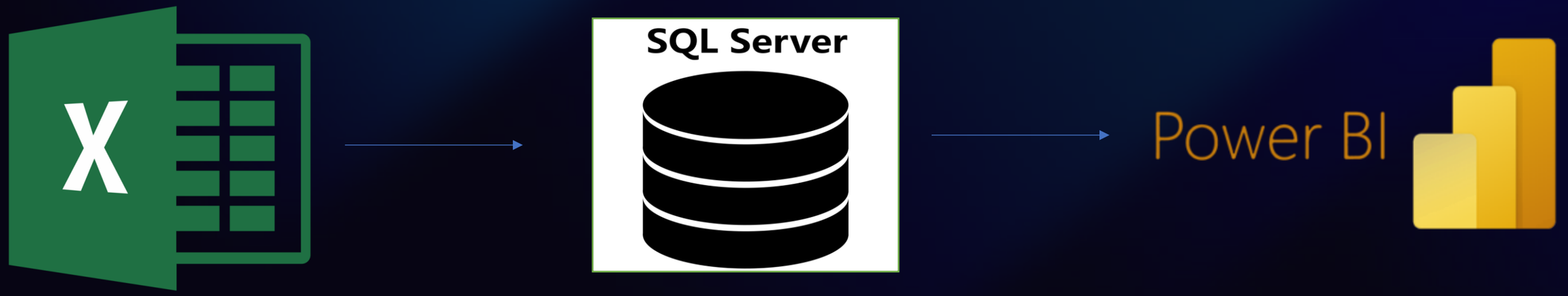
Objective 2

Analyze the combined dataset, identify trends, and derive meaningful insights.

Objective 3

Create an interactive Power BI dashboard to visualize key findings and facilitate data-driven decision-making.

Technology Used



Source Tables and Relationships

Table 1	bike_share_yr_0
Table 2	bike_share_yr_1
Table 3	Cost_table

The project utilized three source tables containing bike_share_yr_0, bike_share_yr_1, and cost_table data. These tables were linked by common keys for a comprehensive data analysis.

Data Tables

```
SELECT * from bike_share_yr_1
```

100 %

Results | Messages

	dteday	season	yr	mnth	hr	holiday	weekday	workingday	weathersit	temp	atemp	hum	windspeed	rider_type	riders
1	2022-01-01 00:00:00.0000000	1	1	1	0	0	0	0	1	0.36	0.3788	0.66	0	casual	5
2	2022-01-01 00:00:00.0000000	1	1	1	1	0	0	0	1	0.36	0.3485	0.66	0.1343	casual	15
3	2022-01-01 00:00:00.0000000	1	1	1	2	0	0	0	1	0.32	0.3485	0.76	0	casual	16
4	2022-01-01 00:00:00.0000000	1	1	1	3	0	0	0	1	0.3	0.3333	0.81	0	casual	11
5	2022-01-01 00:00:00.0000000	1	1	1	4	0	0	0	1	0.28	0.303	0.81	0.0896	casual	0
6	2022-01-01 00:00:00.0000000	1	1	1	5	0	0	0	1	0.28	0.2879	0.81	0.1045	casual	0
7	2022-01-01 00:00:00.0000000	1	1	1	6	0	0	0	1	0.26	0.2727	0.93	0.1343	casual	1
8	2022-01-01 00:00:00.0000000	1	1	1	7	0	0	0	1	0.26	0.2576	0.93	0.1642	casual	1
9	2022-01-01 00:00:00.0000000	1	1	1	8	0	0	0	1	0.26	0.2727	0.87	0.1045	casual	4
10	2022-01-01 00:00:00.0000000	1	1	1	9	0	0	0	1	0.26	0.2727	0.93	0.1045	casual	13
11	2022-01-01 00:00:00.0000000	1	1	1	10	0	0	0	1	0.3	0.3182	0.81	0.1045	casual	18
12	2022-01-01 00:00:00.0000000	1	1	1	11	0	0	0	1	0.34	0.3333	0.76	0.1343	casual	40
13	2022-01-01 00:00:00.0000000	1	1	1	12	0	0	0	1	0.4	0.4091	0.62	0.2836	casual	58
14	2022-01-01 00:00:00.0000000	1	1	1	13	0	0	0	1	0.42	0.4242	0.58	0.2836	casual	82
15	2022-01-01 00:00:00.0000000	1	1	1	14	0	0	0	1	0.44	0.4394	0.54	0.2985	casual	120
16	2022-01-01 00:00:00.0000000	1	1	1	15	0	0	0	1	0.46	0.4545	0.51	0.2985	casual	101
17	2022-01-01 00:00:00.0000000	1	1	1	16	0	0	0	2	0.44	0.4394	0.54	0.2985	casual	68
18	2022-01-01 00:00:00.0000000	1	1	1	17	0	0	0	2	0.48	0.4697	0.48	0.1642	casual	36
19	2022-01-01 00:00:00.0000000	1	1	1	18	0	0	0	3	0.46	0.4545	0.59	0.2537	casual	25
20	2022-01-01 00:00:00.0000000	1	1	1	19	0	0	0	3	0.42	0.4242	0.67	0.3881	casual	20
21	2022-01-01 00:00:00.0000000	1	1	1	20	0	0	0	2	0.44	0.4394	0.62	0.2985	casual	25
22	2022-01-01 00:00:00.0000000	1	1	1	21	0	0	0	2	0.44	0.4394	0.67	0.2537	casual	10
23	2022-01-01 00:00:00.0000000	1	1	1	22	0	0	0	1	0.46	0.4545	0.55	0.4179	casual	13
24	2022-01-01 00:00:00.0000000	1	1	1	23	0	0	0	1	0.44	0.4394	0.51	0.2985	casual	4
25	2022-01-02 00:00:00.0000000	1	1	1	0	1	1	0	1	0.4	0.4091	0.4	0.4627	casual	8

```
SELECT * from bike_share_yr_0;
```

