E_COMMERECE ANALYSIS PROJECT

Presented by: Team 6

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PROJECT OVERVIEW

Our project focuses on analyzing a comprehensive e-commerce database that simulates real-world online retail operations. The database includes detailed and interconnected tables that cover essential components

(1)

Deploy and secure the Azure SQL database

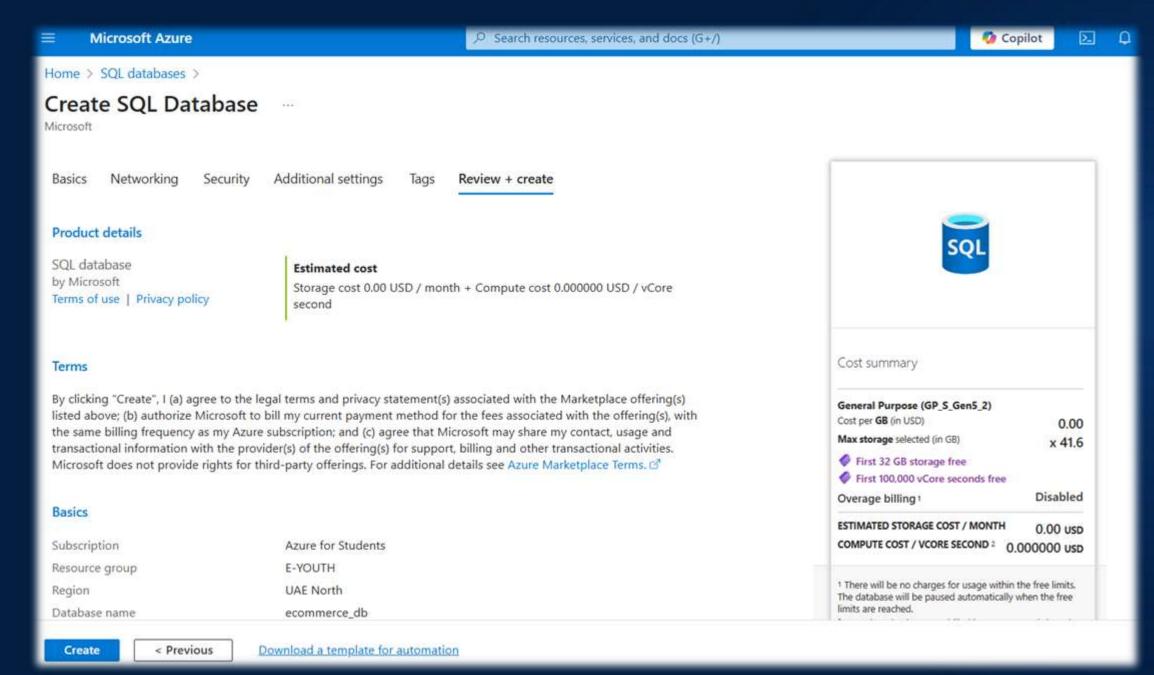
Main Workflow

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Azure Cloud for Data Analytics

Benefits:

- Transform data into actionable insights with Azure's cloud platform.
- Enjoy scalable, secure, and cost-effective solutions built for modern analytics.
- Empower smarter, data-driven decisions to accelerate your business.





(1) Deploy and secure the Azure SQL database

Use SSMS to connect to the Azure SQL database and run basic to advanced SQL queries

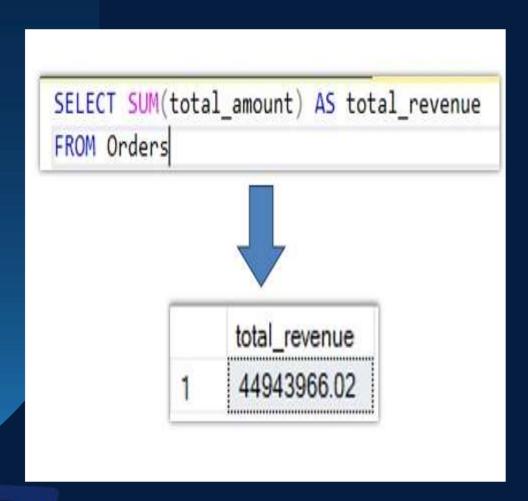
Main Workflow

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Bootcamp

Basics Queries

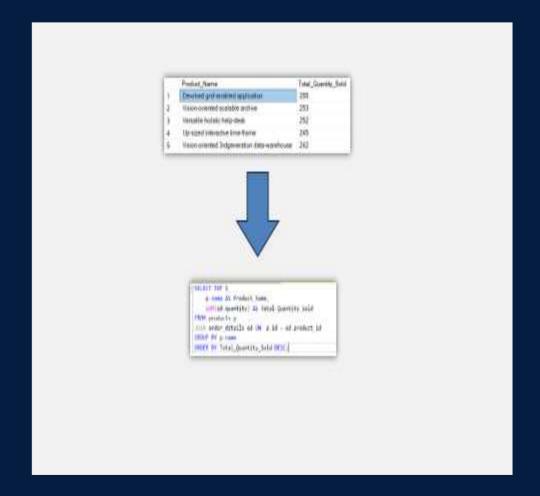


CUSTMER CHURN PREDICTION MODEL





List the top 5 bestselling products by quantity sold.





Identify customers with the highest number of orders.

Basics Queries

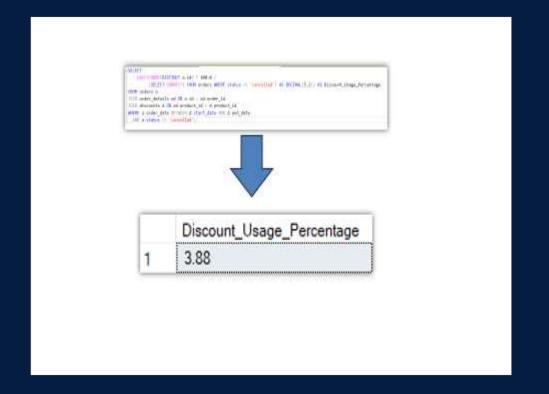


Generate an alert for products with stock quantities below 20 units





Determine the percentage of orders that used a discount.





