Internet Sales Analysis

1. Project Overview
A comprehensive business intelligence solution combining SQL-based data warehousing with interactive dashboard visualizations to analyze internet sales performance, customer behavior, and product trends.
This dataset represents 3 years (2019–2021) of sales data for an online bicycle and accessories retailer.The company sells exclusively through internet channels and operates globally across multiple continents.

2. Dataset Summary

- Rows: 50,000+
Table (Columns) Overview

- Fact_InternetSales
  7+ columns
  Includes: ProductKey, CustomerKey, OrderDateKey, SalesAmount, etc.
- DIM_Products
  10+ product attributes
  Covers details like product name, category, color, size, etc.
- DIM_Customers
  8+ customer attributes
  Includes demographic and geographic details
- DIM_Calendar
  8+ date attributes
  Supports time intelligence (Year, Month, Quarter, etc.)

The SQL file includes all CREATE TABLE statements and 18 analytical queries.

3. Data Analysis using SQL

We performed structured analysis in PostgreSQL to answer key business questions:

1. Write a query to calculate the total SalesAmount for each Year using the OrderDateKey and the DIM_Calendar table.

year integer	total_sales numeric
1	2019	5839631.00
2	2020	16351550.34
3	2021	45694.72

2. Retrieve the monthly SalesAmount trend for the year 2020, displaying MonthNo and total SalesAmount.

	year integer	monthno integer	total_sales numeric
1	2020	12	1874360.29
2	2020	11	1780920.06
3	2020	10	1673293.41
4	2020	9	1447495.69
5	2020	8	1551065.56
6	2020	7	1371675.81
7	2020	6	1643177.78
8	2020	5	1284592.93
9	2020	4	1046022.77
10	2020	3	1049907.39
11	2020	2	771348.74
12	2020	1	857689.91

3. Find the top 10 products by total SalesAmount, showing ProductItemCode, Product Name, and total revenue.

	productitemcode character varying (100)	product_name character varying (100)	total_revenue numeric
1	BK-M68B-46	Mountain-200 Black, 46	1371420.81
2	BK-M68B-42	Mountain-200 Black, 42	1363142.43
3	BK-M68S-38	Mountain-200 Silver, 38	1339462.86
4	BK-M68S-46	Mountain-200 Silver, 46	1301100.17
5	BK-M68B-38	Mountain-200 Black, 38	1290768.24
6	BK-M68S-42	Mountain-200 Silver, 42	1255363.22
7	BK-R89B-52	Road-250 Black, 52	730037.65
8	BK-R89R-58	Road-250 Red, 58	696092.54
9	BK-R89B-48	Road-250 Black, 48	691205.91
10	BK-R89B-44	Road-250 Black, 44	621832.26

4. Identify the top 10 customers by total SalesAmount, including CustomerKey and Full Name.

	customerkey [PK] integer	full_name character varying (200)	total_revenue numeric
1	11433	Maurice Shan	12909.67
2	11439	Janet Munoz	12489.17
3	11241	Lisa Cai	11469.19
4	11417	Lacey Zheng	11248.46
5	11420	Jordan Turner	11200.77
6	11242	Larry Munoz	11068.01
7	11425	Ariana Gray	10528.63
8	11429	Marco Lopez	10468.38
9	14186	Katrina Tang	9796.32
10	12301	Nichole Nara	9717.11

5. For each customer, calculate the average SalesAmount per order and sort the result in descending order.

	customerkey [PK] integer	full_name character varying (200)	avg_sales_amount numeric
1	16235	Sebastian Morris	2443.35
2	20482	Gina Diaz	2443.35
3	21557	Kate Lal	2443.35
4	18307	Amy Zhang	2443.35
5	25875	Jocelyn Price	2443.35
6	16745	Krista Moreno	2443.35
7	16776	Dalton Lewis	2443.35
8	28836	Lauren Cook	2443.35
9	29281	Charles Anderson	2443.35
10	20167	Joe Serrano	2443.35
11	20610	Jessie Zhou	2443.35
12	19621	Mariah Barnes	2443.35
13	28798	Timothy Phillips	2443.35
14	18693	Ann Subram	2443.35
15	28834	Natalie Hill	2443.35
16	18254	Larry Martin	2443.35

