Hanoi School of Business & Management

REVENUE MANAGEMENT AND PRICING

Present by Group 8

PhD. Nguyen Huy Anh

Dr. Emmanuel Plan

Xuan Thuy Street., Ha Noi City

MEET THE TEAM:

- NGUYỄN BÙI CHÂU ANH – 22080006
- TRƯƠNG HOÀNG DIỆP – 22080020
- NGUYỄN THỊ THÙY DUNG – 22080022
- DƯƠNG YẾN NHI – 22080068
- LÊ THỊ VÂN ANH – 22080005
- NGUYỄN VŨ HUY – 22080039
- ĐOÀN TRỌNG TẤN – 22080081
- ĐOÀN HOÀNG ANH – 22080003
- VŨ BẢO SƠN – 22080080

OVERVIEW :

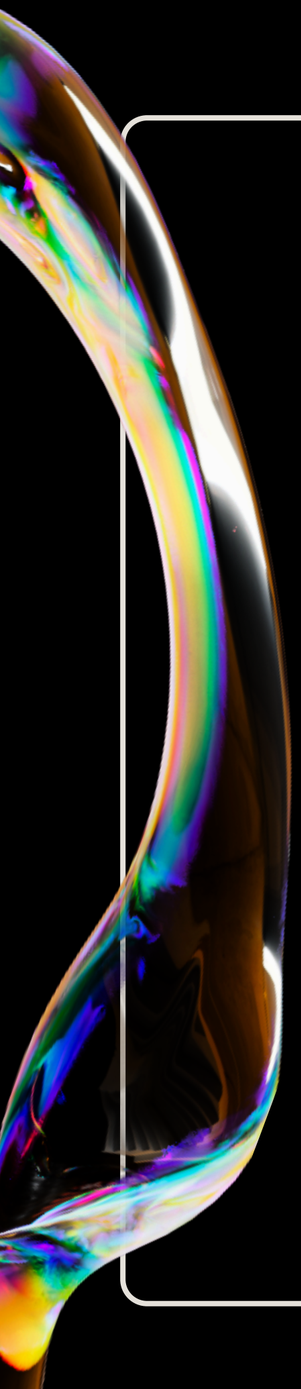
INTRODUCTION

Context:

- The booming e-commerce industry with platforms like Amazon, Shopee, Lazada.
- The importance of revenue management and pricing strategies in a competitive landscape.
- Customers' easy access to price information creates pressure on businesses to be transparent and competitive.

Report Objectives:

- Use data to improve revenue management, optimize pricing strategies, and enhance customer experience.



REPORT OBJECTIVES

Optimize Pricing Strategies

- Adjust pricing to suit different customer segments.
- Balance competitiveness with profitability.

Revenue Forecasting

- Use historical data to predict future revenue trends.
- Reduce risks in business planning.

Customer Behavior Analysis:

- Understand shopping habits, product preferences.
- Identify factors influencing purchase decisions.

Inventory Management

- Forecast product demand to optimize costs and avoid stockouts.

DATA SOURCE AND FEATURES

DATA SOURCE

"E-commerce Sales and Order Details Dataset" from December 2019.

KEY FEATURES

Includes: Order ID, product categories, price per product, purchase date, and address.