Calculate the average rating for each product.

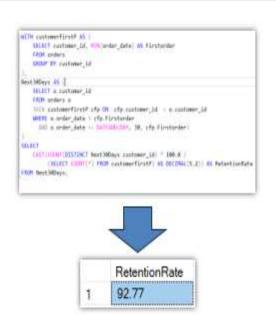




Advanced Queries

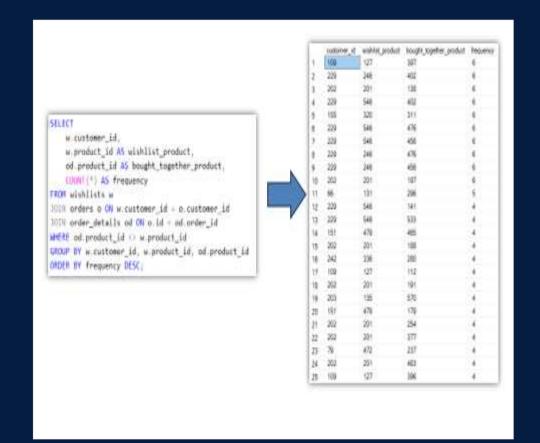


Compute the 30-day customer retention rate after their first purchase



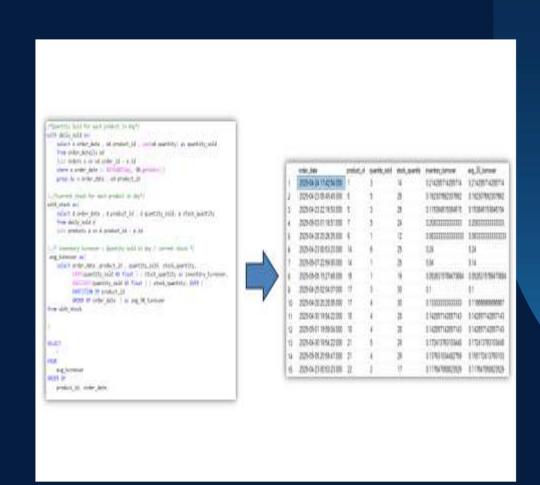


Recommend products frequently bought together with items in customer wishlists





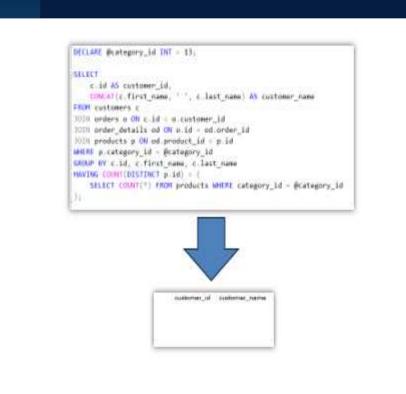
Track inventory turnover trends using a 30-day moving average



Advanced Queries



Identify customers
who have purchased
every product in a
specific category



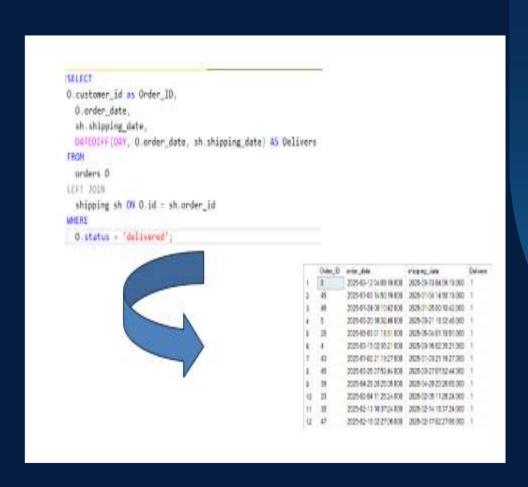


Find pairs of products commonly bought together in the same order.





Calculate the time taken to deliver orders in days.



(1) Deploy and secure the Azure SQL database

Use SSMS to connect to the Azure SQL database and run basic to advanced SQL queries

