Adventure Works Sales and Marketing Analysis Data Warehouse

Author: Saakshi Agarwal

Executive Summary

This report analyses store performance using key financial metrics such as total revenue, total profit, and profit margins. It identifies the most profitable and highest revenue-generating stores, examines seasonal sales trends, and evaluates the impact of promotions on revenue growth. By analysing historical data from 2011 to 2014, the study provides insights into business cycles, regional performance, and operational efficiency, offering strategic recommendations for marketing, inventory management, and pricing strategies.

This report provides an in-depth analysis of store performance by evaluating total revenue, profitability, and seasonal sales trends using sales data from 2011 to 2014. The objective of this study is to identify high-performing stores, assess regional market strengths, analyze seasonal demand fluctuations, and evaluate the impact of promotions on revenue growth. The goal is to derive actionable insights that can optimize marketing strategies, inventory management, and pricing models for long-term business success.

To achieve this, a SQL-based data processing approach was implemented using Azure Data Factory (ADF) and ERD modeling. Historical sales data was extracted from SQL Server using ADF pipelines, structured into a star schema, and processed through ETL workflows to ensure data consistency. The dataset was analyzed using SQL queries, joins, and aggregations, focusing on revenue trends, order volume, and profitability metrics.

VIP customers generate the highest revenue and show strong loyalty, while new and regular customers have low retention rates. Many promotions boost sales but hurt profit margins, especially deep discounts. High-performing regions like the Northwest, Canada, and France benefit from premium pricing. Seasonal trends impact sales, requiring better inventory planning. To improve profitability, the business should implement tiered loyalty programs, focus on value-based promotions, expand in top-performing regions, and align inventory with seasonal demand.

Motivation

As an analyst, we selected Marketing and Sales as our scenario because of their crucial role in business growth, customer engagement, and profitability. In today's highly competitive market, businesses must adopt data-driven strategies to optimize their marketing efforts, maximize sales, and improve customer retention.

We were particularly drawn to this scenario because it allows us to analyze real-world challenges, such as identifying high-value customers, evaluating the effectiveness of promotions, and understanding how different product and pricing strategies impact revenue. Businesses can make informed decisions that enhance marketing efficiency and drive sustainable growth by leveraging data analytics.

Furthermore, assessing sales trends, store performance, and seasonal demand fluctuations is essential for optimizing inventory management and strategic planning. This scenario provides valuable insights into how organizations can refine their sales strategies and marketing campaigns to better align with consumer behaviour.

Our goal in choosing this topic is to explore how data-driven decision-making can transform marketing strategies and sales performance, ultimately leading to increased customer satisfaction and business success.

Insightful Questions

The goal is to leverage data-driven insights to maximize sales, enhance customer retention, and improve marketing effectiveness. By analyzing customer behavior, promotion performance, product trends, store profitability, and seasonal patterns, the business aims to make informed and strategic decisions that drive growth. This approach ensures that business actions are proactive, targeted, and aligned with overall strategic objectives.

1. Which customer segments (VIP, Regular, New) have the highest retention rates, and what factors drive their spending behavior?

- Business Relevance: Understanding which customer segments are most loyal and what drives their spending helps the business design targeted loyalty programs and personalized marketing campaigns to retain high-value customers.
- Scenario Relevance: In maximizing customer retention, identifying VIP, Regular, and new customers' behaviors ensures that resources are focused on the right groups.
- Purpose: This question aims to uncover which customers are most likely to return and how much they spend, allowing for more effective retention strategies.

2. Which promotions resulted in the highest increase in sales, and how does discount percentage impact profitability?

- Business Relevance: Identifying effective promotions ensures marketing budgets are spent on campaigns that generate real revenue growth without compromising profitability.
- Scenario Relevance: For improving marketing effectiveness, knowing which promotions work best allows optimization of future marketing plans.
- Purpose: The goal is to determine which promotions offer the best balance between driving sales and maintaining healthy profit margins.

3. Which product categories and brands generate the highest revenue, and how do promotions affect sales performance for each product?

- Business Relevance: This helps tailor product-specific pricing and promotional strategies, ensuring that high-revenue categories are priced and marketed strategically.
- Scenario Relevance: Essential for businesses aiming to optimize their product portfolio and maximize return from marketing and sales efforts.
- Purpose: To identify top-performing product categories and brands and understand how discounts impact their sales performance.

4. Which physical store locations are the most profitable, and how do sales and profitability vary across different stores?

- Business Relevance: Pinpointing top-performing stores helps with decisions related to inventory management, staffing, and localized marketing.
- Scenario Relevance: Directly relates to improving sales channel performance and understanding store-level dynamics.
- Purpose: To rank stores by profitability and analyze what factors contribute to high or low performance.

5. What are the peak sales periods, and how do seasonal trends affect overall revenue?

- Business Relevance: Identifying seasonal sales patterns supports better inventory management, staffing, and targeted seasonal promotions.
- Scenario Relevance: Key for aligning supply chain and marketing strategies with demand fluctuations.
- Purpose: To recognize peak sales months and seasons for proactive business planning.

These questions collectively help improve customer retention, maximize promotion ROI, optimize product pricing, enhance store profitability, and support accurate sales forecasting — enabling data-driven strategies for boosting sales, profitability, and marketing effectiveness.