100 %

Results | Messages

	dteday	season	yr	mnth	hr	holiday	weekday	workingday	weathersit	temp	atemp	hum	windspeed	rider_type	riders
1	2021-01-01 00:00:00.0000000	1	0	1	0	0	6	0	1	0.24	0.2879	0.81	0	casual	3
2	2021-01-01 00:00:00.0000000	1	0	1	1	0	6	0	1	0.22	0.2727	0.8	0	casual	8
3	2021-01-01 00:00:00.0000000	1	0	1	2	0	6	0	1	0.22	0.2727	0.8	0	casual	5
4	2021-01-01 00:00:00.0000000	1	0	1	3	0	6	0	1	0.24	0.2879	0.75	0	casual	3
5	2021-01-01 00:00:00.0000000	1	0	1	4	0	6	0	1	0.24	0.2879	0.75	0	casual	0
6	2021-01-01 00:00:00.0000000	1	0	1	5	0	6	0	2	0.24	0.2576	0.75	0.0896	casual	0
7	2021-01-01 00:00:00.0000000	1	0	1	6	0	6	0	1	0.22	0.2727	0.8	0	casual	2
8	2021-01-01 00:00:00.0000000	1	0	1	7	0	6	0	1	0.2	0.2576	0.86	0	casual	1
9	2021-01-01 00:00:00.0000000	1	0	1	8	0	6	0	1	0.24	0.2879	0.75	0	casual	1
10	2021-01-01 00:00:00.0000000	1	0	1	9	0	6	0	1	0.32	0.3485	0.76	0	casual	8
11	2021-01-01 00:00:00.0000000	1	0	1	10	0	6	0	1	0.38	0.3939	0.76	0.2537	casual	12
12	2021-01-01 00:00:00.0000000	1	0	1	11	0	6	0	1	0.36	0.3333	0.81	0.2836	casual	26
13	2021-01-01 00:00:00.0000000	1	0	1	12	0	6	0	1	0.42	0.4242	0.77	0.2836	casual	29
14	2021-01-01 00:00:00.0000000	1	0	1	13	0	6	0	2	0.46	0.4545	0.72	0.2985	casual	47
15	2021-01-01 00:00:00.0000000	1	0	1	14	0	6	0	2	0.46	0.4545	0.72	0.2836	casual	35
16	2021-01-01 00:00:00.0000000	1	0	1	15	0	6	0	2	0.44	0.4394	0.77	0.2985	casual	40
17	2021-01-01 00:00:00.0000000	1	0	1	16	0	6	0	2	0.42	0.4242	0.82	0.2985	casual	41
18	2021-01-01 00:00:00.0000000	1	0	1	17	0	6	0	2	0.44	0.4394	0.82	0.2836	casual	15
19	2021-01-01 00:00:00.0000000	1	0	1	18	0	6	0	3	0.42	0.4242	0.88	0.2537	casual	9
20	2021-01-01 00:00:00.0000000	1	0	1	19	0	6	0	3	0.42	0.4242	0.88	0.2537	casual	6
21	2021-01-01 00:00:00.0000000	1	0	1	20	0	6	0	2	0.4	0.4091	0.87	0.2537	casual	11
22	2021-01-01 00:00:00.0000000	1	0	1	21	0	6	0	2	0.4	0.4091	0.87	0.194	casual	3
23	2021-01-01 00:00:00.0000000	1	0	1	22	0	6	0	2	0.4	0.4091	0.94	0.2239	casual	11
24	2021-01-01 00:00:00.0000000	1	0	1	23	0	6	0	2	0.46	0.4545	0.88	0.2985	casual	15
25	2021-01-02 00:00:00.0000000	1	0	1	0	0	0	0	2	0.46	0.4545	0.88	0.2985	casual	4

```
select * from cost_table;
```