(3) Connect Power BI to Azure SQL using to build interactive dashboards

Main Workflow

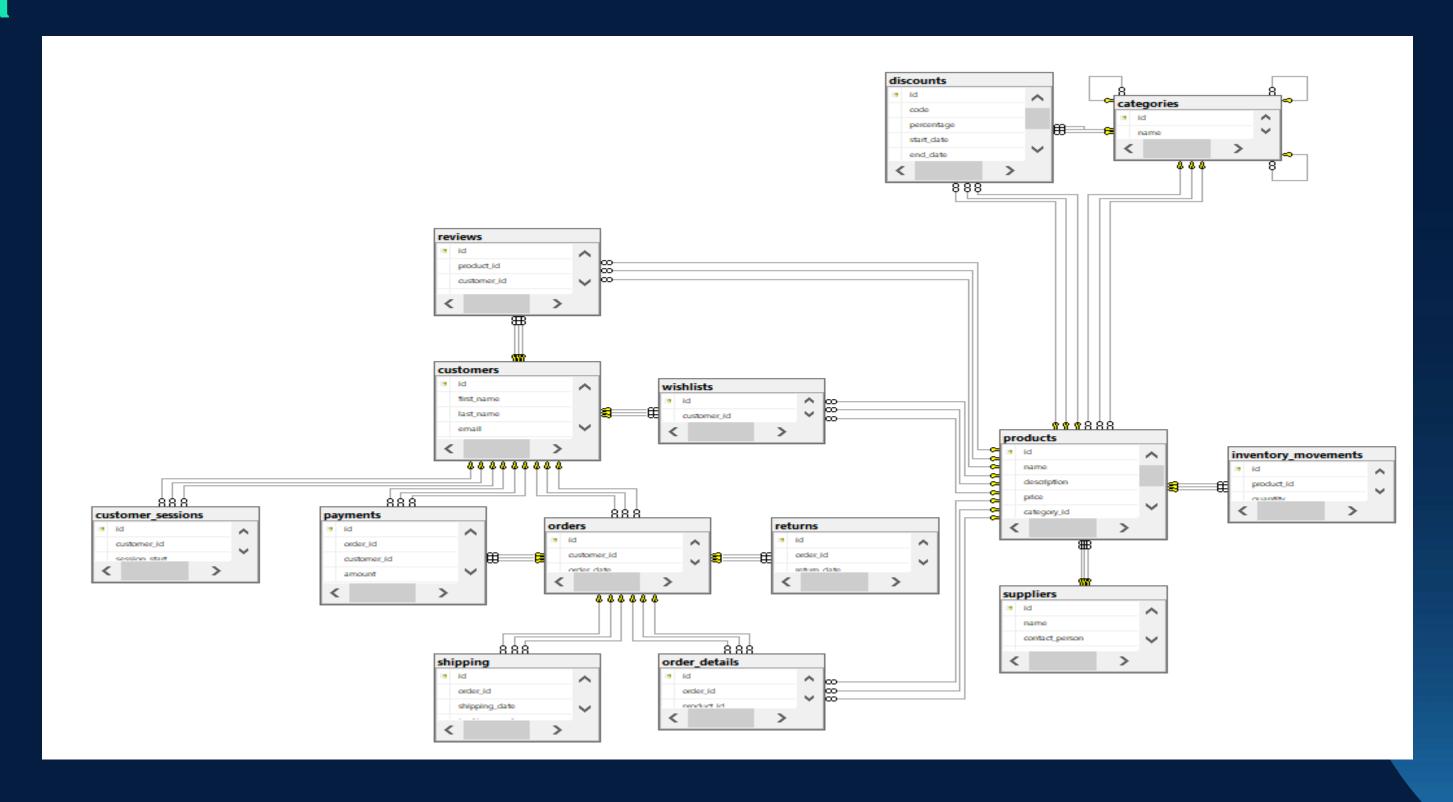
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Data Source

Snowflake schema

Problem:

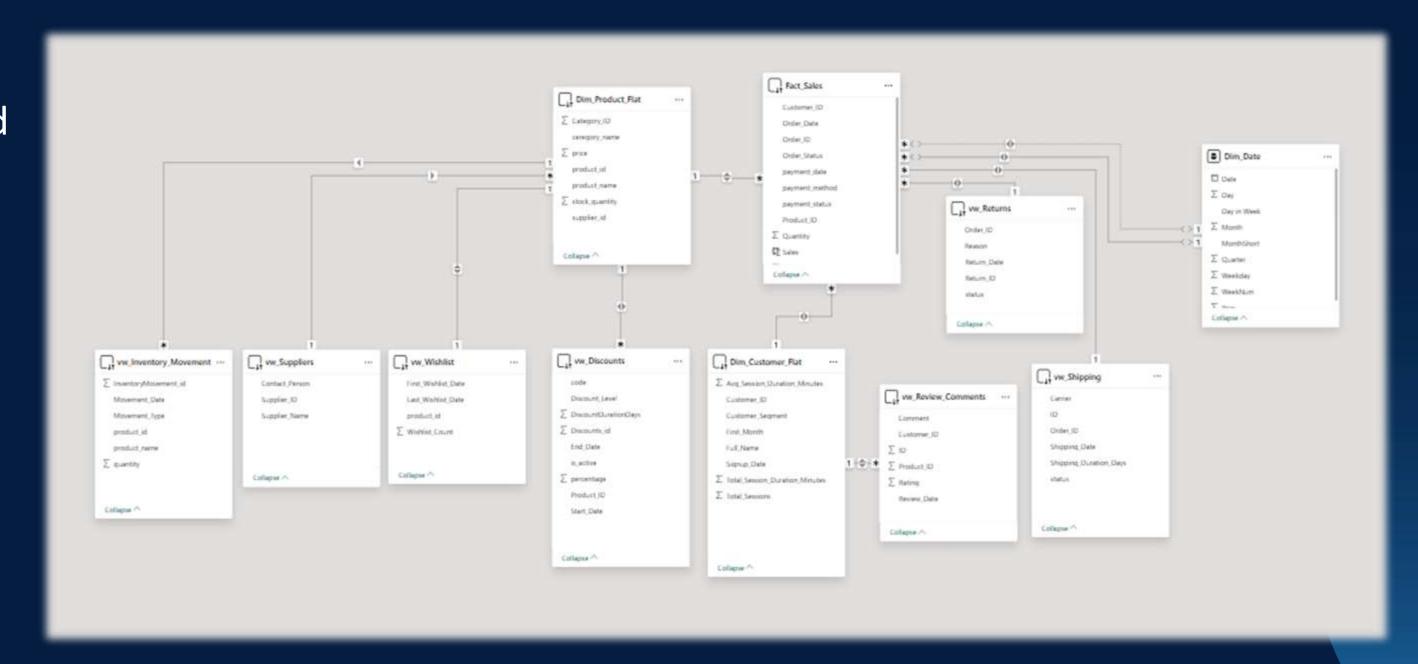
We encountered performance issues as it was heavy on the model and not optimal for reporting



Data Source

As a Solution:

the model was restructured into a **Star Schema** in Power Bl, using SQL **Views** as the base for each dimension and fact table



South

DASHBOARDS ANALYSIS



SALES DASHBOARD

Provide an overview of sales trends by many Important Indicators.



CUSTOMERS DASHBOARD

Track customer behavior and purchasing behavior to understand target audiences, analyze strengths and weaknesses to increase customer numbers and loyaltys.