Entity-Relationship Diagram

Figure 1: *Star Schema Entity-Relationship Diagram For Sales And Marketing*

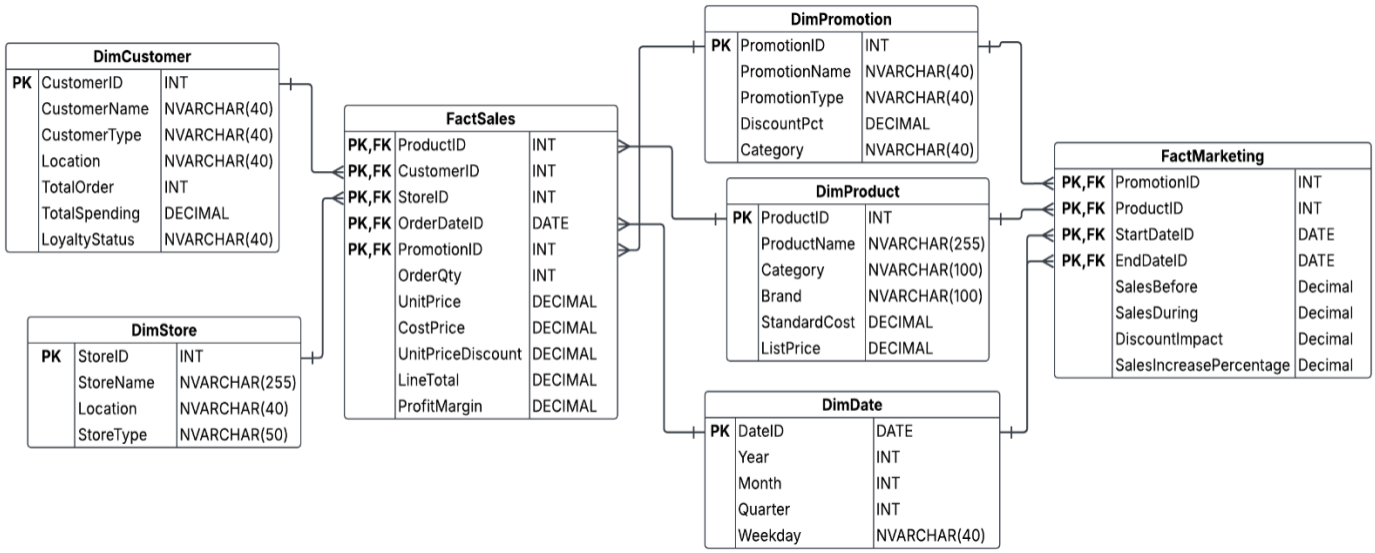


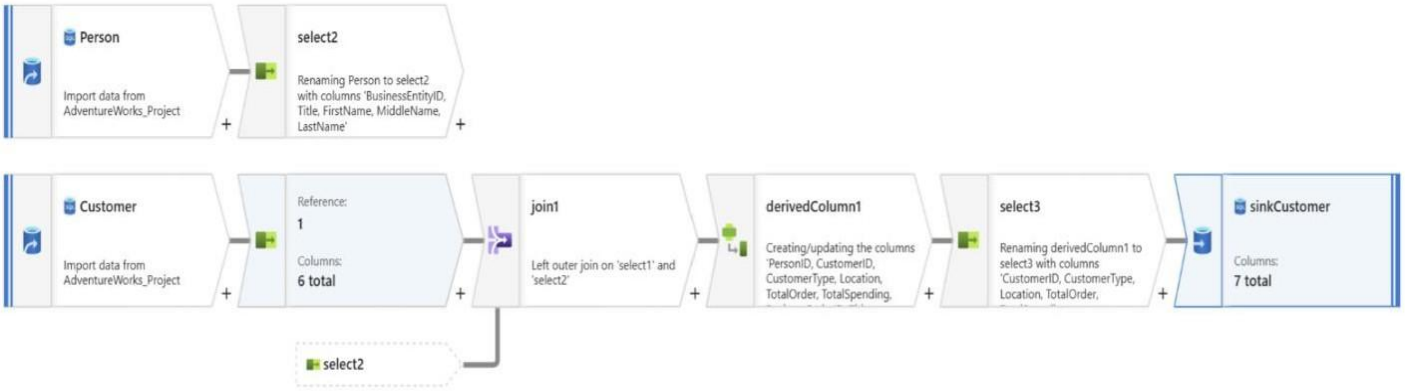
Figure 1 represents a Star Schema designed for analyzing sales, marketing, customer, and store performance. At the center is the FactSales table, which records transactional data such as products sold, customers, stores, promotions, and revenue details. It links to dimension tables like DimCustomer, DimStore, DimProduct, DimPromotion, and DimDate for detailed attributes. Another fact table, FactMarketing, captures promotion performance and sales impact. This schema supports in-depth analysis of sales trends, profit margins, customer spending, store revenue, promotion effectiveness, and product performance, enabling comprehensive business insights across various dimensions.