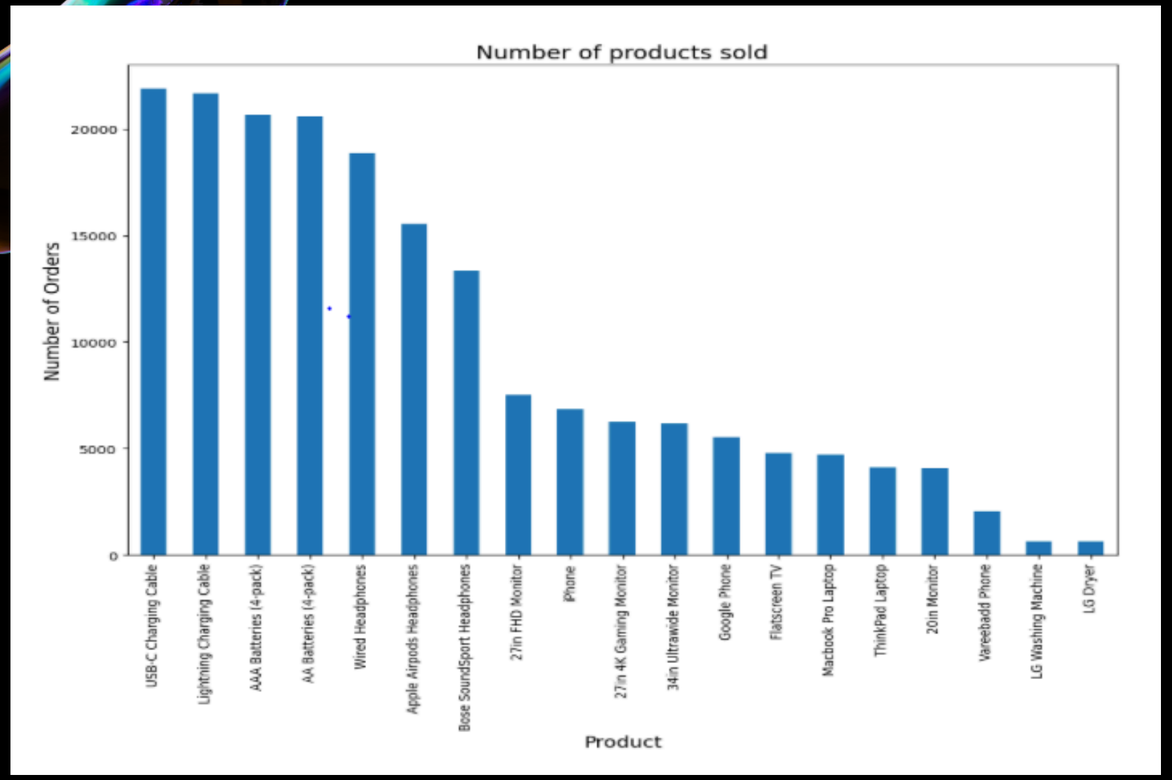
APPLICATIONS

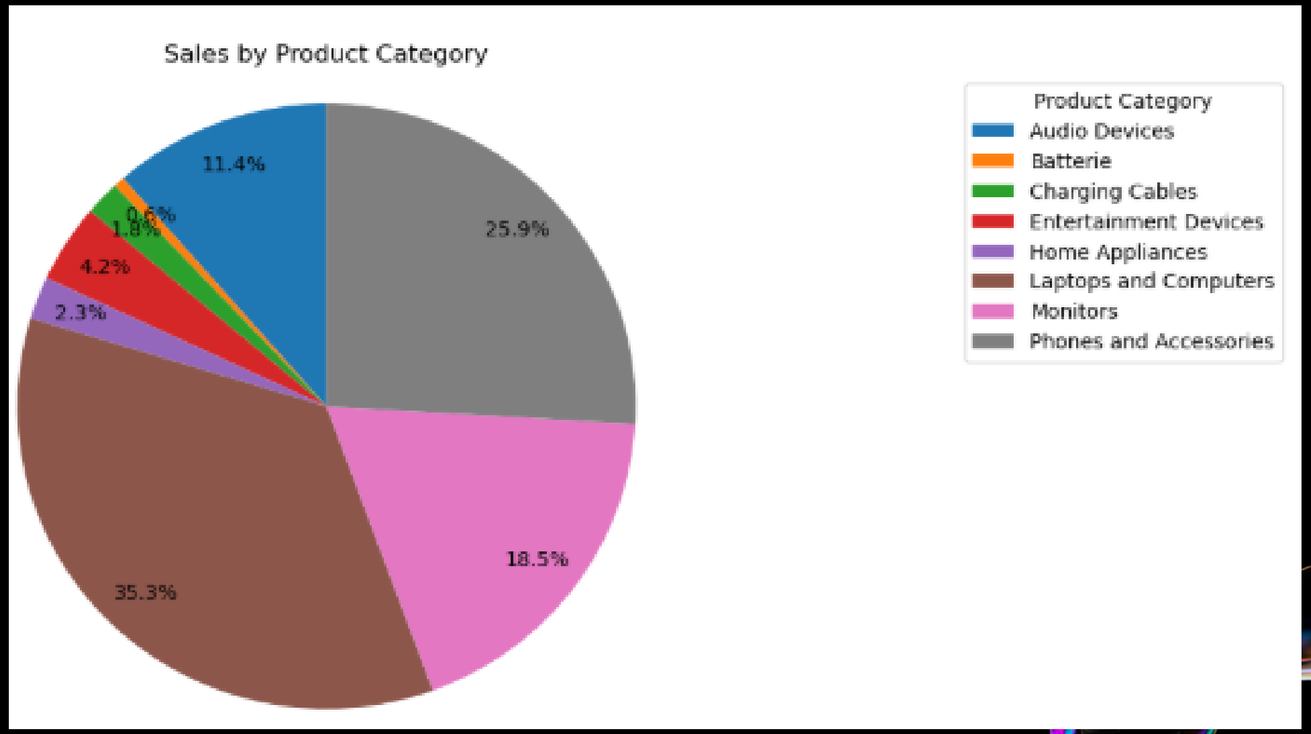
- Analyze sales trends by time, location, and product category.
- Provide insights into customer behavior and preferences

LIMITATIONS

Data only covers one year(2019), which may not fully reflect long-term trends.