6. Retrieve the list of repeat customers who have placed more than one SalesOrderNumber, along with total SalesAmount.

	customerkey integer	full_name character varying (200)	order_count bigint	total_spent numeric
1	11433	Maurice Shan	6	12909.67
2	11439	Janet Munoz	6	12489.17
3	11241	Lisa Cai	7	11469.19
4	11417	Lacey Zheng	7	11248.46
5	11420	Jordan Turner	7	11200.77
6	11242	Larry Munoz	7	11068.01
7	11425	Ariana Gray	6	10528.63
8	11429	Marco Lopez	6	10468.38
9	14186	Katrina Tang	4	9796.32
10	12301	Nichole Nara	4	9717.11
11	12132	Kaitlyn Henderson	4	9716.00
12	13592	Gabriella Collins	4	9695.73
13	12308	Margaret He	4	9691.00
14	12131	Randall Dominguez	4	9687.72
15	12300	Adriana Gonzalez	4	9664.43
16	12321	Rosa Hu	4	9637.38

7. Display total SalesAmount grouped by Product Category and Sub Category.

	product_category character varying (100)	sub_category character varying (100)	total_sales_amount numeric
1	Bikes	Road Bikes	8750975.84
2	Bikes	Mountain Bikes	8603421.01
3	Bikes	Touring Bikes	3844801.05
4	Accessories	Tires and Tubes	245529.32
5	Accessories	Helmets	225335.60
6	Clothing	Jerseys	172950.68
7	Clothing	Shorts	71319.81
8	Accessories	Bottles and Cages	56798.19
9	Accessories	Fenders	46619.58
10	Accessories	Hydration Packs	40307.67
11	Accessories	Bike Stands	39591.00
12	Accessories	Bike Racks	39360.00
13	Clothing	Vests	35687.00
14	Clothing	Gloves	35020.70
15	Clothing	Caps	19688.10
16	Accessories	Cleaners	7218.60
17	Clothing	Socks	5106.32

8. Show the total SalesAmount for each Year and MonthNo.

	year integer	monthno integer	sales_amount numeric
1	2019	1	495364.01
2	2019	2	504139.67
3	2019	3	373482.95
4	2019	4	400335.59
5	2019	5	358877.87
6	2019	6	555160.18
7	2019	7	444558.28
8	2019	8	523917.45
9	2019	9	486177.50
10	2019	10	535159.56
11	2019	11	537955.67
12	2019	12	624502.27
13	2020	1	857689.91
14	2020	2	771348.74
15	2020	3	1049907.39
16	2020	4	1046022.77

9. Retrieve the top-selling product attributes by finding the highest revenue combinations of Product Color and Product Size.

	product_color character varying (50)	product_size character varying (50)	revenue numeric
1	Silver	38	1453347.38
2	Silver	46	1407289.79
3	Black	42	1389601.94
4	Silver	42	1380051.98
5	Black	46	1371420.81
6	Black	38	1290768.24
7	Black	52	1004460.82
8	Black	48	951130.29
9	Black	44	880433.66
10	Black	58	845595.26
11	Red	58	739156.99
12	Yellow	42	733318.70
13	Yellow	44	723549.27
14	Yellow	40	708450.53
15	Yellow	48	678433.97
16	Blue	46	539820.84
17	Blue	54	529187.25

10. Calculate total SalesAmount grouped by Product Status to compare active vs discontinued products.

	product_status character varying (50)	total_revenue numeric
1	Current	16524458.68
2	Outdate	5715271.79

11. List all customers whose DateFirstPurchase falls in the year 2021, along with their lifetime total SalesAmount.

	customerkey [PK] integer	full_name character varying (200)	first_purchase date	total_sales numeric
1	11733	Kristi Schmidt	2021-01-01	194.98
2	28024	Miguel Perry	2021-01-17	194.72
3	14575	Rachel Lee	2021-01-23	185.97
4	14206	Edwin West	2021-01-09	156.59
5	25189	Aidan Hayes	2021-01-01	152.60
6	16303	Tracy Yuan	2021-01-26	149.98
7	16576	Corey Beck	2021-01-06	149.46
8	20134	Franklin Zhao	2021-01-26	148.98
9	14514	Rachel Jones	2021-01-26	141.98
10	26613	Priscilla Lal	2021-01-19	138.96
11	13671	Frank Ramos	2021-01-28	135.23
12	20275	Angela Kelly	2021-01-13	133.49
13	20201	Chloe Harris	2021-01-28	133.49
14	18805	Tracy Simpson	2021-01-27	133.49
15	18846	Deb Hughes	2021-01-03	132.97
16	18774	Justin Flores	2021-01-26	132.97

