PORTFOLIO

Retail Merch Sales Analysis By SQL & POWER BI

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Understanding Customer Behavior:

- *Analyze how gender, age, and location affect what customers buy.*
- *Tailor marketing to fit these patterns.*
- *Improving Sales Performance:*

Find top-performing products and optimize pricing/shipping.

- *Understand what drives total sales.*

- *Using Ratings and Reviews:*

Identify what customers like or dislike based on ratings.

- *Improve product quality and satisfaction.*

- *Boosting Profitability:*

Pinpoint profitable products and demographics.

- *Reduce costs like shipping to improve margins.*

- *Optimizing International Shipping:*

Study trends in shipping overseas.

- *Compare costs and sales between domestic and international orders.*

- *Predicting Product Demand:*

Forecast sales trends to manage inventory better.

- *Prepare for seasonal changes in demand.*

- *Targeted Marketing by Gender/Age:*

See who buys what (gender/age group).

- *Create personalized campaigns for maximum impact.*

Selecting the table of Merch retail sales

```
select * from merch_sales;
```

order_id	order_date	product_id	product_category	buyer_gender	buyer_age	order_location	international_shipping	sales_price	shipping_charges	sales_per_unit	quantity	total_sales	rating	review
189440	2024-07-21	BF1543	Clothing	Male	30	New Jersey	No	100	0	100	1	100	4	The delivery team handled the product with ca
187385	2024-07-20	BF1543	Clothing	Male	32	Las Vegas	No	100	0	100	1	100	3	Had slight delays but the product was in good
181844	2024-07-21	BF1544	Other	Female	26	Cardiff	Yes	9	40	49	1	49	2	Waste of Money.
197934	2024-08-19	BF1544	Other	Male	28	Pittsburgh	No	9	0	9	2	18	3	Had slight delays but the product was in good
122470	2024-01-06	BF1545	Other	Female	19	Miami	No	10	0	10	3	30	5	Lack of delivery delays is greatly appreciated.
199680	2024-06-01	BF1546	Clothing	Male	29	Sydney	Yes	118	100	218	1	218	1	The product had an underwhelming design.
130929	2024-03-06	BF1547	Ornaments	Male	32	Memphis	No	32	0	32	3	96	4	Premium quality as usual.
164427	2024-04-16	BF1547	Ornaments	Male	26	Miami	No	32	0	32	2	64	3	Not as expected.
149510	2024-05-22	BF1545	Other	Female	26	New York	No	10	0	10	1	10	4	Lack of delivery delays is greatly appreciated.
176280	2024-02-27	BF1548	Clothing	Male	20	Sydney	Yes	65	100	165	1	165	4	Great design is one of the major positives of th
196659	2023-11-05	BF1546	Clothing	Female	34	Montreal	Yes	118	25	143	1	143	5	The product was delivered quickly.
146245	2024-09-24	BF1548	Clothing	Male	21	Sacramento	No	65	0	65	1	65	1	There is clear evidence of subpar detailing.
150560	2024-10-04	BF1546	Clothing	Male	29	Las Vegas	No	118	0	118	3	354	5	The product was delivered quickly.
138348	2024-01-26	BF1549	Clothing	Male	26	New Jersey	No	130	0	130	2	260	2	The product had an underwhelming design.
138790	2024-05-13	BF1547	Ornaments	Male	24	Montreal	Yes	32	25	57	2	114	3	Average product
170025	2023-12-03	BF1550	Clothing	Male	34	Paris	Yes	97	50	147	1	147	5	Exquisite craftsmanship here is absolutely app

1. Sales Trends Over Time Analyze how sales change over time to identify patterns or seasonality.

```sql
SELECT
    DATE_FORMAT(order_date, '%Y-%m') AS month,
    product_category,
    SUM(total_sales) AS total_sales,
    SUM(quantity) AS total_quantity
FROM
    merch_sales
GROUP BY DATE_FORMAT(order_date, '%Y-%m') , product_category
ORDER BY DATE_FORMAT(order_date, '%Y-%m') , total_sales DESC;
```

month	product_category	total_sales	total_quantity
2023-11	Clothing	45351	445
2023-11	Ornaments	12176	301
2023-11	Other	4831	162
2023-12	Clothing	54291	525
2023-12	Ornaments	13640	332
2023-12	Other	5102	223
2024-01	Clothing	54050	528
2024-01	Ornaments	12313	322
2024-01	Other	5439	237
2024-02	Clothing	49077	456
2024-02	Ornaments	13073	319

Insights : As we can see in below query result that ending of the year months like nov,dec and so on and start of the year months jan,feb,march etc. sales have hit the maximum potential and with that sold quantity has also increased.