Azure Data Factory Screenshots

Figure 2: ***Data Flow For DimPromotion***

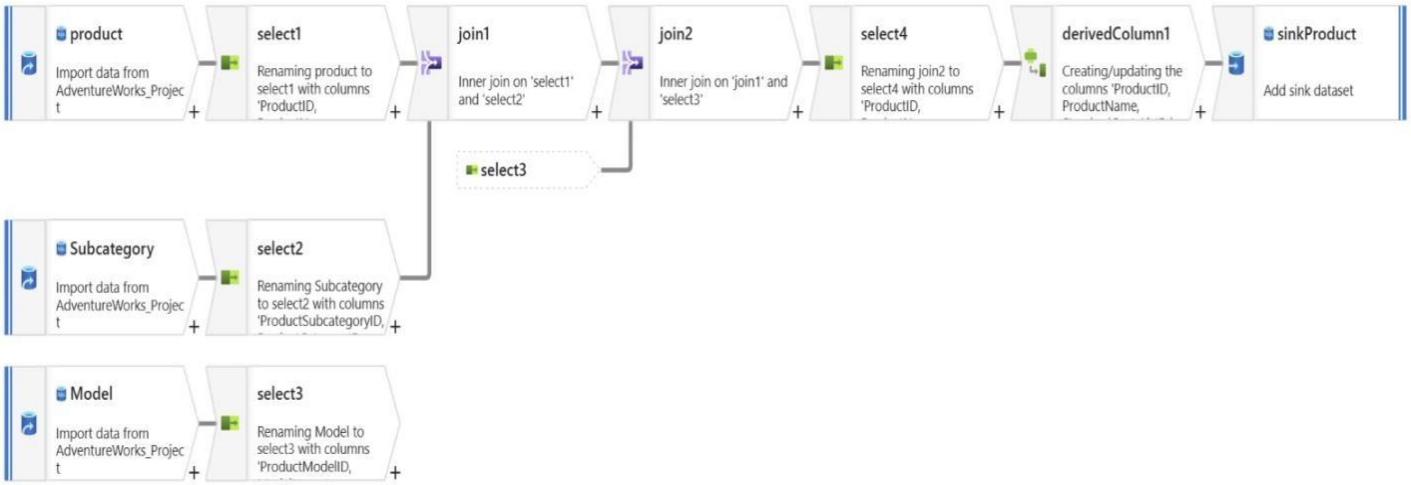
Note. The Promotion dimension flow formats SpecialOffer data to create DimPromotion, including PromotionName, DiscountPct, and PromotionType.

Figure 3: ***Data Flow For DimCustomer***



Note. The Customer dimension flow joins data from Person and Customer tables to create customer profiles with attributes like CustomerType, Location, TotalOrder, and LoyaltyStatus, and loads them into DimCustomer.

Figure 4: ***Data Flow For DimProduct***



Note. The Product dimension flow combines Product, Subcategory, and Model data to build DimProduct with details like ProductName, Category, Brand, and pricing information.

Figure 5: ***Data Flow For FactSales***

Note. The Sales fact flow directly imports and stores transactional data into FactSales for sales analysis.

Figure 6: ***Data Flow For DimDate***

Note. The Date dimension flow imports and filters DimDate to retain relevant columns (Year, Quarter, Month, Weekday) for DimDate

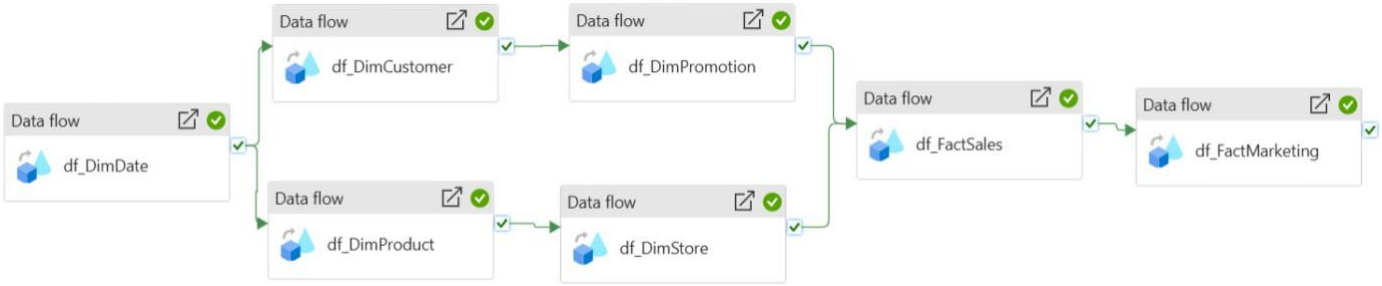
Figure 7: ***Data Flow for DimStore***

Note. Store dimension flow joins Store, Customer, and Territory data to form DimStore, adding attributes like StoreType and regional details.

Figure 8: ***Data Flow For FactMarketing***

Note. The Marketing fact flow processes FactMarketing to standardize columns like SalesBefore, SalesDuring, DiscountImpact, and stores the result in FactMarketing

Figure 9: ***Pipeline***



Note. This pipeline shows the sequential ETL process where dimension tables are loaded first, followed by FactSales and FactMarketing, ensuring a complete star schema for analytics.