PRODUCT-SPECIFIC INSIGHTS

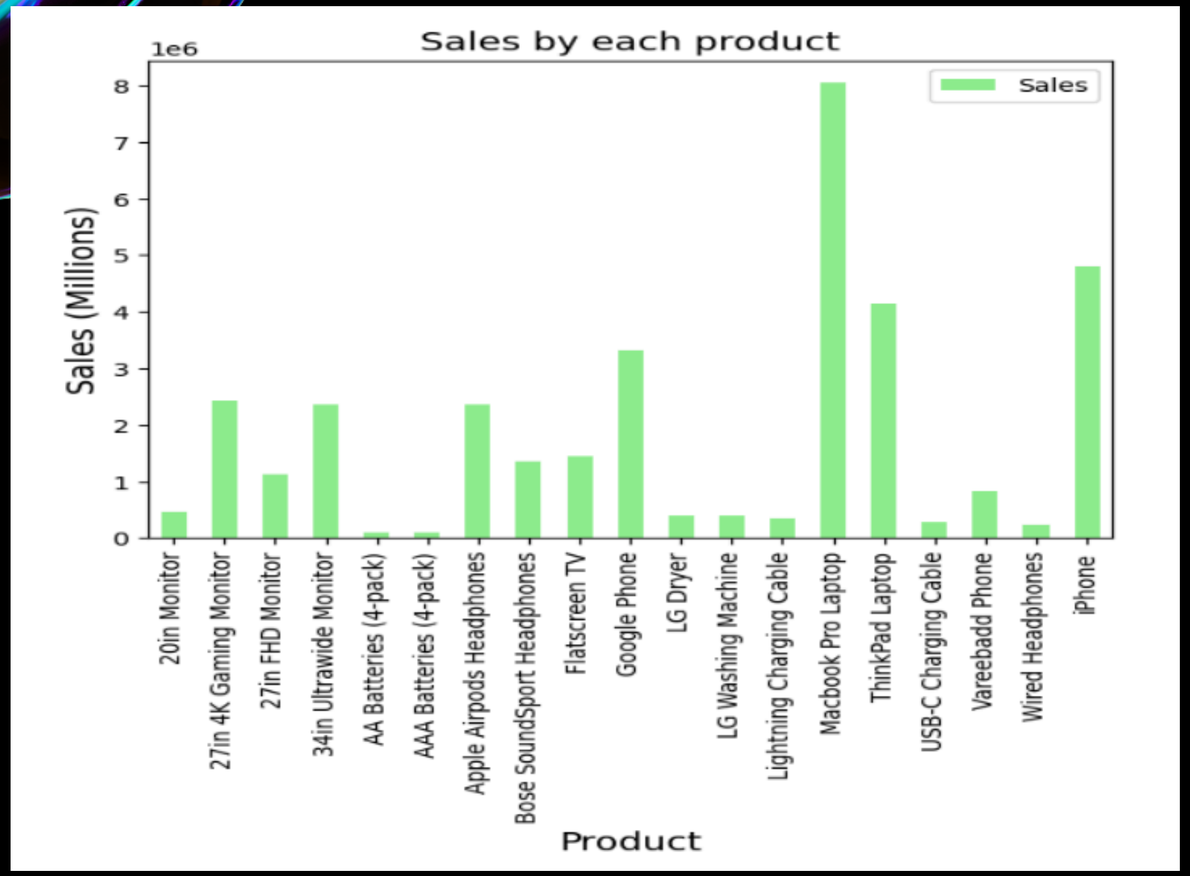




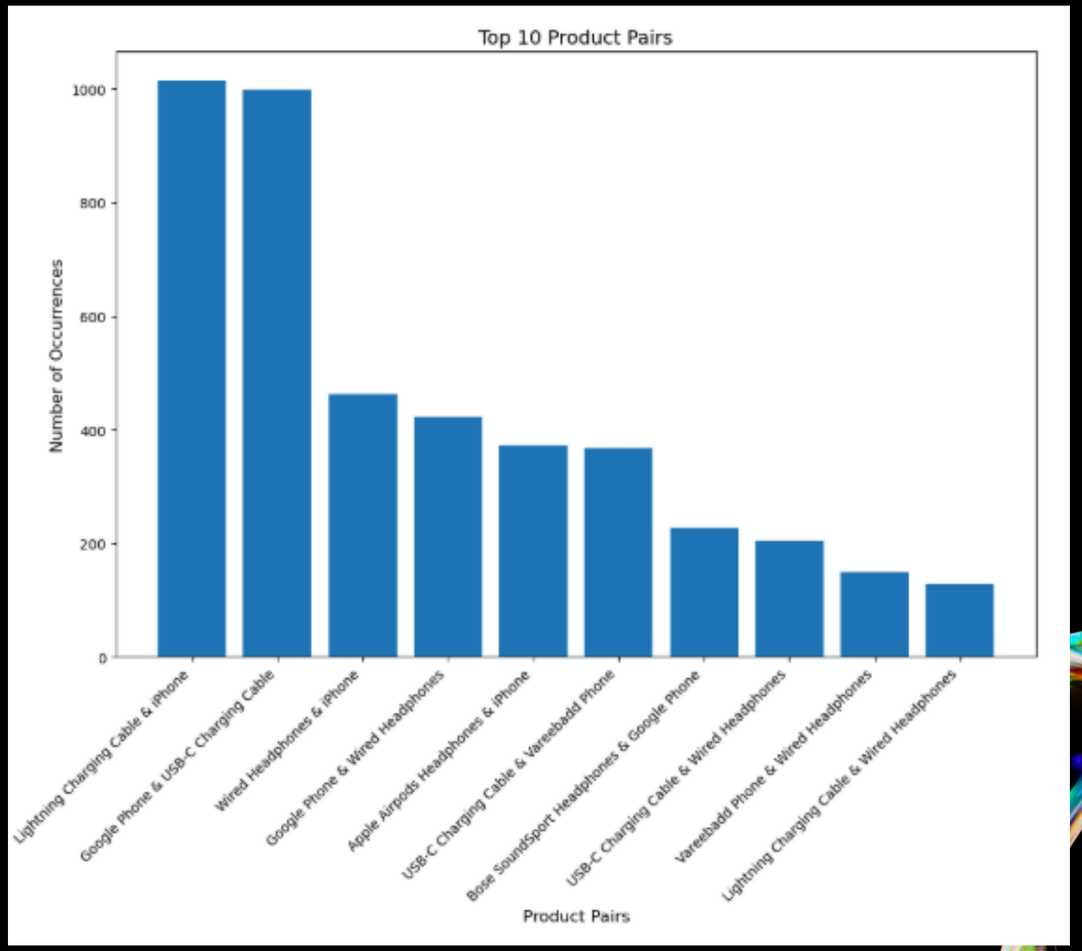
Number of Products Sold
Focuses on top-selling and low-selling products, identifying trends in consumer preferences.

Sales by Product
Examines revenue contributions across product categories, emphasizing laptops and computers.