PRODUCT DASHBOARD

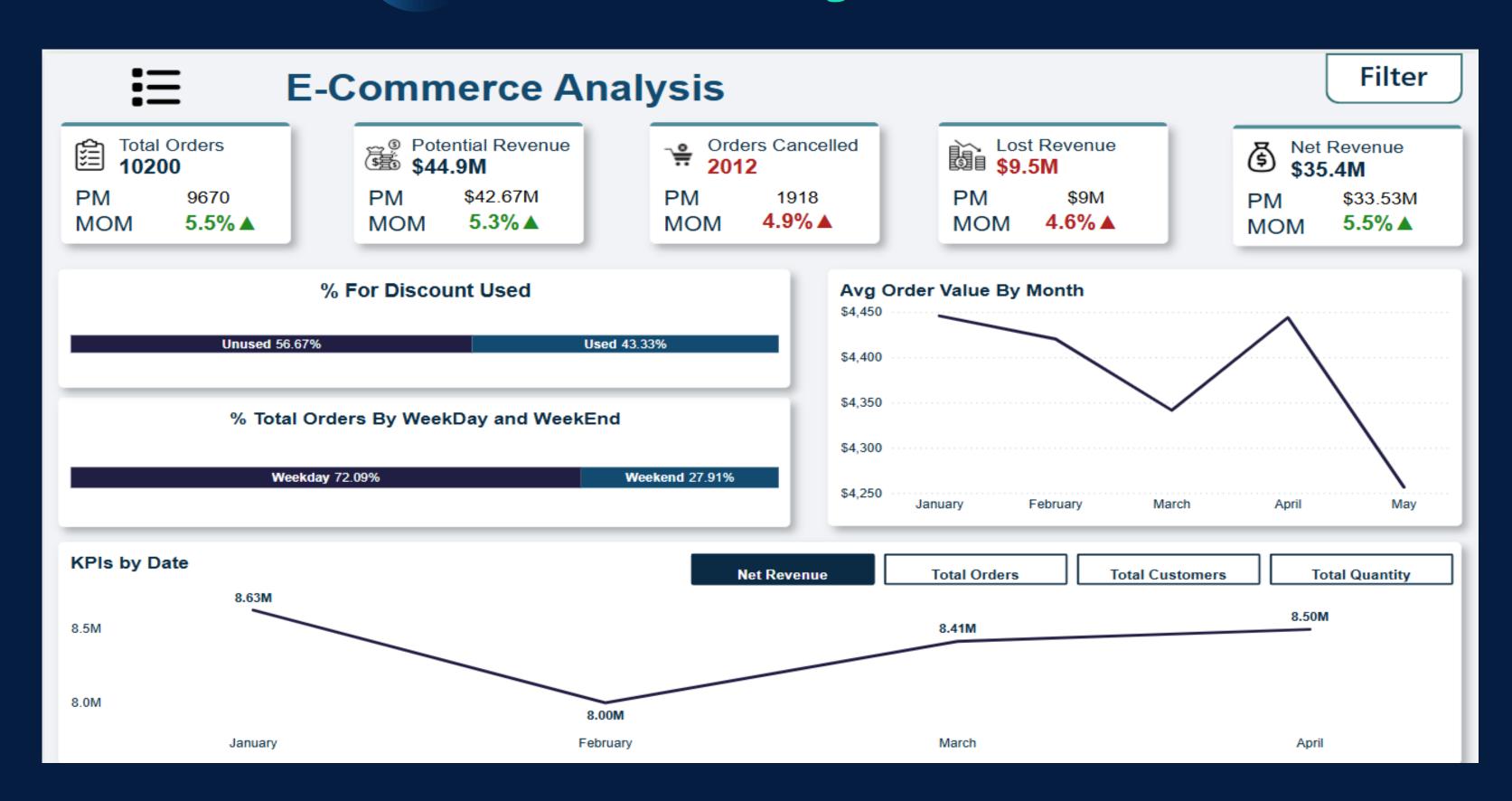
Analyze product performance with a focus on sales volume.



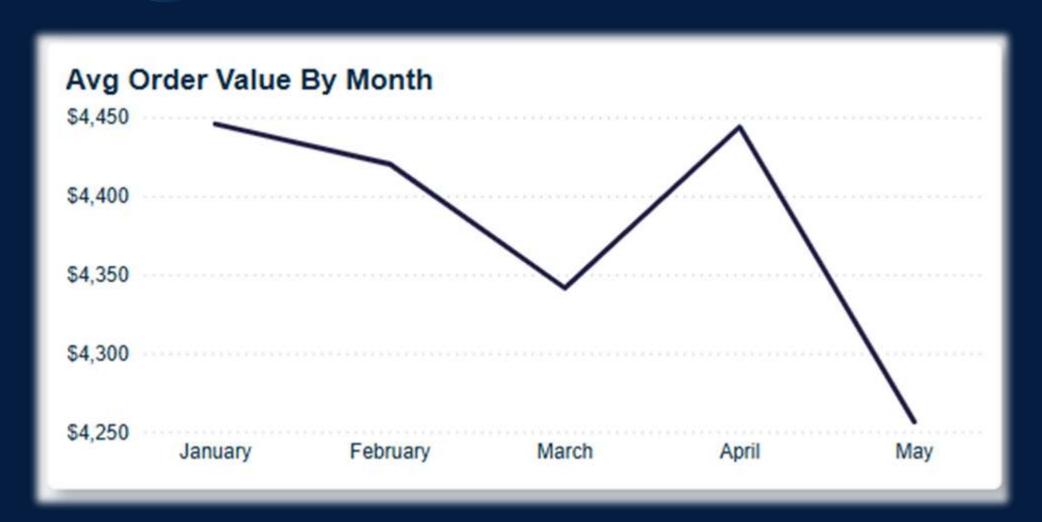
RETURNS & CANCELLED DASHBOARD

Analyze all Returns Reasons, focus on Category, payment method any reason Leads to increased returns.