SQL Statements

Q1)

i. Code for analyzing total spending and orders in different years and types of customer segments.

```
WITH CustomerPurchaseHistory AS (
    -- Aggregate customer sales history per year
    SELECT
        fs.CustomerID,
        dc.LoyaltyStatus AS CustomerSegment,
        dd.Year AS PurchaseYear,
        COUNT(DISTINCT fs.OrderDateID) AS TotalOrders,      -- Unique orders per customer per year
        SUM(fs.LineTotal) AS TotalSpending                  -- Total spending per customer per year
    FROM FactSales fs
    JOIN DimCustomer dc ON fs.CustomerID = dc.CustomerID
    JOIN DimDate dd ON fs.OrderDateID = dd.DateID
    GROUP BY fs.CustomerID, dc.LoyaltyStatus, dd.Year
)
SELECT
    CustomerSegment,
    PurchaseYear,
    SUM(TotalOrders) AS TotalOrders,     -- Total orders for that segment and year
    CAST(SUM(TotalSpending) AS DECIMAL(18,2)) AS TotalSpending
FROM CustomerPurchaseHistory
GROUP BY CustomerSegment, PurchaseYear
ORDER BY PurchaseYear DESC, TotalSpending DESC, CustomerSegment;
```

Figure 10: ***Output for Analyzing Customer spending patterns***

	CustomerSegment	PurchaseYear	TotalOrders	TotalSpending
1	VIP	2014	320	12517259.78
2	Regular	2014	4015	8501838.17
3	New	2014	7426	1400400.37
4	VIP	2013	1089	36471439.76
5	Regular	2013	5593	11120243.65
6	New	2013	7500	1374204.56
7	VIP	2012	868	30163150.68
8	Regular	2012	2569	7139366.44
9	New	2012	478	373183.19
10	VIP	2011	304	9641499.08
11	Regular	2011	1145	4399145.18
12	New	2011	158	115055.27

ii. Analyzing retention rate across different years and type of customers segments.

```
WITH CustomerPurchaseHistory AS (
 -- Aggregate customer sales history per year
    SELECT
        fs.CustomerID,
        dc.LoyaltyStatus AS CustomerSegment,
        dd.Year AS PurchaseYear
    FROM FactSales fs
    JOIN DimCustomer dc ON fs.CustomerID = dc.CustomerID
    JOIN DimDate dd ON fs.OrderDateID = dd.DateID
    GROUP BY fs.CustomerID, dc.LoyaltyStatus, dd.Year
)
SELECT
    cp1.CustomerSegment,
    cp1.PurchaseYear AS CurrentYear,
    CAST(COUNT(DISTINCT cp2.CustomerID) * 100.0 / NULLIF(COUNT(DISTINCT
cp1.CustomerID), 0) AS DECIMAL(5,2)) AS RetentionRate -- formatted as %
FROM CustomerPurchaseHistory cp1
LEFT JOIN CustomerPurchaseHistory cp2
    ON cp1.CustomerID = cp2.CustomerID
```

```
    AND cp1.PurchaseYear = cp2.PurchaseYear - 1   -- customers who returned next year
GROUP BY cp1.CustomerSegment, cp1.PurchaseYear
ORDER BY cp1.PurchaseYear DESC, cp1.CustomerSegment;
```

Figure 11: ***Output for Analyzing Retention rate over the years***

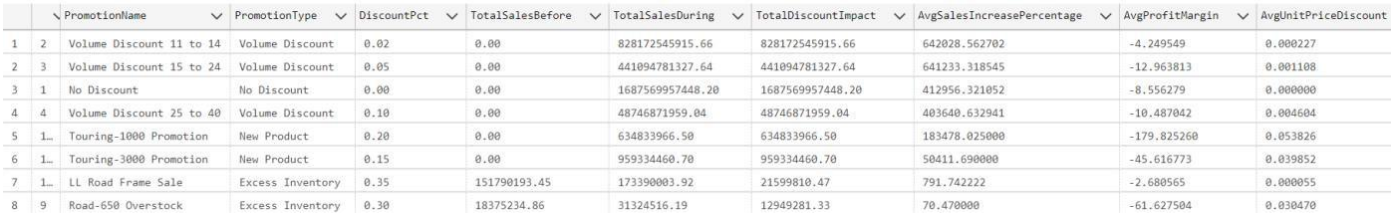
	CustomerSegment	CurrentYear	RetentionRate
1	New	2014	0.00
2	Regular	2014	0.00
3	VIP	2014	0.00
4	New	2013	19.15
5	Regular	2013	29.42
6	VIP	2013	90.91
7	New	2012	21.74
8	Regular	2012	60.53
9	VIP	2012	84.56
1…	New	2011	10.19
1…	Regular	2011	4.32
1…	VIP	2011	100.00

Q2)

i. Analyzing poor profit margin after promotion was applied

```
SELECT
    dp.PromotionID,
    dp.PromotionName,
    dp.PromotionType,
    dp.DiscountPct,
    SUM(fm.SalesBefore) AS TotalSalesBefore,
SUM(fm.SalesDuring) AS TotalSalesDuring,
SUM(fm.DiscountImpact) AS TotalDiscountImpact,
AVG(fm.SalesIncreasePercentage) AS AvgSalesIncreasePercentage,
AVG(fs.ProfitMargin) AS AvgProfitMargin,
AVG(fs.UnitPriceDiscount) AS AvgUnitPriceDiscount
FROM DimPromotion dp
LEFT JOIN FactMarketing fm ON dp.PromotionID = fm.PromotionID
LEFT JOIN FactSales fs ON dp.PromotionID = fs.PromotionID
GROUP BY
    dp.PromotionID,
    dp.PromotionName,
    dp.PromotionType,
    dp.DiscountPct
HAVING
    AVG(fm.SalesIncreasePercentage) > 0      -- Sales increased during promotion
    AND AVG(fs.ProfitMargin) < 5             -- Profit margin is poor (adjust threshold as needed, e.g., < 0
for negative profit)
ORDER BY
    AVG(fm.SalesIncreasePercentage) DESC;   -- Sort by highest sales increase
```