PRODUCT-SPECIFIC INSIGHTS

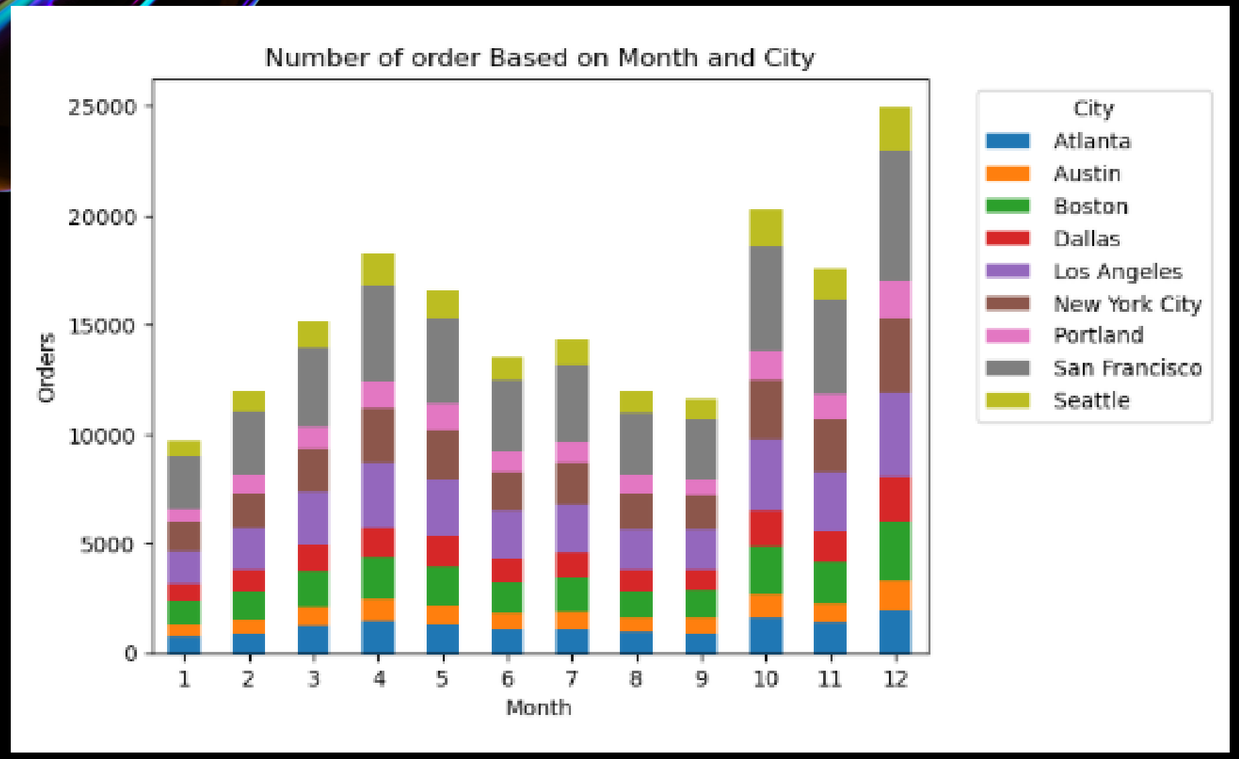


Sales by Each Product
Breaks down revenue by individual products, highlighting flagship items and underperformers.

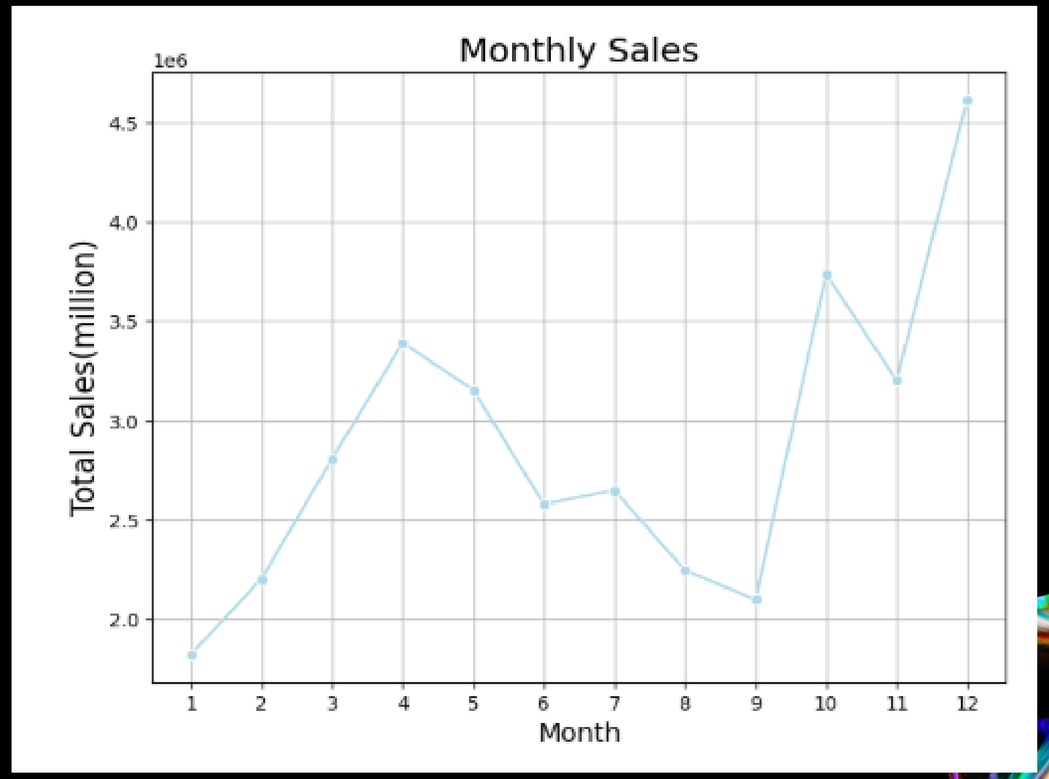


Top 10 Product Pairs
Analyzes complementary purchases, providing insights for cross-selling and bundling strategies.