12. List the number of customers in each Gender category.

	gender character varying (20)	customer_count bigint
1	Male	9351
2	Female	9133

13. Show total SalesAmount per Customer City.

	customer_city character varying (200)	total_sales numeric
1	London	693517.96
2	Paris	470333.98
3	Wollongong	256013.91
4	Bendigo	233819.75
5	Berlin	230563.72
6	Warrnambool	224971.07
7	Bellflower	220219.40
8	Townsville	217410.53
9	Sydney	215964.37
10	Goulburn	212457.62
11	Caloundra	206842.43
12	Brisbane	206520.67
13	Geelong	201783.30
14	Berkeley	192217.15
15	Port Macquarie	187001.03
16	Hervey Bay	185535.79
17	York	183164.26

14. Retrieve all orders placed in a specific month (e.g., March) of any year.

	salesordernumber character varying (50)	order_date date	customerkey integer	productkey integer	salesamount numeric (12,2)
1	SO47462	2019-03-01	15926	375	2181.56
2	SO47463	2019-03-01	14203	373	2181.56
3	SO47464	2019-03-01	16461	370	2443.35
4	SO47465	2019-03-01	15303	341	782.99
5	SO47466	2019-03-01	24887	381	1000.44
6	SO47467	2019-03-01	13446	371	2181.56
7	SO47468	2019-03-01	26152	329	782.99
8	SO47469	2019-03-02	19301	383	1000.44
9	SO47470	2019-03-02	28685	358	2049.10
10	SO47471	2019-03-02	14539	370	2443.35
11	SO47472	2019-03-02	13438	379	2181.56
12	SO47473	2019-03-02	21875	369	2443.35
13	SO47474	2019-03-02	21893	379	2181.56
14	SO47475	2019-03-02	21945	369	2443.35
15	SO47476	2019-03-02	12693	352	2071.42
16	SO47477	2019-03-03	28560	352	2071.42

15. Show the total number of orders placed each year.

	year integer	order_count bigint
1	2019	3267
2	2020	21289
3	2021	871

16. List all products in each Product Line along with the total sales for that line.

	product_line character varying (50)	productitemcode character varying (100)	product_name character varying (100)	product_revenue numeric
1	M	BK-M68B-46	Mountain-200 Black, 46	1371420.81
2	M	BK-M68B-42	Mountain-200 Black, 42	1363142.43
3	M	BK-M68S-38	Mountain-200 Silver, 38	1339462.86
4	M	BK-M68S-46	Mountain-200 Silver, 46	1301100.17
5	M	BK-M68B-38	Mountain-200 Black, 38	1290768.24
6	M	BK-M68S-42	Mountain-200 Silver, 42	1255363.22
7	M	BK-M38S-38	Mountain-400-W Silver, 38	113884.52
8	M	BK-M38S-46	Mountain-400-W Silver, 46	106189.62
9	M	BK-M38S-42	Mountain-400-W Silver, 42	99264.21
10	M	BK-M38S-40	Mountain-400-W Silver, 40	98494.72
11	M	TI-M823	HL Mountain Tire	48860.00
12	M	FE-6654	Fender Set - Mountain	46619.58
13	M	ST-1401	All-Purpose Bike Stand	39591.00
14	M	TI-M602	ML Mountain Tire	34818.39
15	M	BK-M18B-44	Mountain-500 Black, 44	31319.42
16	M	BK-M18B-48	Mountain-500 Black, 48	30239.44
17	M	BK-M18S-48	Mountain-500 Silver, 48	28249.50

17. Show all customers who made purchases worth more than 10,000 in total.

|	customerkey [PK] integer	full_name character varying (200)	total_spend numeric
1	11433	Maurice Shan	12909.67
2	11439	Janet Munoz	12489.17
3	11241	Lisa Cai	11469.19
4	11417	Lacey Zheng	11248.46
5	11420	Jordan Turner	11200.77
6	11242	Larry Munoz	11068.01
7	11425	Ariana Gray	10528.63
8	11429	Marco Lopez	10468.38

18. Identify orphan keys by listing ProductKey values in FACT_InternetSales that do not exist in DIM_Products and CustomerKey values missing from DIM_Customers.