Figure 12: ***Output for Analyzing poor profit margin after promotion***



		PromotionName	PromotionType	DiscountPct	TotalSalesBefore	TotalSalesDuring	TotalDiscountImpact	AvgSalesIncreasePercentage	AvgProfitMargin	AvgUnitPriceDiscount
1	2	Volume Discount 11 to 14	Volume Discount	0.02	0.00	828172545915.66	828172545915.66	642028.562702	-4.249549	0.000227
2	3	Volume Discount 15 to 24	Volume Discount	0.05	0.00	441094781327.64	441094781327.64	641233.318545	-12.963813	0.001108
3	1	No Discount	No Discount	0.00	0.00	1687569957448.20	1687569957448.20	412956.321052	-8.556279	0.000000
4	4	Volume Discount 25 to 40	Volume Discount	0.10	0.00	48746871959.04	48746871959.04	403640.632941	-10.487042	0.004604
5	1…	Touring-1000 Promotion	New Product	0.20	0.00	634833966.50	634833966.50	183478.025000	-179.825260	0.053826
6	1…	Touring-3000 Promotion	New Product	0.15	0.00	959334460.70	959334460.70	50411.690000	-45.616773	0.039852
7	1…	LL Road Frame Sale	Excess Inventory	0.35	151790193.45	173390003.92	21599810.47	791.742222	-2.680565	0.000055
8	9	Road-650 Overstock	Excess Inventory	0.30	18375234.86	31324516.19	12949281.33	70.470000	-61.627504	0.030470

ii. Analyzing healthy profit margin after promotion was applied

```
SELECT
    dp.PromotionID,
    dp.PromotionName,
    dp.PromotionType,
    dp.DiscountPct,
    SUM(fm.SalesBefore) AS TotalSalesBefore,
    SUM(fm.SalesDuring) AS TotalSalesDuring,
    SUM(fm.DiscountImpact) AS TotalDiscountImpact,
    AVG(fm.SalesIncreasePercentage) AS AvgSalesIncreasePercentage,
    AVG(fs.ProfitMargin) AS AvgProfitMargin,
    AVG(fs.UnitPriceDiscount) AS AvgUnitPriceDiscount
FROM DimPromotion dp
LEFT JOIN FactMarketing fm ON dp.PromotionID = fm.PromotionID
LEFT JOIN FactSales fs ON dp.PromotionID = fs.PromotionID
GROUP BY
    dp.PromotionID,
    dp.PromotionName,
    dp.PromotionType,
    dp.DiscountPct
HAVING
    AVG(fm.SalesIncreasePercentage) > 0        -- Sales must increase
    AND AVG(fs.ProfitMargin) >= 5              -- Healthy positive profit margin
ORDER BY
    AVG(fm.SalesIncreasePercentage) DESC;      -- Sorted by highest sales growth among effective promos
```

Figure 13: ***Output for Analyzing healthy profit margin***

		PromotionName	PromotionType	Discou…	TotalSalesBefore	TotalSalesDuring	TotalDiscount…	AvgSalesIncreasePerc…	AvgProfitMargin	AvgUnitPriceDiscount
1	5	Volume Discount 41 to 60	Volume Discount	0.15	0.00	145116975.84	145116975.84	102483.740000	10.665254	0.013290
2	1…	Mountain-500 Silver Clearan…	Discontinued Product	0.40	737166468.15	1985973845.61	1248807397.29	78.214285	21.495461	0.034296
3	1…	Sport Helmet Discount-2003	Seasonal Discount	0.15	22850337.16	38508166.76	15657856.97	68.870000	7.087902	0.009744

iii. Analyzing Negative profit margin after promotion was applied

```
SELECT
    dp.PromotionID,
    dp.PromotionName,
    dp.PromotionType,
    dp.DiscountPct,
    SUM(fm.SalesBefore) AS TotalSalesBefore,
    SUM(fm.SalesDuring) AS TotalSalesDuring,
    SUM(fm.DiscountImpact) AS TotalDiscountImpact,
    AVG(fm.SalesIncreasePercentage) AS AvgSalesIncreasePercentage,
    AVG(fs.ProfitMargin) AS AvgProfitMargin,
    AVG(fs.UnitPriceDiscount) AS AvgUnitPriceDiscount
FROM DimPromotion dp
LEFT JOIN FactMarketing fm ON dp.PromotionID = fm.PromotionID
LEFT JOIN FactSales fs ON dp.PromotionID = fs.PromotionID
GROUP BY
    dp.PromotionID,
    dp.PromotionName,
    dp.PromotionType,
    dp.DiscountPct
HAVING
    SUM(fm.SalesDuring) > 100000  -- You can adjust this sales threshold as needed
    AND AVG(fs.ProfitMargin) < 0  -- Negative profit margin
ORDER BY
    SUM(fm.SalesDuring) DESC;      -- Highest sales first
```