2. Top-Selling Products & Find the best-selling products by category and revenue.

```sql
SELECT
    product_category,
    order_location,
    SUM(total_sales) AS total_revenue,
    SUM(quantity) AS total_quantity
FROM
    merch_sales
GROUP BY product_category , order_location
ORDER BY total_revenue DESC , total_quantity DESC
LIMIT 10;
```

product_category	order_location	total_revenue	total_quantity
Clothing	San Francisco	34129	382
Clothing	New Jersey	33203	361
Clothing	Sacramento	30724	346
Clothing	Portland	30713	329
Clothing	New York	30343	339
Clothing	Memphis	29766	321
Clothing	Las Vegas	29153	326
Clothing	Sydney	29022	153
Clothing	Cleveland	29004	320
Clothing	Miami	28282	308

Insights : As we can see in below query result that Clothing category Have high sales and High sales in location like San francisco and new jersey. as result in this we can increase in shipping quality and accurate the product quality according
to the customers neeeds that only give highs to us

3. Gender-Based Purchasing Trends Compare purchasing behavior by gender.

```sql
SELECT
    buyer_gender,
    product_category,
    AVG(sales_price) AS avg_price,
    SUM(quantity) AS total_quantity,
    SUM(total_sales) AS total_Revenue
FROM
    merch_sales
GROUP BY buyer_gender , product_category
ORDER BY buyer_gender , total_Revenue DESC;
```

buyer_gender	product_category	avg_price	total_quantity	total_Revenue
Female	Clothing	90.5445	1816	189643
Female	Ornaments	26.1795	1166	49687
Female	Other	10.8632	654	16803
Male	Clothing	89.8382	4281	447558
Male	Ornaments	26.1512	2602	106117
Male	Other	10.6298	1815	46654

Insights : As we can see here that Females dominate purchases in clothing and ornaments, contributing ₹189,643 in total revenue with an average spend of ₹90 per transaction.

4. Age Group Insights Determine which age groups spend the most and on which product categories.

```sql
SELECT
    CASE
        WHEN buyer_age < 18 THEN 'under 18'
        WHEN buyer_age BETWEEN 18 AND 30 THEN '18-30'
        WHEN buyer_age BETWEEN 31 AND 50 THEN '31-50'
        ELSE '50+'
    END AS AgeGroup,
    product_category,
    SUM(total_sales) AS Total_Sales,
    AVG(rating) AS avg_rating
FROM
    merch_sales
GROUP BY AgeGroup , product_category
ORDER BY Total_Sales DESC;
```

AgeGroup	product_category	Total_Sales	avg_rating
18-30	Clothing	462371	3.4961
31-50	Clothing	174830	3.5083
18-30	Ornaments	111277	3.4245
18-30	Other	46723	3.5776
31-50	Ornaments	44527	3.5016
31-50	Other	16734	3.5930

Insights : Age Group 18-30 dominates **Clothing sales**, contributing ₹462,371 with an average rating of 3.50.Age Group 31-50 shows lower **Clothing** sales, ₹174,830, but a similar rating of 3.51.
Ornaments perform better with 18-30, generating ₹111,277 (rating: 3.42), compared to ₹44,527 (rating: 3.50) for 31-50.
Other products have higher ratings across both groups, with 18-30 contributing ₹46,723 (rating: 3.58) and
31-50 contributing ₹16,734 (rating: 3.59).

5. Ratings and Reviews Analysis Understand how ratings impact sales and product categories.

```sql
SELECT
    product_category,
    ROUND(AVG(rating), 2) AS avg_rating,
    SUM(total_sales) AS Total_sales,
    COUNT(review) AS count_reviews
FROM
    merch_sales
WHERE
    rating IS NOT NULL
GROUP BY product_category
ORDER BY avg_rating DESC , Total_sales DESC;
```

product_category	avg_rating	Total_sales	count_reviews
Other	3.58	63457	1434
Clothing	3.50	637201	3704
Ornaments	3.45	155804	2256

Insights : **Clothing**: Highest sales (₹637,201) and reviews (3,704), with an average rating of 3.50.
Ornaments: Moderate sales (₹155,804) and reviews (2,256), with an average rating of 3.45.
Other: Lowest reviews (1,434) but moderate sales (₹63,457), with an average rating of 3.58.

6. Shipping Analysis (Domestic vs. International) Compare domestic and international shipping sales.

```sql
SELECT
    international_shipping AS is_international,
    product_category,
    SUM(total_sales) AS total_sales,
    AVG(shipping_charges) AS avg_ship_charges,
    COUNT(order_id) AS total_orders
FROM
    merch_sales
GROUP BY international_shipping , product_category
ORDER BY total_sales DESC;
```

is_international	product_category	total_sales	avg_ship_charges	total_orders
No	Clothing	385358	0.0000	2577
Yes	Clothing	251843	47.7285	1127
Yes	Ornaments	89677	48.8129	695
No	Ornaments	66127	0.0000	1561
Yes	Other	45336	47.3095	433
No	Other	18121	0.0000	1001

Insights : Clothing dominates domestic sales with
₹385,358 from 2,577 orders,
60% higher revenue than international sales,
which generated ₹251,843 from 1,127 orders.

International sales of ornaments and other
products outperform domestic sales in
revenue by 35% and 2.5x, respectively, despite
having fewer orders.

Shipping charges impact: International orders
incur an average
shipping cost of ₹47–₹49, while domestic orders
have no shipping charges,
driving higher domestic order volumes.