Sales Analysis

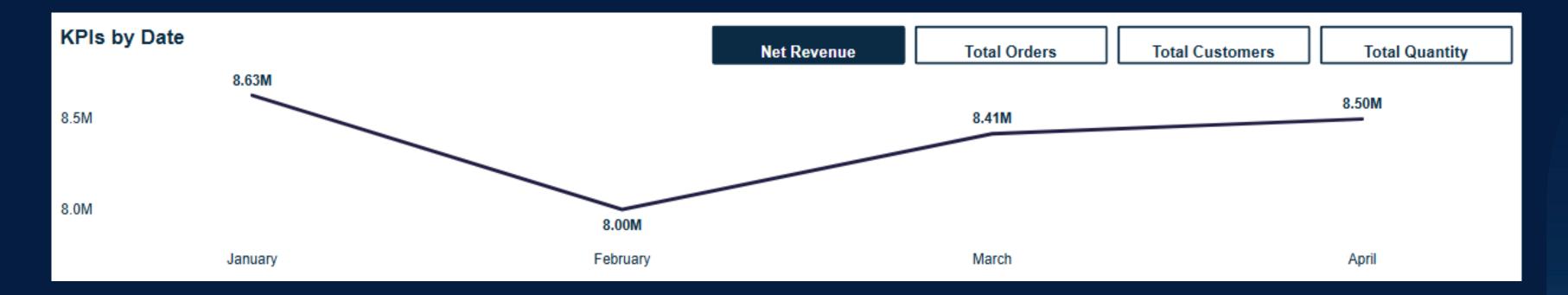


Sales Analysis



- The Average Order Value was low in March, at \$4,300 compared to \$4,400 in the other months
- The best strategy here would be to offer discounts and promotions for orders above \$4,500 to encourage higher spending
- Important note: Data for May is incomplete, covering only the first 7 days, So we ignore

Sales Analysis



The highest revenue was recorded in January, reaching approximately 8.63M, while February had the lowest at 8M Overall, the revenue figures are relatively close throughout the period