Figure 14: ***Output for Analyzing Negative profit margin***

		PromotionName	PromotionType	DiscountPct	TotalSalesBef…	TotalSalesDuring	TotalDiscountImpact	AvgSalesIncreasePerc…	AvgProfitMargin	AvgUnitPriceDiscount
1	1	No Discount	No Discount	0.00	0.00	1687569957448.20	1687569957448.20	412956.321052	-8.556279	0.000000
2	2	Volume Discount 11 to 14	Volume Discount	0.02	0.00	828172545915.66	828172545915.66	642028.562702	-4.249549	0.000227
3	3	Volume Discount 15 to 24	Volume Discount	0.05	0.00	441094781327.64	441094781327.64	641233.318545	-12.963813	0.001108
4	4	Volume Discount 25 to 40	Volume Discount	0.10	0.00	48746871959.04	48746871959.04	403640.632941	-10.487042	0.004604
5	1…	Touring-3000 Promotion	New Product	0.15	0.00	959334460.70	959334460.70	50411.690000	-45.616773	0.039852
6	1…	Touring-1000 Promotion	New Product	0.20	0.00	634833966.50	634833966.50	183478.025000	-179.825260	0.053826
7	1…	LL Road Frame Sale	Excess Inventory	0.35	151790193.45	173390003.92	21599810.47	791.742222	-2.680565	0.000055
8	9	Road-650 Overstock	Excess Inventory	0.30	18375234.86	31324516.19	12949281.33	70.470000	-61.627504	0.030470

Q3)

i. Analyzing product-level revenue by category, brand, and promotion type

```
SELECT
    dp.Category,
    dp.Brand,
    dp.ProductName,
    dpr.PromotionType,  -- Promotion Type added
    SUM(fs.LineTotal) AS TotalRevenue,
    -- Revenue when promotions are applied
    SUM(CASE
            WHEN fs.PromotionID IS NOT NULL AND fs.PromotionID <> 1 THEN fs.LineTotal
            ELSE 0
        END) AS RevenueWithPromotion,
    -- Revenue without any promotion (No discount)
    SUM(CASE
            WHEN fs.PromotionID IS NULL OR fs.PromotionID = 1 THEN fs.LineTotal
            ELSE 0
        END) AS RevenueWithoutPromotion,
    -- % of revenue from promotions
    CASE
        WHEN SUM(fs.LineTotal) = 0 THEN 0
        ELSE
            (SUM(CASE
                WHEN fs.PromotionID IS NOT NULL AND fs.PromotionID <> 1 THEN fs.LineTotal
                ELSE 0
             END) * 100.0) / SUM(fs.LineTotal)
    END AS PercentRevenueFromPromotions
FROM FactSales fs
JOIN DimProduct dp ON fs.ProductID = dp.ProductID
LEFT JOIN DimPromotion dpr ON fs.PromotionID = dpr.PromotionID  --Join to bring in promotion details
GROUP BY
    dp.Category,
    dp.Brand,
```

```
    dp.ProductName,
    dpr.PromotionType  -- Promotion Type included for analysis
ORDER BY TotalRevenue DESC;
```

Figure 15: ***Output for Analyzing product level revenue***

	Category	Brand	ProductName	PromotionType	TotalRevenue	RevenueWithPromotion	RevenueWithoutPromotion	PercentRevenueFromPromotions
1	Mountain Bikes	Mountain-200	Mountain-200 Black, 38	Discontinued Product	3105727.02	3105727.02	0.00	100.000000
2	Mountain Bikes	Mountain-200	Mountain-200 Black, 42	Volume Discount	2646353.16	2646353.16	0.00	100.000000
3	Mountain Bikes	Mountain-200	Mountain-200 Silver, 38	Volume Discount	2354215.25	2354215.25	0.00	100.000000
4	Mountain Bikes	Mountain-200	Mountain-200 Silver, 42	Volume Discount	2181044.21	2181044.21	0.00	100.000000
5	Mountain Bikes	Mountain-200	Mountain-200 Silver, 46	Volume Discount	2133156.80	2133156.80	0.00	100.000000
6	Mountain Bikes	Mountain-200	Mountain-200 Black, 46	Discontinued Product	1936203.94	1936203.94	0.00	100.000000
7	Road Bikes	Road-250	Road-250 Black, 44	Volume Discount	1888480.40	1888480.40	0.00	100.000000
8	Road Bikes	Road-250	Road-250 Black, 48	Volume Discount	1656450.08	1656450.08	0.00	100.000000
9	Road Bikes	Road-350-W	Road-350-W Yellow, 48	Volume Discount	1380253.81	1380253.81	0.00	100.000000
10	Touring Bikes	Touring-1000	Touring-1000 Blue, 60	Volume Discount	1370784.02	1370784.02	0.00	100.000000
11	Road Bikes	Road-250	Road-250 Black, 52	No Discount	1278046.88	0.00	1278046.88	0.000000