productkey 🔒 integer	customerkey 🔒 integer

4. Dashboards in Power BI

Finally, we built an interactive dashboard in **Power BI** to present insights visually.
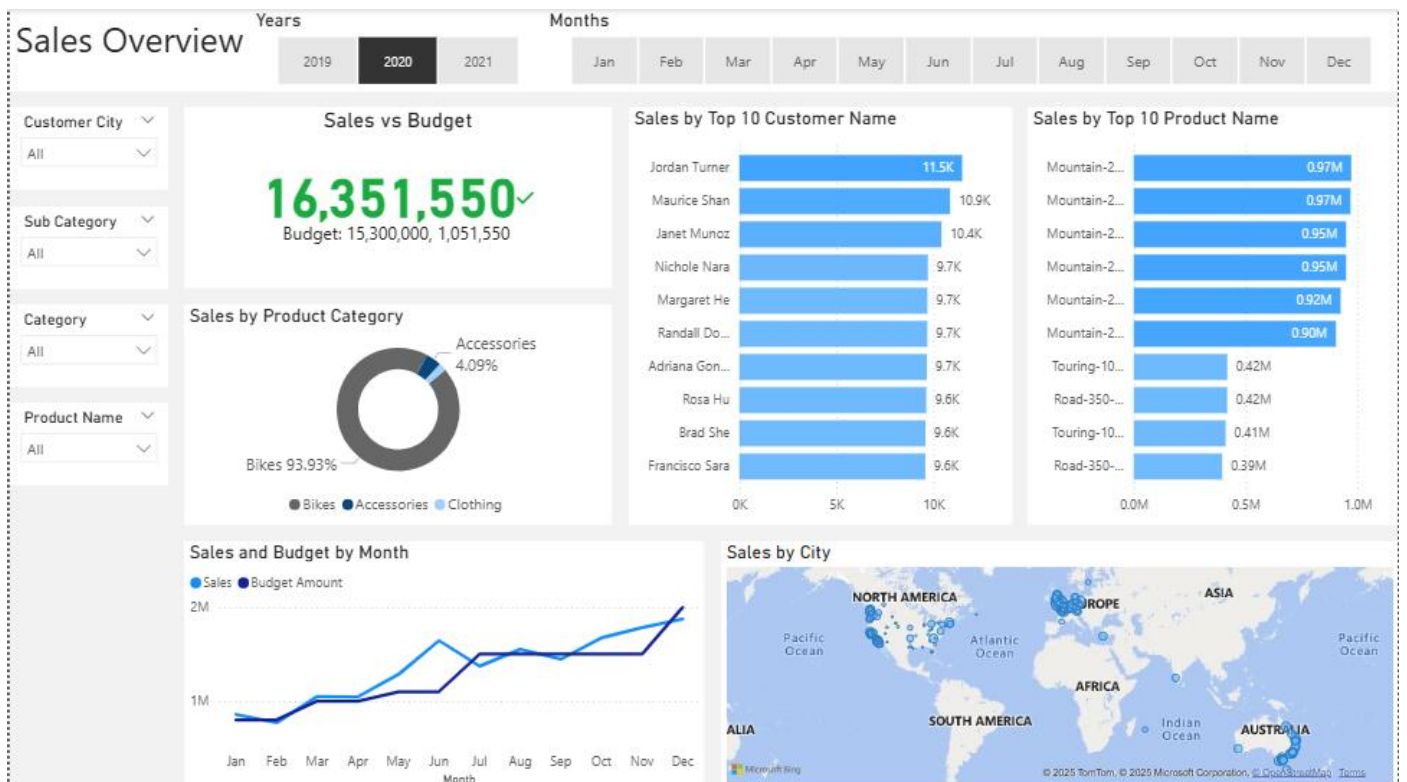
Customer Details