TEMPORAL TRENDS

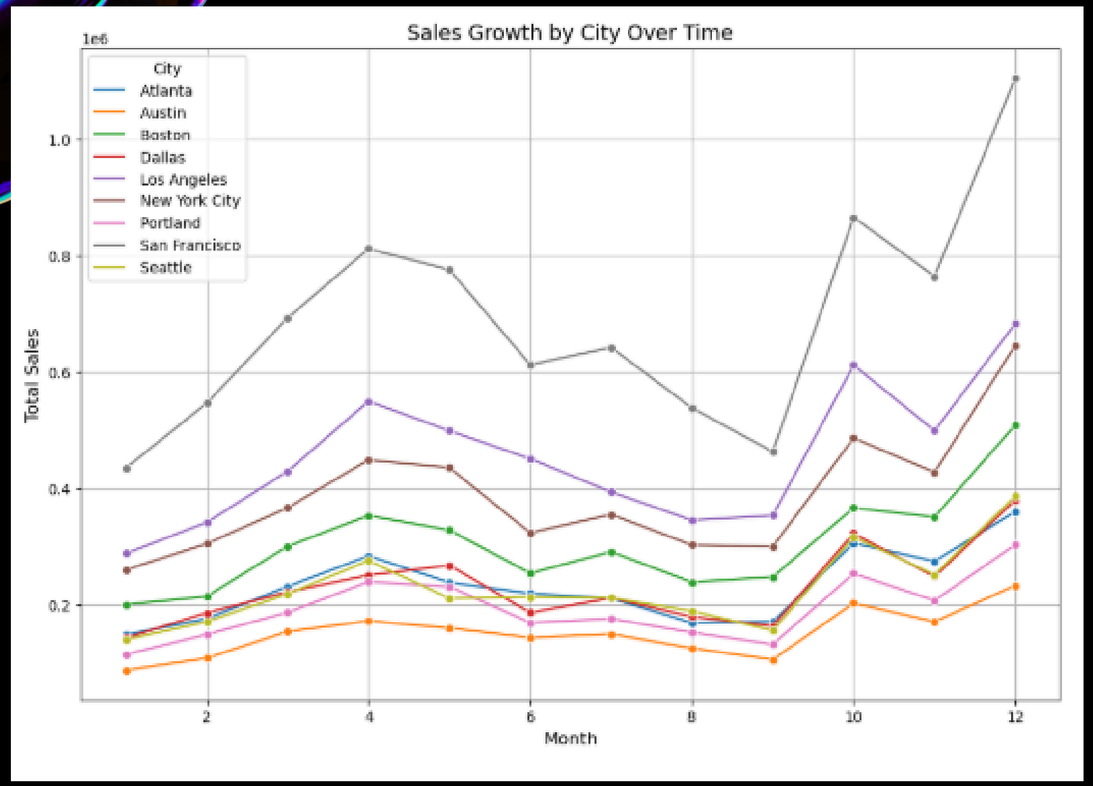


Number of Orders Based on Month and City
Tracks monthly sales trends and city-level performance, highlighting peak periods like December.

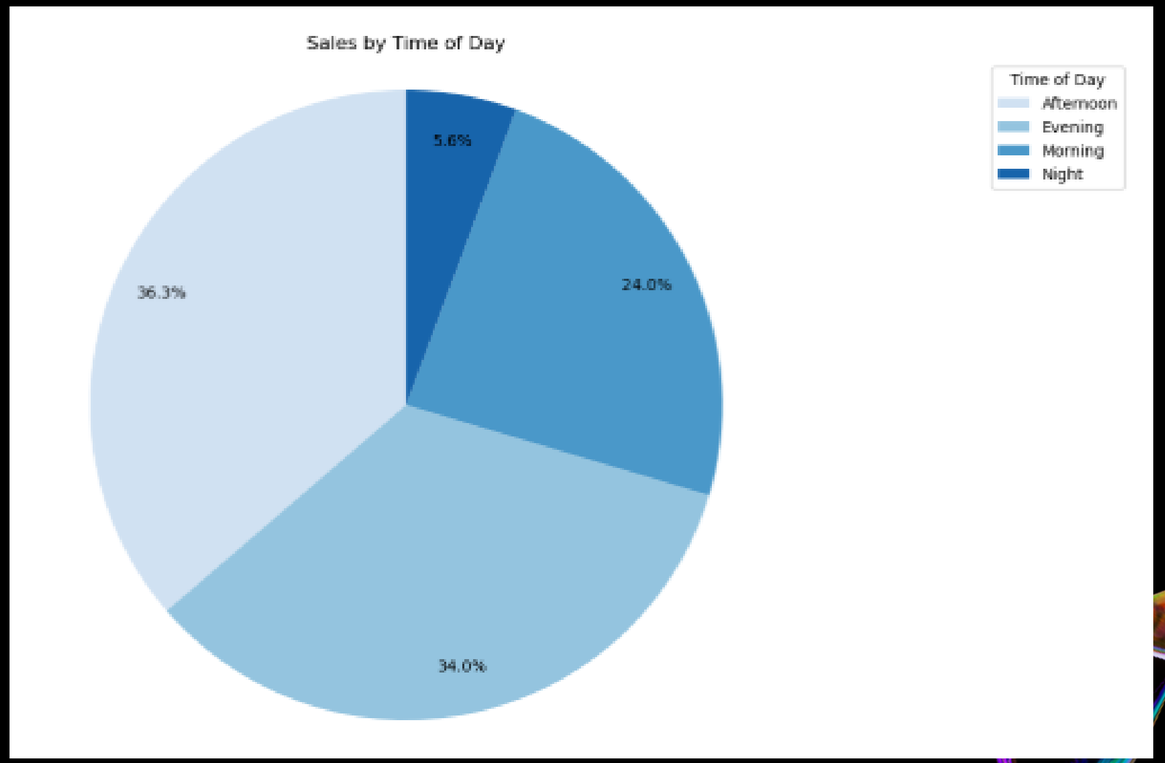


Sales by Month
Offers a detailed view of monthly revenue trends and seasonal fluctuations