Q4)

i. Analyzing the top 5 highest total profit-generating store

```
SELECT TOP 5
    ds.StoreID,
    ds.StoreName,
    ds.Location AS StoreLocation,
    -- Total Profit calculated as (LineTotal - (CostPrice * OrderQty))
    SUM(fs.LineTotal - (fs.CostPrice * fs.OrderQty)) AS TotalProfit,
    -- Total Revenue generated from each store
    SUM(fs.LineTotal) AS TotalRevenue,
    -- Average Profit Margin across all sales in that store
    CASE
        WHEN SUM(fs.LineTotal) = 0 THEN 0
        ELSE (SUM(fs.LineTotal - (fs.CostPrice * fs.OrderQty)) * 100.0) / SUM(fs.LineTotal)
    END AS ProfitMarginPercentage,
    -- Number of Orders/Transactions processed
    COUNT(DISTINCT fs.OrderDateID) AS TotalOrders,
    -- Average Order Value for each store
    CASE
        WHEN COUNT(DISTINCT fs.OrderDateID) = 0 THEN 0
        ELSE SUM(fs.LineTotal) / COUNT(DISTINCT fs.OrderDateID)
    END AS AvgOrderValue
FROM
    FactSales fs
JOIN
    DimStore ds ON fs.StoreID = ds.StoreID
GROUP BY
    ds.StoreID, ds.StoreName, ds.Location
ORDER BY
    TotalProfit DESC; -- Ranking stores by highest profit first
```

Figure 16: ***Output for Analyzing top 5 highest profits***

	StoreID	StoreName	StoreLocation	TotalProfit	TotalRevenue	ProfitMarginPercentage	TotalOrders	AvgOrderValue
1	1840	Top Sports Supply	Canada	38695.23	602559.94	6.421805	8	75319.992500
2	1970	Permanent Finish Products	Northwest	38670.25	577089.55	6.700909	12	48090.795833
3	1032	Brakes and Gears	Northwest	38040.98	877107.24	4.337095	12	73092.270000
4	518	Latest Sports Equipment	Northwest	37915.93	724299.73	5.234839	12	60358.310833
5	808	Registered Cycle Store	France	35847.93	580222.50	6.178307	8	72527.812500

ii. Analyzing top 5 highest revenue generating store

```
SELECT TOP 5
    ds.StoreID,
    ds.StoreName,
    ds.Location AS StoreLocation,
    -- Total Revenue generated from each store
    SUM(fs.LineTotal) AS TotalRevenue,
    -- Total Profit calculated as (LineTotal - (CostPrice * OrderQty))
    SUM(fs.LineTotal - (fs.CostPrice * fs.OrderQty)) AS TotalProfit,
    -- Profit Margin %
    CASE
        WHEN SUM(fs.LineTotal) = 0 THEN 0
        ELSE (SUM(fs.LineTotal - (fs.CostPrice * fs.OrderQty)) * 100.0) / SUM(fs.LineTotal)
    END AS ProfitMarginPercentage,
    -- Total Orders/Transactions processed
    COUNT(DISTINCT fs.OrderDateID) AS TotalOrders,
    -- Average Order Value
    CASE
        WHEN COUNT(DISTINCT fs.OrderDateID) = 0 THEN 0
        ELSE SUM(fs.LineTotal) / COUNT(DISTINCT fs.OrderDateID)
    END AS AvgOrderValue
FROM
    FactSales fs
JOIN
    DimStore ds ON fs.StoreID = ds.StoreID
GROUP BY
    ds.StoreID, ds.StoreName, ds.Location
```

```
ORDER BY
    TotalRevenue DESC; -- Sorted by highest revenue
```

Figure 17: ***Output for Analyzing top 5 highest revenue making stores***

	StoreID	StoreName	StoreLocation	TotalRevenue	TotalProfit	ProfitMarginPercentage	TotalOrders	AvgOrderValue
1	1032	Brakes and Gears	Northwest	877107.24	38040.98	4.337095	12	73092.270000
2	814	Excellent Riding Supplies	Southeast	853849.29	-63509.29	-7.437997	12	71154.107500
3	828	Vigorous Exercise Company	Canada	841908.95	-29577.95	-3.513200	12	70159.079166
4	1992	Totes & Baskets Company	Southwest	816755.64	-60116.42	-7.360392	12	68062.970000
5	592	Retail Mall	Canada	799277.86	-65779.25	-8.229835	12	66606.488333

iii. Analyzing top 5 highest profit margin generating store

```
SELECT TOP 5
    ds.StoreID,
    ds.StoreName,
    ds.Location AS StoreLocation,
    -- Total Revenue generated from each store
    SUM(fs.LineTotal) AS TotalRevenue,
    -- Total Profit calculated as (LineTotal - (CostPrice * OrderQty))
    SUM(fs.LineTotal - (fs.CostPrice * fs.OrderQty)) AS TotalProfit,
    -- Profit Margin % calculation
    CAST(
        CASE
            WHEN SUM(fs.LineTotal) = 0 THEN 0
            ELSE (SUM(fs.LineTotal - (fs.CostPrice * fs.OrderQty)) * 100.0) / SUM(fs.LineTotal)
        END
    AS DECIMAL(5, 2)) AS ProfitMarginPercentage,
    -- Number of Orders/Transactions processed
    COUNT(DISTINCT fs.OrderDateID) AS TotalOrders,
    -- Average Order Value for each store
    CAST(
        CASE
            WHEN COUNT(DISTINCT fs.OrderDateID) = 0 THEN 0
            ELSE SUM(fs.LineTotal) / COUNT(DISTINCT fs.OrderDateID)
        END
    AS DECIMAL(18, 2)) AS AvgOrderValue
```

```
FROM
    FactSales fs
JOIN
    DimStore ds ON fs.StoreID = ds.StoreID
GROUP BY
    ds.StoreID, ds.StoreName, ds.Location
ORDER BY
    ProfitMarginPercentage DESC; -- Order by highest profit margin percentage
```