Customer 360

Filter

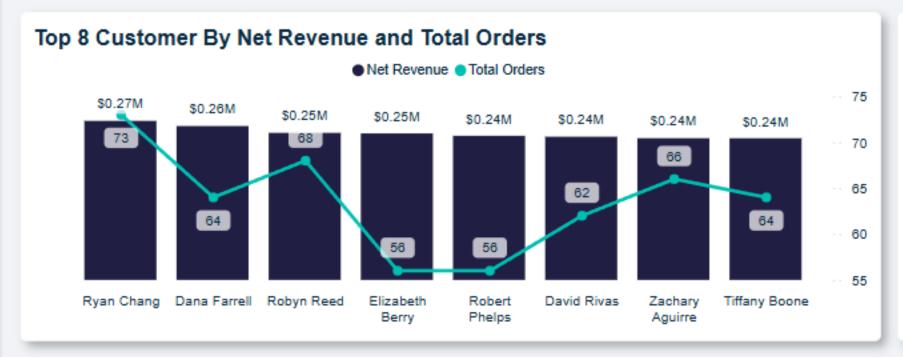




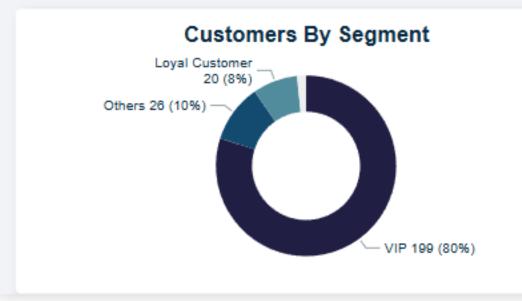




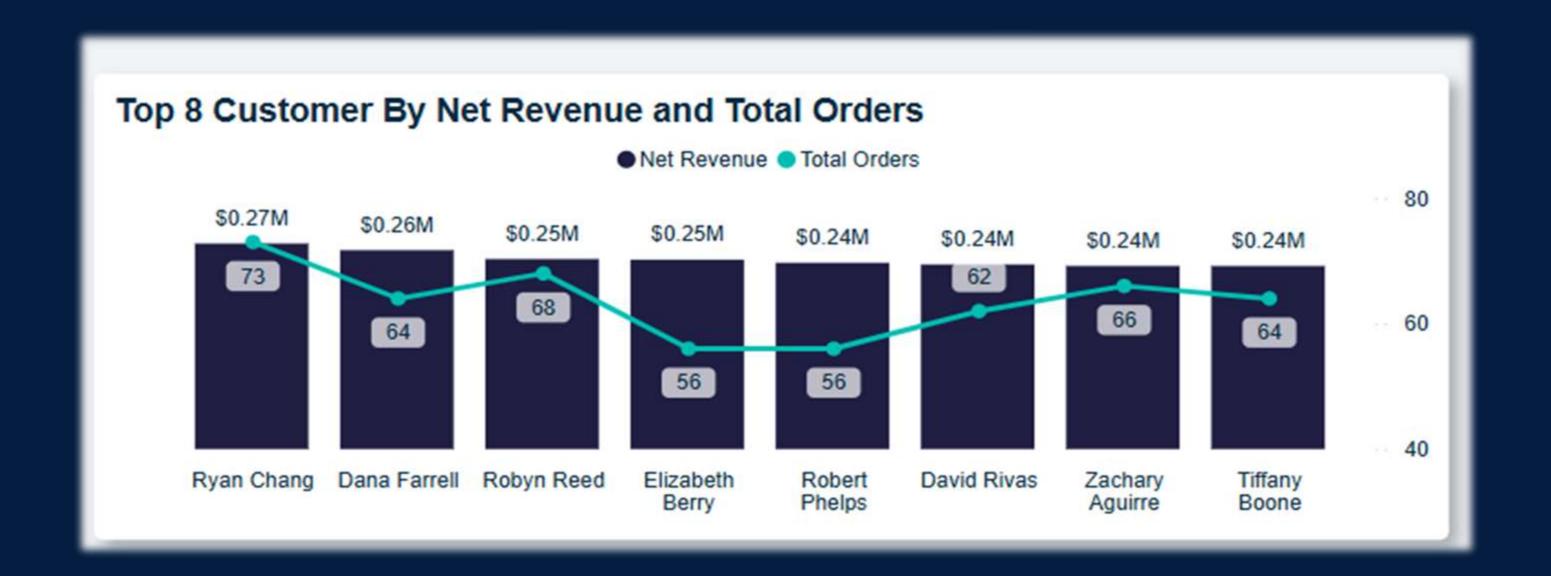
Avg Session Duration (Mins)
61.90 Min







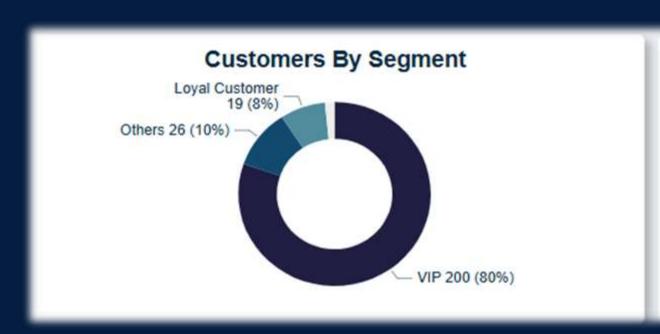
Customers	Total Sessions	Monetary	Frequency	AOV	Total Quantity	RFM ▼	Segment
Aaron Jones	44	\$161,823	44	\$4,378	421	455	VIP
Adrian Johnson	35	\$188,770	49	\$5,008	495	455	VIP
Alexis Knox	47	\$168,766	42	\$4,693	387	455	VIP
Amber Coleman	31	\$160,748	55	\$4,509	536	455	VIP
Amber French	13	\$221,467	56	\$5,135	556	455	VIP
Amy Hill	30	\$210,044	52	\$4,721	506	455	VIP
Andrea Macdonald	30	\$148,737	57	\$3,212	392	455	VIP



- The number of orders doesn't always reflect the profit.
- Some clients place fewer orders but bring in the highest profit.
- If we increase sales to those clients, our profit will grow significantly.

• There was a drop in the number of new customers in February and March compared to January.





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- 80% of our Customers are VIP, which is a positive indicator.
- The table shows full details including:
- Number of orders
- Average order value
- Customer classification

PRODUCT ANALYSIS



Product Analysis

- •Although the Speech category has lower sales compared to other categories, it ranks among the top 5 in revenue.
- •Increasing sales in this category can lead to a significant boost in total revenue

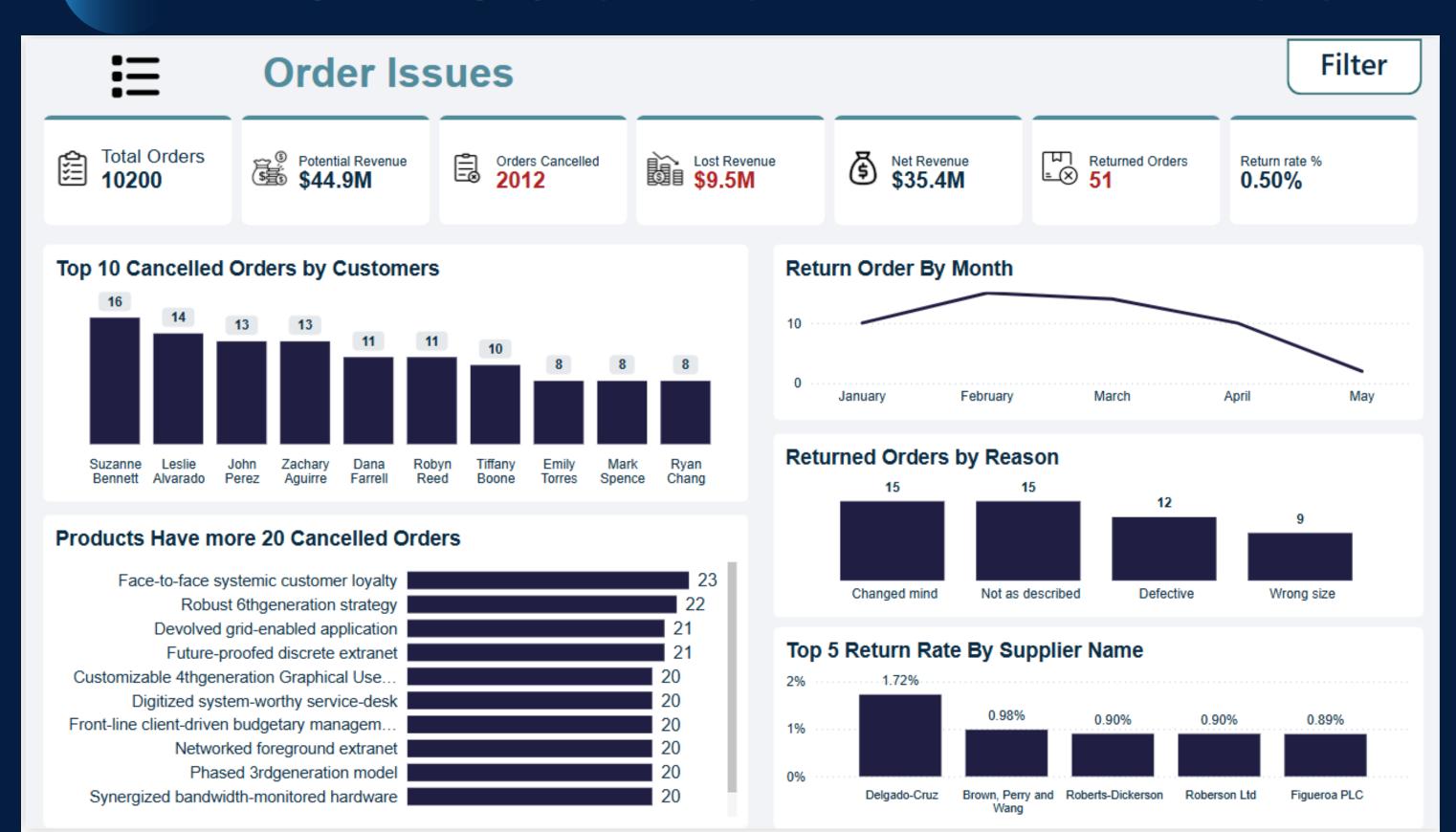


Product Analysis

Product Name	Stock	Total Orders	
Compatible modular policy	•	19	6
Exclusive dedicated middleware	•	19	8
nnovative context-sensitive matrices	0	19	5
ntuitive secondary migration	0	19	7
nverse holistic open architecture	•	19	6
Proactive non-volatile standardization	•	19	6
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- •The table shows products with less than 20 units in stock.
- •It also includes the number of times each product was sold.
- •This helps identify which items should be prioritized for restocking.