TEMPORAL TRENDS

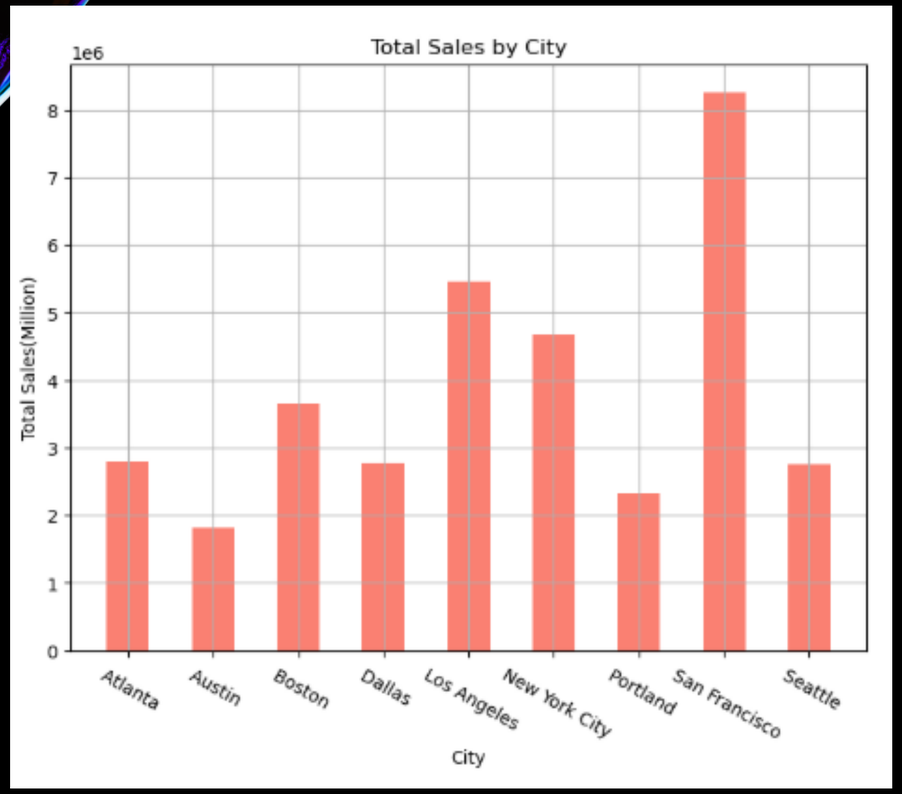


Sales Growth by City Over Time
Shows temporal revenue growth in major cities, emphasizing year-end surges.

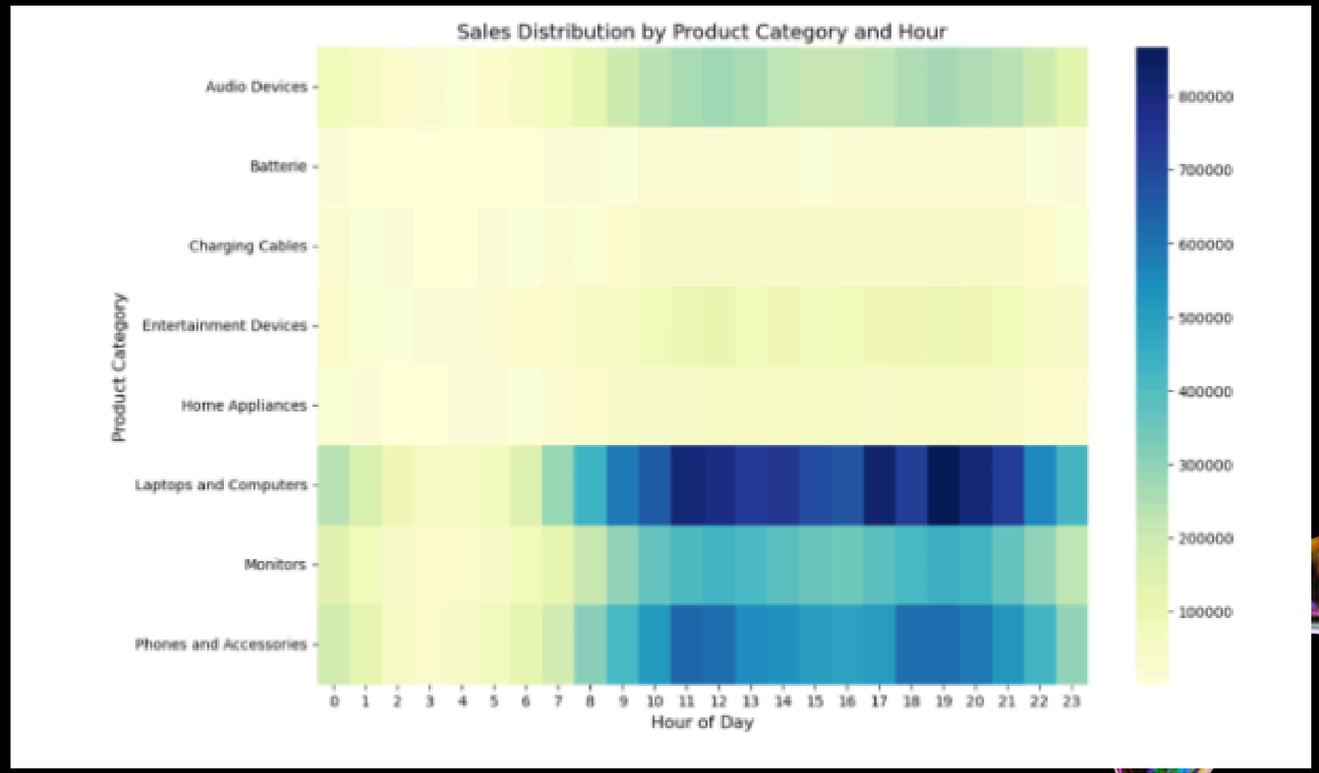


Sales Trends by Time of Day
Identifies peak shopping times, offering opportunities for time-sensitive marketing.