100 %

Results | Messages

	yr	price	COGS
1	0	3.99	1.24
2	1	4.99	1.56

SQL Queries for Data Transformation

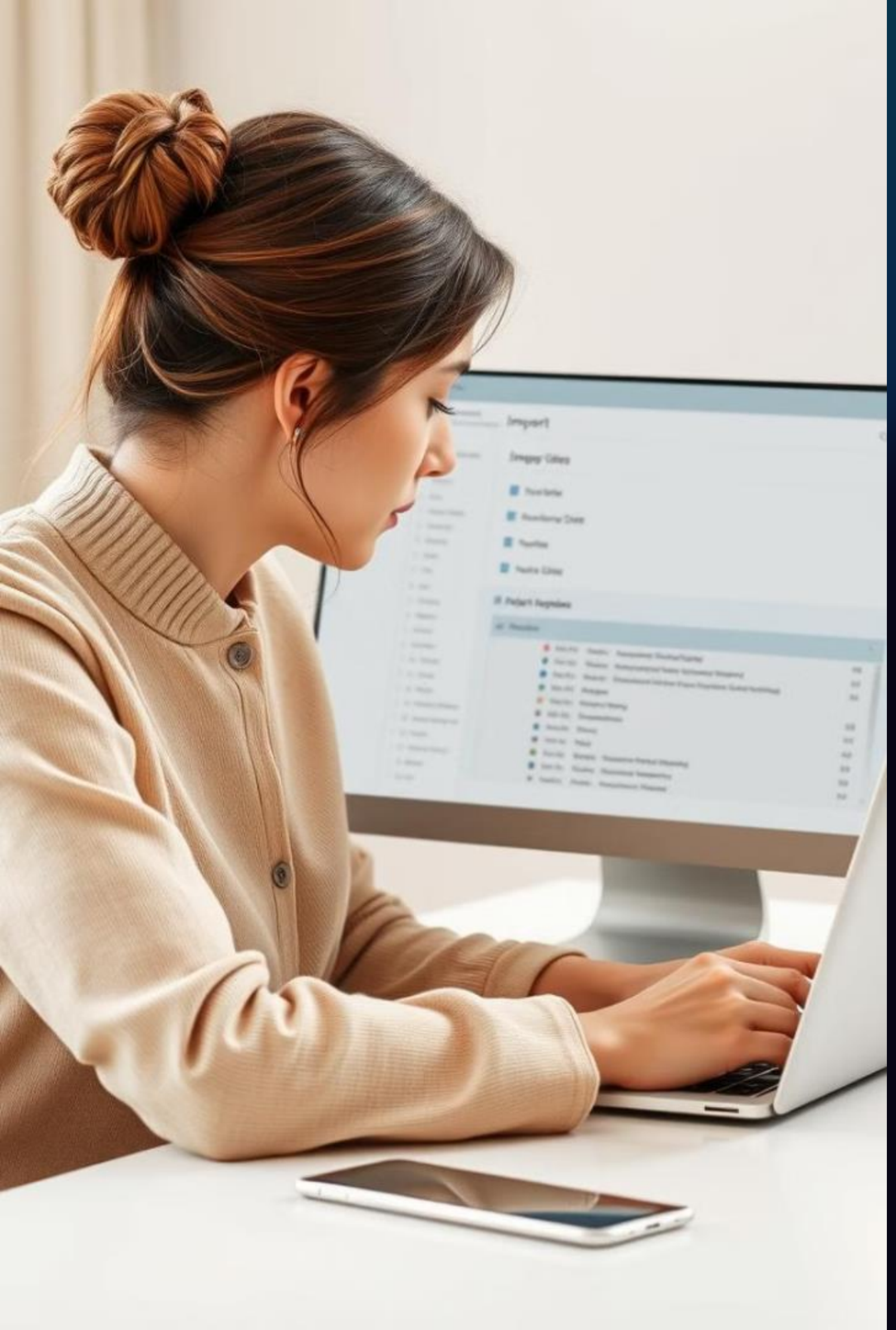
```
with cte as (
SELECT * from bike_share_yr_0
union all
SELECT * from bike_share_yr_1 )
SELECT dteday,
       season,
   a.yr,
   weekday,
   hr,
   rider_type,
   riders,
   price,
   COGS,
   riders*price as revenue,
   riders*price - COGS as profit
from cte a
left join cost_table b
on a.yr = b.yr
```