7. High-Value Customers Identify customers with the highest spending.

```sql
SELECT
    buyer_gender,
    order_location,
    SUM(total_sales) AS total_spending,
    COUNT(order_id) AS total_orders
FROM
    merch_sales
GROUP BY buyer_gender , order_location
HAVING SUM(total_sales) > 1000
ORDER BY total_orders DESC
LIMIT 10;
```

buyer_gender	order_location	total_spending	total_orders
Male	New Jersey	29874	313
Male	San Francisco	29325	305
Male	Memphis	27080	290
Male	Portland	25083	286
Male	San Antonio	23351	281
Male	Cleveland	25339	279
Male	Pittsburgh	24453	273
Male	Las Vegas	23502	269
Male	Miami	23998	269
Male	Sacramento	23387	268

Insights :

Top Spender: New Jersey ($29,874, 313 orders).

Lowest: Sacramento ($23,387, 268 orders).

Avg Spend/Order: Highest in New Jersey ($95.44), lowest in Sacramento ($87.28).
Spending aligns with order volume.

8. Profit Margin Analysis Calculate profit margins for different product categories.

```sql
SELECT
    product_category,
    SUM(sales_per_unit * quantity - shipping_charges) AS total_profit,
    SUM(total_sales) AS Total_revenue,
    ROUND((SUM(sales_per_unit * quantity - shipping_charges) / SUM(total_sales)) * 100,
          2) AS profit_margin
FROM
    merch_sales
GROUP BY product_category
ORDER BY total_profit DESC;
```

product_category	total_profit	Total_revenue	profit_margin
Clothing	583411	637201	91.56
Ornaments	121879	155804	78.23
Other	42972	63457	67.72

Insights :

Clothing has the highest profit margin at 91.56%, generating ₹583,411 profit from ₹637,201 in revenue.

Ornaments contribute the second-highest profit margin at 78.23%, with a profit of ₹121,879 from ₹155,804 in revenue.

Other category has the lowest profit margin at 67.72%, generating ₹42,972 in profit from ₹63,457 in revenue.

9. International Market Trends Analyze international markets' performance.

```sql
SELECT
    order_location,
    COUNT(order_id) AS total_orders,
    SUM(total_sales) AS total_sales,
    AVG(shipping_charges) avg_shipcharges
FROM
    merch_sales
WHERE
    international_shipping = 'Yes'
GROUP BY order_location
ORDER BY total_sales DESC;
```

order_location	total_orders	total_sales	avg_shipcharges
Sydney	184	48049	100.0000
Mumbai	187	38115	70.0000
New Delhi	174	36054	70.0000
Manchester	208	32426	40.0000
Cardiff	205	32397	40.0000
London	191	32104	40.0000
Liverpool	189	30875	40.0000
Dublin	196	30172	40.0000
Glasgow	178	29000	40.0000
Paris	171	27857	50.0000
Toronto	185	26163	25.0000

Insights :

Highest Total Orders and Sales: Manchester recorded the highest total orders (208) and sales (₹32,426), followed closely by Cardiff (205 orders, ₹32,397) and Sydney (184 orders, ₹48,049).

Average Shipping Charges: Sydney had the highest average shipping charges (₹100), while most other locations, including Mumbai and New Delhi, had average charges around ₹70.

Sales vs Orders: Despite having the highest number of orders, Toronto and Montreal had the lowest total sales (₹26,163 and ₹23,644, respectively), indicating lower average sales per order compared to other locations.

10. Demand Forecasting for Inventory Predict demand by analyzing past trends.

```sql
SELECT
    DATE_FORMAT(order_date, '%Y-%m') AS month,
    product_category,
    SUM(quantity) AS total_quantity
FROM
    merch_sales
GROUP BY DATE_FORMAT(order_date, '%Y-%m') , product_category
ORDER BY DATE_FORMAT(order_date, '%Y-%m') DESC;
```

month	product_category	total_quantity
2024-11	Clothing	68
2024-11	Ornaments	36
2024-11	Other	31
2024-10	Clothing	530
2024-10	Ornaments	261
2024-10	Other	177
2024-09	Clothing	477
2024-09	Ornaments	318
2024-09	Other	231
2024-08	Clothing	455
2024-08	Ornaments	268

Insights :

Clothing Sales Consistency: Clothing consistently leads in total quantity sold each month, with the highest recorded sales in May 2024 (585 units) and a slight dip in November 2024 (68 units). Overall, the monthly sales trend for clothing shows significant fluctuation.

Ornaments Perform Steadily: Ornaments demonstrate steady sales across the months, with an increase in quantity sold from 177 in June 2024 to 340 in May 2024, peaking in July 2024 with 340 units. The sales are generally stable compared to other product categories.

Other Category Fluctuations: The "Other" product category shows a noticeable drop in November 2024 (31 units) compared to earlier months (e.g., 177 in October 2024). There's a trend of decrease in sales volume, particularly towards the end of the year.

THANK YOU!
&
Your feedback on this
would be highly valuable.