Figure 18: ***Output for Analyzing 5 highest profit margins***

	StoreID	StoreName	StoreLocation	TotalRevenue	TotalProfit	ProfitMarginPercentage	TotalOrders	AvgOrderValue
1	1484	Essential Bike Works	United Kingdom	59.34	22.38	37.71	2	29.67
2	996	Hometown Riding Supplies	Germany	144.00	54.24	37.67	1	144.00
3	1904	Mobile Outlet	Northeast	1.37	0.51	37.23	1	1.37
4	912	Retail Cycle Shop	Southwest	91.18	28.50	31.26	1	91.18
5	1470	All Cycle Shop	Northwest	3003.20	858.75	28.59	8	375.40

Q5)

i. Analyzing revenue to identify peak sales periods

```
SELECT
    dd.Year,
    dd.Month,
    DATENAME(MONTH, dd.DateID) AS MonthName,
    -- Total Revenue
    SUM(fs.LineTotal) AS TotalRevenue,
    -- Revenue generated during promotions
    SUM(CASE
            WHEN fs.PromotionID IS NOT NULL AND fs.PromotionID <> 1 THEN fs.LineTotal
            ELSE 0
        END) AS RevenueWithPromotions,
    -- Revenue without promotions
    SUM(CASE
            WHEN fs.PromotionID IS NULL OR fs.PromotionID = 1 THEN fs.LineTotal
            ELSE 0
        END) AS RevenueWithoutPromotions,
    -- % of revenue from promotions
    CASE
        WHEN SUM(fs.LineTotal) = 0 THEN 0
        ELSE
            (SUM(CASE
                WHEN fs.PromotionID IS NOT NULL AND fs.PromotionID <> 1 THEN fs.LineTotal
                ELSE 0
             END) * 100.0) / SUM(fs.LineTotal)
    END AS PercentRevenueFromPromotions,
    -- Total number of orders
    COUNT(DISTINCT fs.OrderDateID) AS TotalOrders
FROM FactSales fs
JOIN DimDate dd ON fs.OrderDateID = dd.DateID
GROUP BY dd.Year, dd.Month, DATENAME(MONTH, dd.DateID)
```

```
ORDER BY dd.Year, dd.Month;
```

Figure 19: ***Output For Analyzing Peak Sales Period***

	SalesY…	SalesMonth	MonthName	TotalRevenue	RevenueWit…	RevenueWithoutPromoti…	PercentRev…	TotalOrders
1	2011	5	May	503805.916900	0.000000	503805.916900	0.000000	43
2	2011	6	June	458910.824800	0.000000	458910.824800	0.000000	141
3	2011	7	July	2044600.003338	80930.462938	1963669.540400	3.958254	231
4	2011	8	August	2495816.733446	26371.906246	2469444.827200	1.056644	250
5	2011	9	September	502073.845800	0.000000	502073.845800	0.000000	157
6	2011	10	October	4588761.816130	102646.450430	4486115.365700	2.236909	327
7	2011	11	November	737839.821400	0.000000	737839.821400	0.000000	230
8	2011	12	December	1309863.251140	5563.144440	1304300.106700	0.424711	228
9	2012	1	January	3970627.278958	299.552258	3970327.726700	0.007544	336
1…	2012	2	February	1475426.909980	5319.922080	1470106.987900	0.360568	219
1…	2012	3	March	2975748.238428	28677.427728	2947070.810700	0.963704	304
1…	2012	4	April	1634600.798332	266572.299132	1368028.499200	16.308097	269

Summary of Insights

VIP customers are the most profitable segment, with higher spending and repeat purchases, while regular and new customers show poor retention and limited revenue contribution. This indicates a need to strengthen customer loyalty and engagement strategies.

Many promotions successfully boost sales but often reduce profit margins especially volume discounts highlighting the need for more profit-focused campaigns. A few well-structured promotions, like the 500 Mountain Silver Clearance Sale, prove that sales and profit can grow together. Regionally, the Northwest market outperforms others in both sales and profitability, while premium-focused stores in Canada and France also show strong margins. Seasonal sales trends show clear peaks mid-year and year-end, emphasizing the importance of timely planning. Some high-value products sell well even without discounts, offering scope to reduce reliance on price cuts and focus more on brand value.

Recommendations

1. **Convert more customers into VIPs.**
   Implement loyalty tiers (e.g., Bronze, Silver, Gold) and personalized offers. Example: Offer early access sales or cashback rewards to regular buyers to push them toward higher-value behavior.
2. **Run smarter promotions, not deeper discounts.**
   Focus on campaigns that boost both sales and profit. Example: Bundle accessories with high-margin bikes instead of slashing prices. Promote offers like "Buy a Touring Bike, get a free Helmet" rather than 30% off.
3. **Expand in high-performing regions.**
   Double down on store expansion in the Northwest. Replicate Canada/France’s premium store model with curated, higher-priced product assortments and trained staff to upsell.
4. **Align planning with seasons and pricing behavior.**
   Stock up ahead of summer and holiday peaks. Highlight premium products as “limited edition” or “flagship” items to reduce discount dependency. Example: Position Road-150 as a premium, full-price product with a strong value story.

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