SQL queries were employed to join the tables, filter specific data, and create new columns based on calculations and transformations.

Transformed Data

dteday	season	yr	weekday	hr	rider_type	riders	price	COGS	revenue	profit
01-01-2022 00:00:00	1	1	0	4	casual	0	4.99	1.56	$0	0
02-01-2022 00:00:00	1	1	1	4	casual	0	4.99	1.56	$0	0
03-01-2022 00:00:00	1	1	2	4	casual	0	4.99	1.56	$0	0
04-01-2022 00:00:00	1	1	3	4	casual	0	4.99	1.56	$0	0
05-01-2022 00:00:00	1	1	4	4	casual	0	4.99	1.56	$0	0
06-01-2022 00:00:00	1	1	5	4	casual	0	4.99	1.56	$0	0
09-01-2022 00:00:00	1	1	1	4	casual	0	4.99	1.56	$0	0
10-01-2022 00:00:00	1	1	2	4	casual	0	4.99	1.56	$0	0
11-01-2022 00:00:00	1	1	3	4	casual	0	4.99	1.56	$0	0
12-01-2022 00:00:00	1	1	4	4	casual	0	4.99	1.56	$0	0
14-01-2022 00:00:00	1	1	6	4	casual	0	4.99	1.56	$0	0
17-01-2022 00:00:00	1	1	2	4	casual	0	4.99	1.56	$0	0
18-01-2022 00:00:00	1	1	3	4	casual	0	4.99	1.56	$0	0
19-01-2022 00:00:00	1	1	4	4	casual	0	4.99	1.56	$0	0
20-01-2022 00:00:00	1	1	5	4	casual	0	4.99	1.56	$0	0
21-01-2022 00:00:00	1	1	6	4	casual	0	4.99	1.56	$0	0
23-01-2022 00:00:00	1	1	1	4	casual	0	4.99	1.56	$0	0
24-01-2022 00:00:00	1	1	2	4	casual	0	4.99	1.56	$0	0
25-01-2022 00:00:00	1	1	3	4	casual	0	4.99	1.56	$0	0
26-01-2022 00:00:00	1	1	4	4	casual	0	4.99	1.56	$0	0
28-01-2022 00:00:00	1	1	6	4	casual	0	4.99	1.56	$0	0
29-01-2022 00:00:00	1	1	0	4	casual	0	4.99	1.56	$0	0
30-01-2022 00:00:00	1	1	1	4	casual	0	4.99	1.56	$0	0
31-01-2022 00:00:00	1	1	2	4	casual	0	4.99	1.56	$0	0
01-02-2022 00:00:00	1	1	3	4	casual	0	4.99	1.56	$0	0
02-02-2022 00:00:00	1	1	4	4	casual	0	4.99	1.56	$0	0
03-02-2022 00:00:00	1	1	5	4	casual	0	4.99	1.56	$0	0
05-02-2022 00:00:00	1	1	0	4	casual	0	4.99	1.56	$0	0