GEOGRAPHIC AND BEHAVIORAL PATTERNS

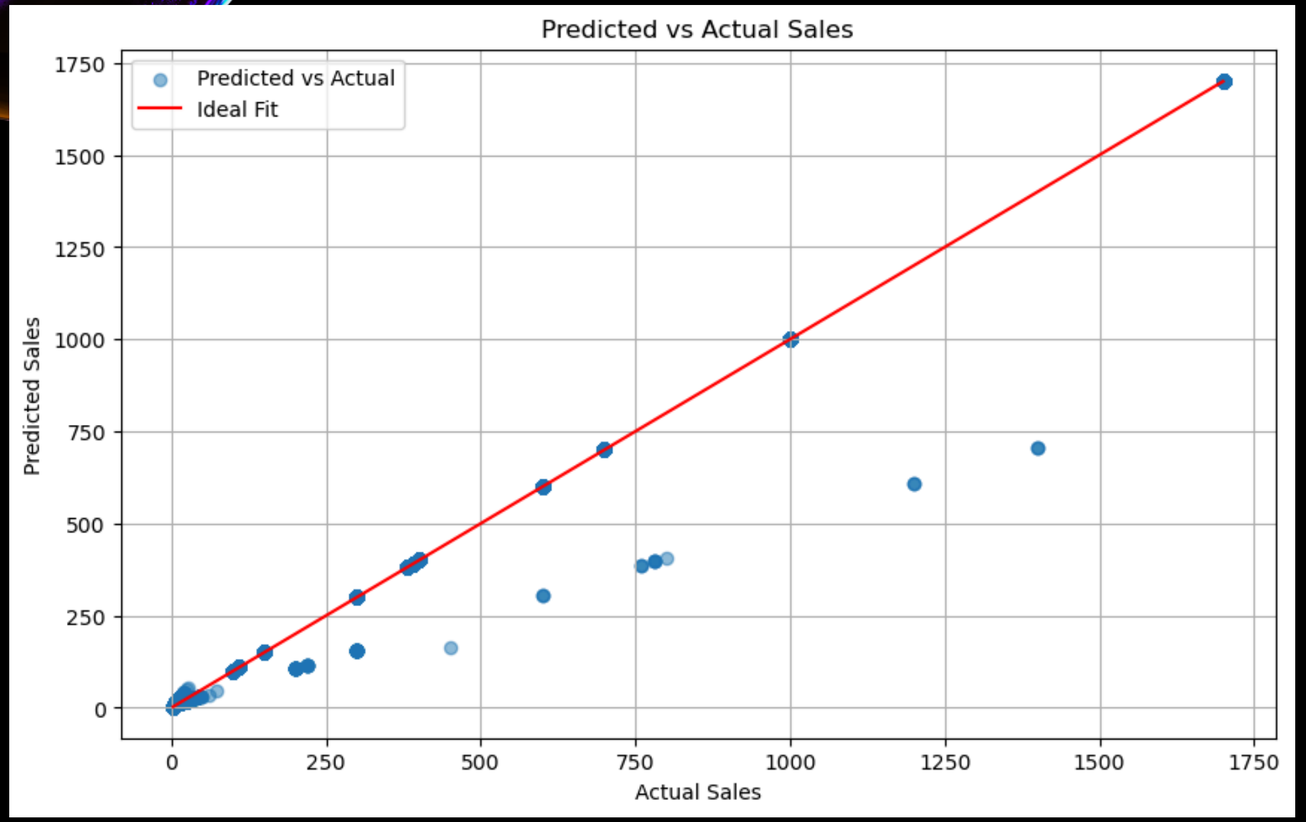


Sales by City
Explores revenue disparities between cities, focusing on high-performing and underperforming markets.



Sales Distribution by Product Category and Hour
Provides a detailed look at sales behavior across product categories and hours, highlighting targeted opportunities.

LINEAR REGRESSION




```
The cofficient(s) b is(are) [[6.63241127 1.0011644 ]]
The intercept a is [-6.60019477]
The linear relationship: 0.9986937223894214
```

Linear regression is used to predict 'Sales' (dependent variable) based on 'Quantity Ordered' and 'Price Each' (independent variables). Data is split 80/20 into training and test sets using a random state for consistency. The model yields an intercept of -6.6002 and coefficients of 6.6324 and 1.0012, forming the equation:

$$y=-6.6002+6.6324x1+1.0012x2$$

The model shows a strong linear relationship ($R2\approx0.9986$)with predictions closely aligning to actual values, though minor deviations exist. Overall, it effectively predicts sales.

OLS REGRESSION RESULTS

OLS Regression Results

Dep. Variable:	Sales	**R-squared:**	1.000
Model:	OLS	**Adj. R-squared:**	1.000
Method:	Least Squares	**F-statistic:**	4.244e+31
Date:	Wed, 18 Dec 2024	**Prob (F-statistic):**	0.00
Time:	10:39:36	**Log-Likelihood:**	3.1225e+06
No. Observations:	130165	**AIC:**	-6.245e+06
Df Residuals:	130160	**BIC:**	-6.245e+06
Df Model:	4		
Covariance Type:	nonrobust		