Customer City: All

Sub Category: All

Category: All

Product Name: All

16,351,550 Sales

15,300,000 Budget

Sales and Budget by Month

● Sales ● Budget Amount

Sales by City

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Sales by Top 10 Customers

Customer	Sales
Jordan Tur...	11.5K
Maurice S...	10.9K
Janet Mun...	10.4K
Nichole N...	9.7K
Margaret ...	9.7K
Randall D...	9.7K
Adriana G...	9.7K
Rosa Hu	9.6K
Brad She	9.6K
Francisco ...	9.6K
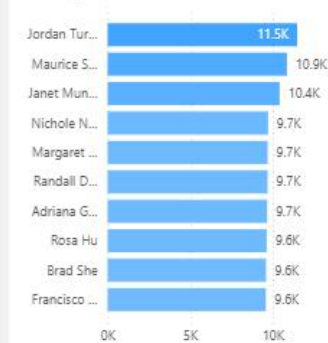
Customer Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Jordan Turner	2,377				2,355		540	2,433	540		3,239		11,484
Maurice Shan	4,885		2,322				1,269		2,384				10,861
Janet Munoz	4,876		3,122							2,419			10,418
Nichole Nara	2,482			2,494	2,322						2,419		9,717
Margaret He	2,500			2,423	2,340						2,428		9,691
Randall Dominguez	4,864			2,355						2,469			9,688
Adriana Gonzalez	2,498		2,393		2,320					2,453			9,664
Rosa Hu			2,492		4,747						2,398		9,637
Brad She	2,443			2,423	2,345						2,384		9,595
Francisco Sara	2,451		2,433		2,295					2,407			9,586
Total	857,690	771,349	1,049,907	1,046,023	1,284,593	1,643,178	1,371,676	1,551,066	1,447,496	1,673,293	1,780,920	1,874,360	16,351,550

Product Details

Customer City: All

Sub Category: All

Category: All

Product Name: All

16,351,550 Sales

15,300,000 Budget

Sales and Budget by Month

● Sales ● Budget Amount

Sales by City

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Sales by Top 10 Products

Product	Sales
Mountain...	0.97M
Mountain...	0.97M
Mountain...	0.95M
Mountain...	0.95M
Mountain...	0.92M
Mountain...	0.90M
Touring-1...	0.42M
Road-350...	0.42M
Touring-1...	0.41M
Road-350...	0.39M
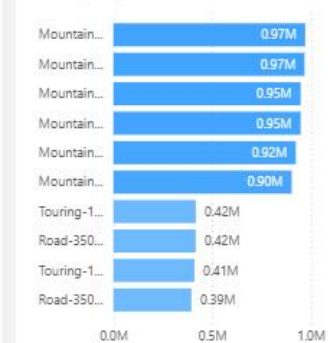
Product Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mountain-200 Black, 42	41,310	45,900	64,260	55,080	89,505	98,685	59,670	94,095	100,980	94,095	100,980	126,224	970,781
Mountain-200 Silver, 38	76,560	41,760	55,680	64,960	74,240	64,960	71,920	83,520	78,880	106,720	109,040	139,199	967,436
Mountain-200 Black, 38	61,965	34,425	64,260	41,310	64,260	94,095	94,095	100,980	73,440	98,685	119,339	100,980	947,831
Mountain-200 Black, 46	61,965	61,965	59,670	66,555	73,440	98,685	82,620	78,030	75,735	80,325	110,160	98,685	947,831
Mountain-200 Silver, 46	34,800	30,160	55,680	58,000	71,920	92,800	99,760	99,760	78,880	76,560	129,919	95,120	923,356
Mountain-200 Silver, 42	51,040	34,800	76,560	60,320	58,000	88,160	69,600	83,520	76,560	83,520	99,760	120,639	902,476
Touring-1000 Blue, 46	11,920	4,768	16,688	26,225	30,993	42,913	42,913	54,834	47,681	61,986	42,913	33,377	417,212
Road-350-W Yellow, 40	15,309	20,412	20,412	20,412	40,824	35,721	32,319	42,525	40,824	40,824	42,525	64,638	416,743
Touring-1000 Yellow, 46	14,304	14,304	19,073	21,457	28,609	40,529	38,145	40,529	33,377	45,297	57,218	57,218	410,060
Road-350-W Yellow, 42	10,206	10,206	18,711	15,309	37,422	40,824	27,216	47,628	42,525	52,731	34,020	57,834	394,630
Total	857,690	771,349	1,049,907	1,046,023	1,284,593	1,643,178	1,371,676	1,551,066	1,447,496	1,673,293	1,780,920	1,874,360	16,351,550

5. Business Recommendations

- Invest more in high-performing product lines like Mountain-200, expanding stock levels and promotional campaigns to maximize revenue from proven best-sellers.

- Improve retention of top customers (who drive a major share of total sales) through loyalty programs, exclusive discounts, and personalized communication.

- Strengthen marketing efforts in high-revenue regions such as North America and Europe, while launching targeted campaigns to grow weaker markets.

- Optimize inventory by analyzing monthly trends, ensuring sufficient stock during peak sales months and adjusting procurement during low-demand periods.

- Expand product category offerings where consistent sales are seen, while discontinuing or reworking low-performing items.

- Use customer segmentation (city, purchase frequency, order value) to create more accurate marketing strategies and targeted email/ads for higher conversion rates.