Query1 (34,758 rows) Column: Profit Margin (0 distinct values)



Importing Data into Power BI

The transformed data was imported into Power BI using the 'Get Data' feature, enabling interactive data analysis and visualization.

Building the Dashboard: Key Visualizations

KPI over Time Trends

A bar chart and line chart showcasing monthly sales revenue and profit over a specified period.

Customer Segmentation

A donut chart demonstrating customer demographics and their buying patterns.

Product Performance

A bar chart highlighting the top-selling products and their sales volumes.

Dashboard

Toman bike shop Dashboard

Riders

3M

Profit Margin

0.45

When are we Making Money ?

This table displays hourly sales data across a weak, with higher earnings in middle and early evening hours, suggesting these are the most profitable times.

hr	0	1	2	3	4	5	6
8	$194	$952	$1,087	$1,131	$1,132	$1,068	$265
9	$360	$503	$546	$552	$556	$598	$433
10	$594	$319	$297	$306	$306	$365	$610
11	$725	$376	$338	$353	$367	$434	$761
12	$857	$477	$422	$449	$461	$549	$868
13	$860	$472	$422	$431	$455	$558	$892
14	$835	$443	$388	$395	$410	$530	$882
15	$812	$466	$431	$422	$456	$584	$883
16	$816	$654	$662	$632	$664	$765	$844
17	$732	$1,153	$1,254	$1,185	$1,222	$1,136	$771
18	$625	$1,105	$1,192	$1,144	$1,165	$971	$671
19	$516	$791	$815	$827	$832	$698	$551
20	$385	$555	$582	$595	$622	$492	$415