RETURNS & CANCELLED ANALYSIS



Recommendations

These are some recommendations we can make based on the dashboard analysis:

Inventory & Product Management

•Restock high-demand, low-stock items promptly to prevent stockouts and lost sales opportunities.

Revenue & Orders

•Prioritize promotional efforts on top-performing product categories such as Hold, Recent, and Speech to maximize revenue impact.

Customer Retention

•Strengthen loyalty programs to retain the top 80% of VIP customers, offering exclusive perks and personalized experiences.

Returns & Cancellations

•Reduce cancellation rates by enhancing product descriptions with clearer visuals, sizing guides, and usage expectations.

Sales Trends & Discounts

•Leverage discount strategies more effectively—with current usage at 43%, explore targeted discounts and limited-time offers to drive conversions without impacting margins.



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(3) Connect Power BI to Azure SQL using to build interactive dashboards

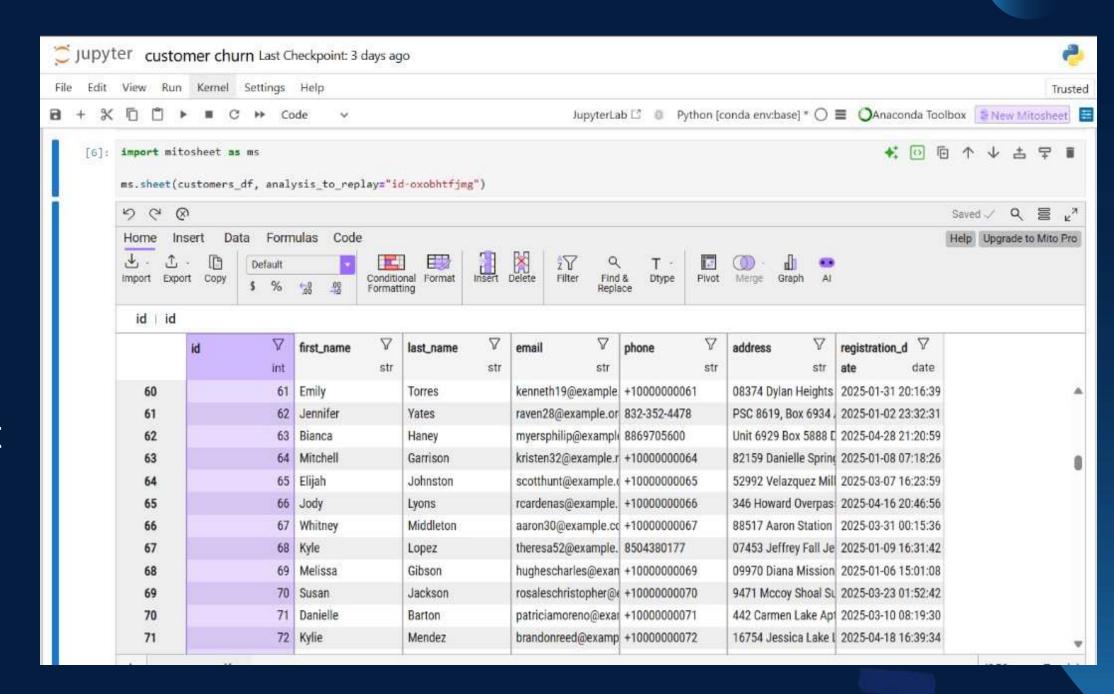
4) Apply machine learning to predict key business metrics

Main Workflow

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MACHINE LEARNING

- We used Mito for spreadsheet-style cleaning, along with Python libraries such as Pandas and NumPy to handle missing values, convert data types, and standardize formats. These steps ensured the dataset was clean and ready for modeling.
- we used two of machine learning models that predict a group of different things that will affect our decision-making, which we will detail in the upcoming slides



ML MODELS

Customer Churn Prediction

A classification model that predicts if a customer will return for another purchase

Revenue Prediction

A regression model that predicts payment amount based on order details

Customer Churn Prediction Using Azure Machine Learning

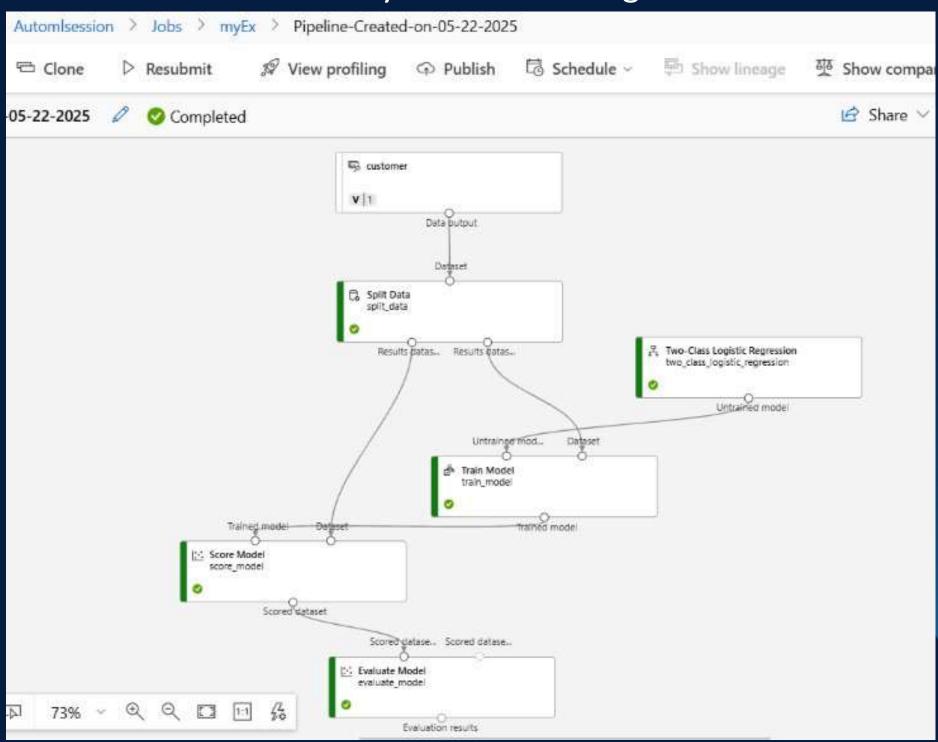
Business Problem Customer Churn: A Critical Challenge

- Losing customers affects revenue and growth.
- Early prediction helps you retain valuable customers through targeted actions.