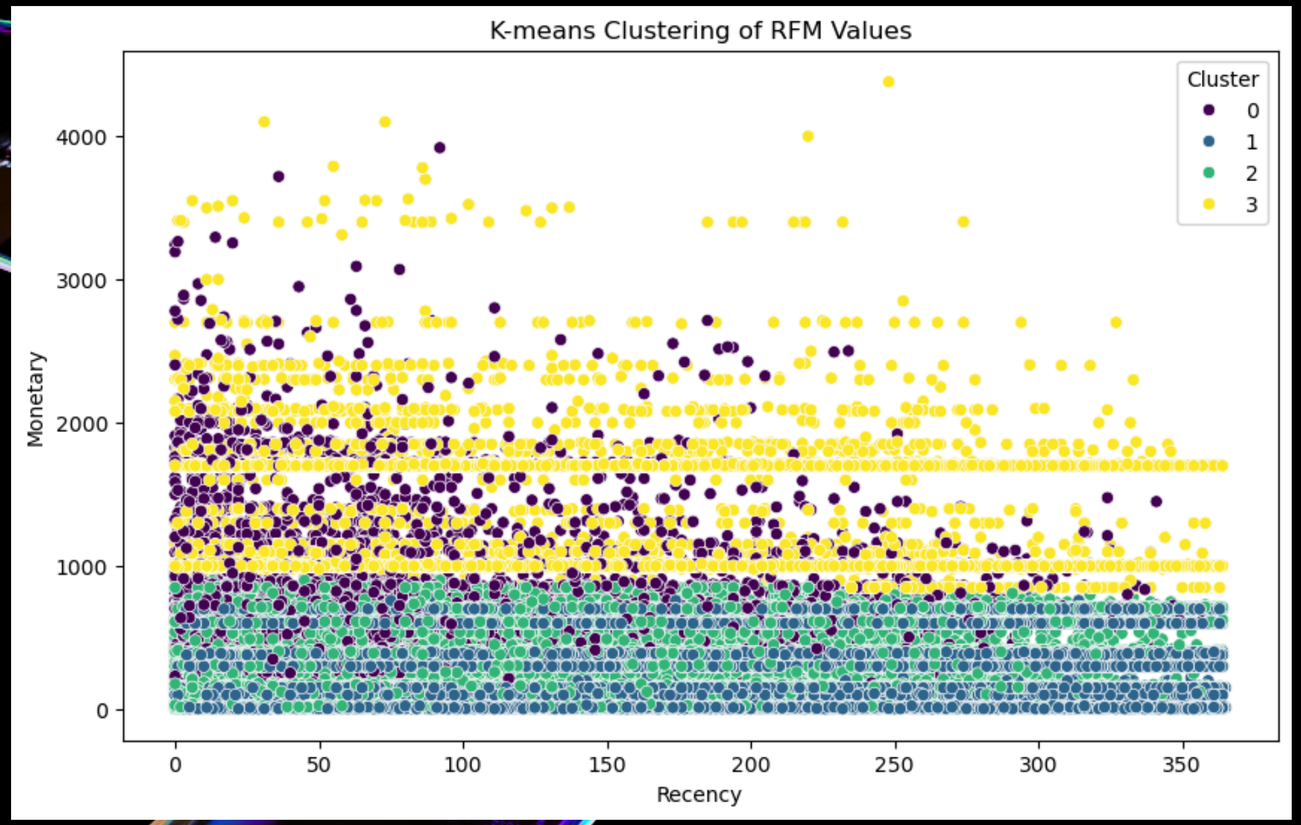
	coef	std err	t	P>|t|	[0.025	0.975]
const	-5.171e-12	1.01e-13	-50.976	0.000	-5.37e-12	-4.97e-12
Quantity Ordered	7.999e-12	5.98e-14	133.667	0.000	7.88e-12	8.12e-12
Price Each	-3.469e-15	1.92e-15	-1.807	0.071	-7.23e-15	2.94e-16
Sales	1.0000	1.92e-15	5.22e+14	0.000	1.000	1.000
Hour	2.193e-14	4.72e-15	4.650	0.000	1.27e-14	3.12e-14

Omnibus:	62780.814	**Durbin-Watson:**	0.826
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	351553.777
Skew:	-2.332	**Prob(JB):**	0.00
Kurtosis:	9.563	**Cond. No.**	2.33e+03

The results show strong model performance:

- The F-statistic p-value is very small, confirming the model's significance.
- Adjusted R2 indicates a strong linear relationship, consistent with the original R2.
- Coefficients are significant (small p-values), but the intercept has a large p-value, suggesting a model without the intercept may be better.

K-MEANS CLUSTERING



We used K-Means and the RFM model to segment customers based on:

- Recency (R): Days since last purchase.
- Frequency (F): Number of purchases.
- Monetary (M): Total spending.

Using 2020-01-01 as the reference date for recency, customers were divided into 4 groups:

Group 1 (Blue): Low frequency and spending, at risk of churning.

Group 2 (Purple): Moderate spending ($1000–$3500) and recency (0–200 days), potential for upgrade or downgrade.

Group 3 (Green): High frequency, high spending, recent purchases (0–100 days), core loyal customers.

Group 4 (Yellow): High spending and frequency but long inactive periods, high re-engagement potential.

KEY CONCLUSIONS

Revenue Trends

Gradual increase early in the year, peak in December due to holiday spending.

Category Contribution

Laptops and computers dominate (75% revenue), followed by phones and accessories (25.9%).

City Analysis

High revenue from major cities (San Francisco, Los Angeles, New York), lower in smaller cities (Dallas, Seattle, Portland).

Hourly Trends

Peak sales during mid-day, reflecting shopping habits

Top Products

MacBook Pro ($7.6M) and iPhone ($5M) lead; monitors and headphones need strategies to boost sales.

Insights

Forecast vs. actual sales and city-specific growth guide business adjustments.

RECOMMENDATIONS

Marketing Strategies:

- Tailor campaigns to customer segments and offer personalized promotions.
- Seasonal sales for slower months like February (e.g., Valentine's Day bundles).
- Focus on high-revenue cities with advanced product offerings.

Product & Quality Optimization:

- Optimize inventory for high-demand items (e.g., phones).
- Offer product bundles to encourage larger purchases.
- Invest in flagship products and assess low-performing ones for improvement.

Customer Retention:

- Implement loyalty programs and exclusive perks.
- Address customer service and delivery issues for higher satisfaction.

Performance Monitoring:

- Track KPIs like revenue, churn, and customer satisfaction.
- Conduct market research to identify trends and opportunities.

Sustainable Growth:

- Invest in R&D, diversify product lines, and expand into new categories (e.g., home appliances, audio equipment).
- Focus on after-sales service and advanced technologies to attract more customers.

Hanoi School of Business & Management

THANK YOU

for your time and attention

Present by Group 8

PhD. Nguyen Huy Anh

Dr. Emmanuel Plan

Xuan Thuy Stress, Ha Noi City