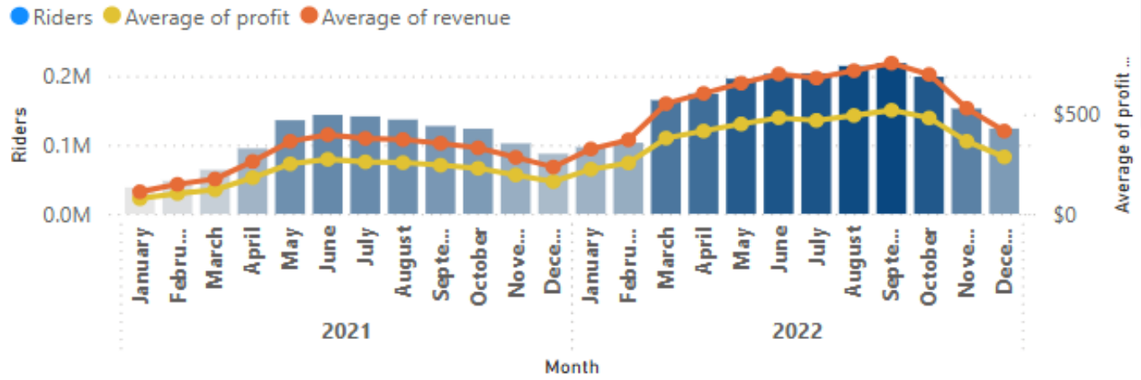
Revenue

$15M

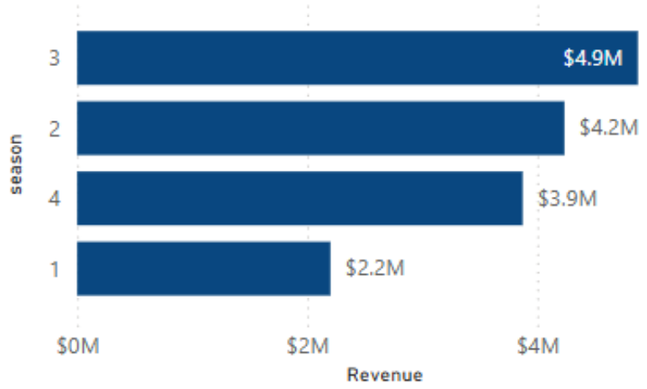
Profit

10.45M

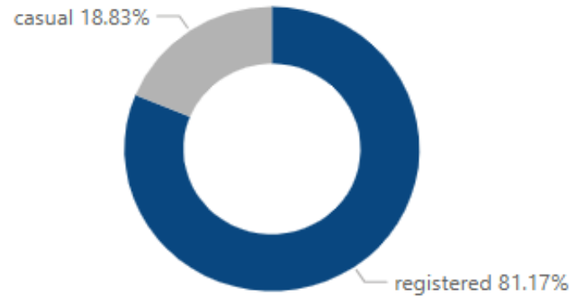
KPI over Time



Revenue by season



Riders Demography



Conclusion and Takeaways

1

Data Integration

Combining data from multiple sources provides a comprehensive view for analysis.

2

Power BI Dashboard

Interactive dashboard created for effectively communicate key findings and facilitate decision-making.

This project demonstrated the power of integrating data from multiple sources using SQL and visualizing the insights with a dynamic Power BI dashboard.

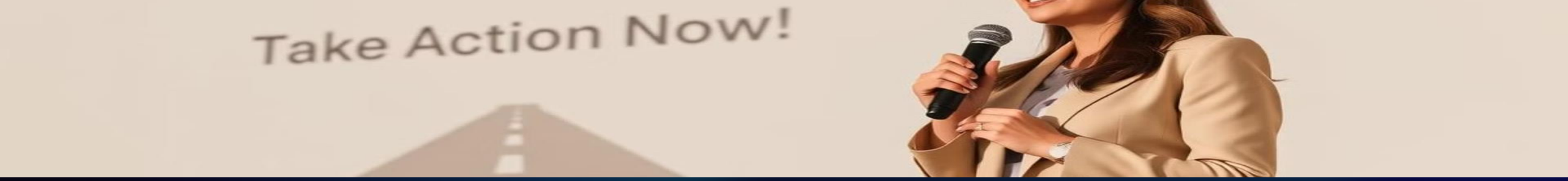
Insight and Findings

- **Peak Revenue Hours**: The **midday and early evening hours** generate the highest sales, indicating that these are the most profitable times for the bike shop.

- **Seasonal Revenue Trends**: Revenue by season shows that **Season 3 (likely summer months)** generates the highest revenue ($4.9M), while **Season 1 (likely winter months)** has the lowest revenue ($2.2M). This suggests demand is **seasonally driven**, with peak sales occurring in warmer months.

- **Steady Growth in Riders & Profits**: The **KPI over Time** chart shows a **gradual increase in riders and profits** from early 2021 to mid-2022, peaking around summer before declining slightly. This indicates strong business growth with **seasonal fluctuations**.

- **Majority of Riders are Registered Users**: The **Riders Demography** pie chart shows that **81.17% of riders are registered users**, meaning that most customers are **loyal or returning users**, which is a positive indicator for business stability.



Recommendation

- Conservative Increase: Considering the substantial increase last year, a more conservative increase might be prudent to avoid hitting a price ceiling where demand starts to drop. An increase in the range of 10-15% could test the market's response without risking a significant loss of customers.
- Price Setting: If the price in 2022 was $4.99, a 10% increase would make the new price about $5.49. A 15% increase would set the price at approximately $5.74.

Strategy recommendation:

- Market Analysis: Conduct further market research to understand customer satisfaction, potential competitive changes, and the overall economic environment. This can guide whether leaning towards the lower or higher end of the suggested increase.
- Segmented Pricing Strategy: Consider different pricing for casual versus registered users, as they may have different price sensitivities.
- feedback and sales data: Monitoring closely will allow you to fine-tune your pricing strategy without committing fully to a price that might turn out to be too high.

Thank you !

Project made by -Gitanjali Pekamwar