• Goal:

Predict customers who are likely to leave so you can act before they do.

Powered by Azure ML Designer





Customer Churn Prediction Using Azure Machine Learning



• Data Source:

Customer transaction and behavior data

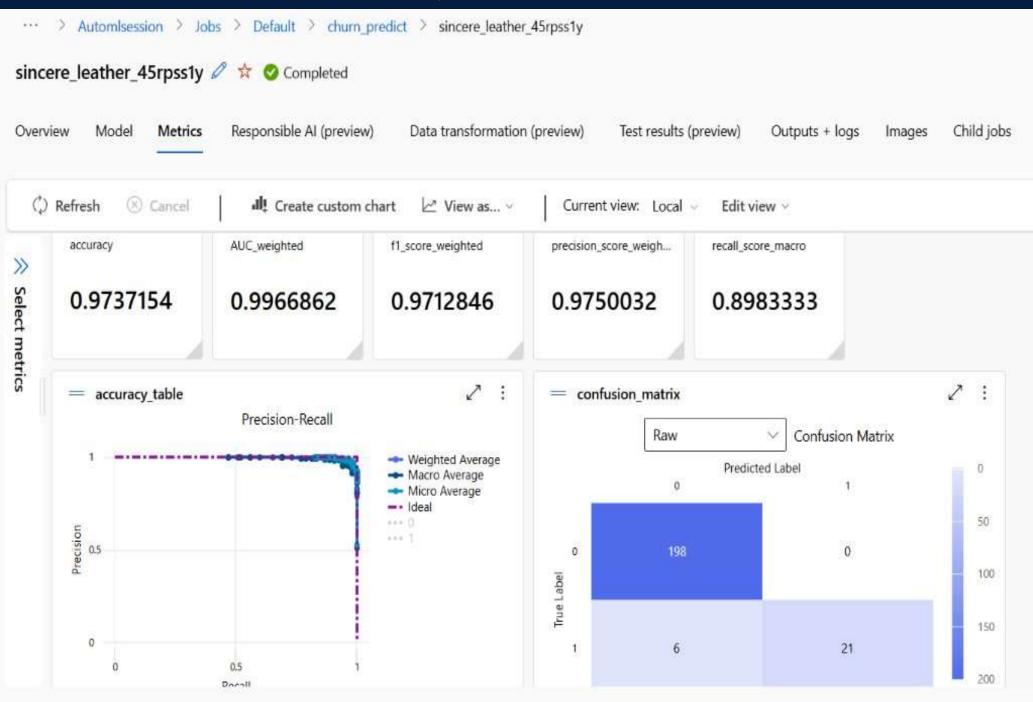
Key Features:

Days since last order, Total Spend, num of sessions, Session duration, return rate

Labeled Dataset:

Customers marked as churned

Powered by Automated ML





Revenue Prediction Using Azure Machine Learning



"Why Predict Revenue?"

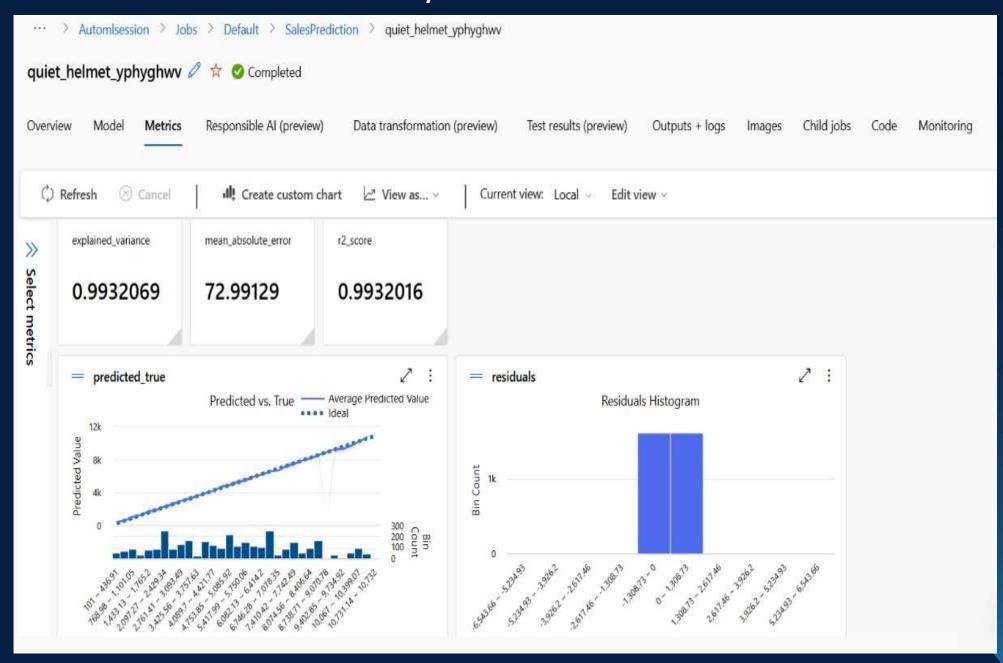
Key Challenges:

• Fluctuating demand, pricing inefficiencies, missed upsell opportunities.

Solution Benefits:

- •Forecast sales trends by product, customer segment, and time.
- Optimize discounts/pricing dynamically.
- •Identify high-value purchase windows (e.g., weekends, evenings).

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Any Questions?

We would like to hear your thoughts or answer any questions you may have.



OUR TEAM

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Thank

