

Electronic Product Sales Data Analysis in the US

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Project Goal

The main objective here is to extract key performance indicators (KPIs) that will help to make data-driven decisions and improve company business.

01

Raw data collection

02

Data processing & Data cleaning

03

Data analysis & Models

04

Insight visualization

Data collection and Analytic tool

WHERE

Kaggle: Sales Product Data

(<https://www.kaggle.com/datasets/knightbearr/sales-product-data>)

180K records

HOW

SQL(Data processing/ Data analysis)

Excel(Data cleaning/Pivot tables/Data visualization)

PowerPoint

Data Exploration

Product Categories

iPhone
Lightning Charging Cable
Wired Headphones
27in FHD Monitor
Vareebadd Phone
Wired Headphones

...19 products

Consumer Demographics

Atlanta
Austin
Boston
Dallas
Los angeles
New york
Portland
San francisco
Seattle
... 10 cities in total

Duplicate order problem

There are total of 180,000 orders in 2019, but about 5,600 of them are duplicated.

The repetition represents the fact that our customer buy a set of items together as a package. We observed that its repetition is meaningful, representing the consumer ordering two different products in one order.

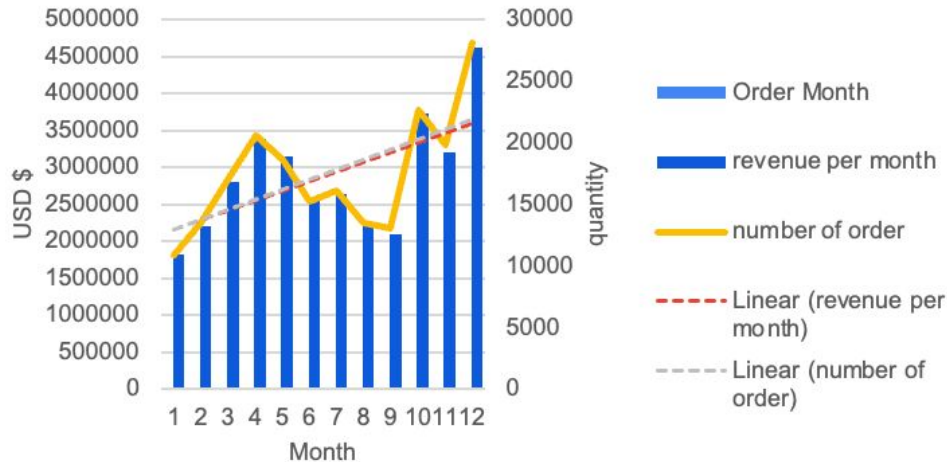
Product Analysis

In 2019, the Number of Orders and Sales Revenue are increasing; while, we see a downward trend in Average Order Value(AOV).

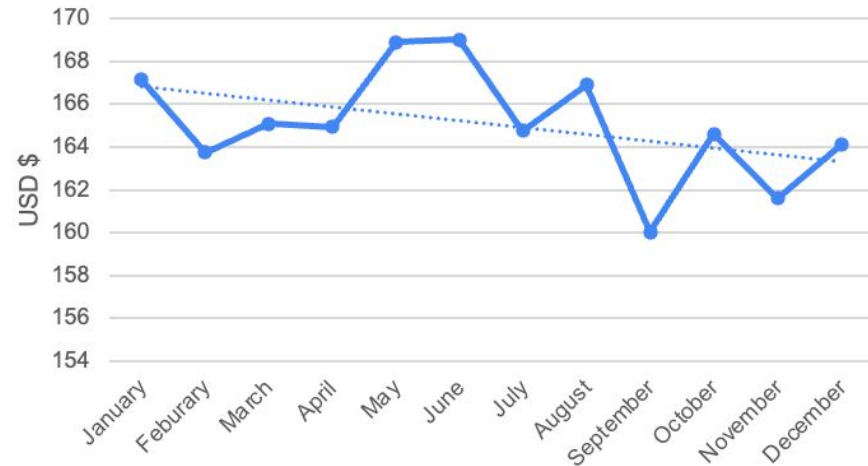
A low or dropping AOV means **our transaction revenue is lower than ideal.**

To solve the problem, I analyze the sales of each product to see which product brings the most profits.

Order Quantity & Sales Revenue



Average order value (average price)



Hypothesis: High-sold products have a low price

What products sold the most?

USB-C Charging Cable

Lightning Charging Cable

AAA Batteries (4-pack)

What products generate the most sales?

Macbook Pro Laptop

iPhone

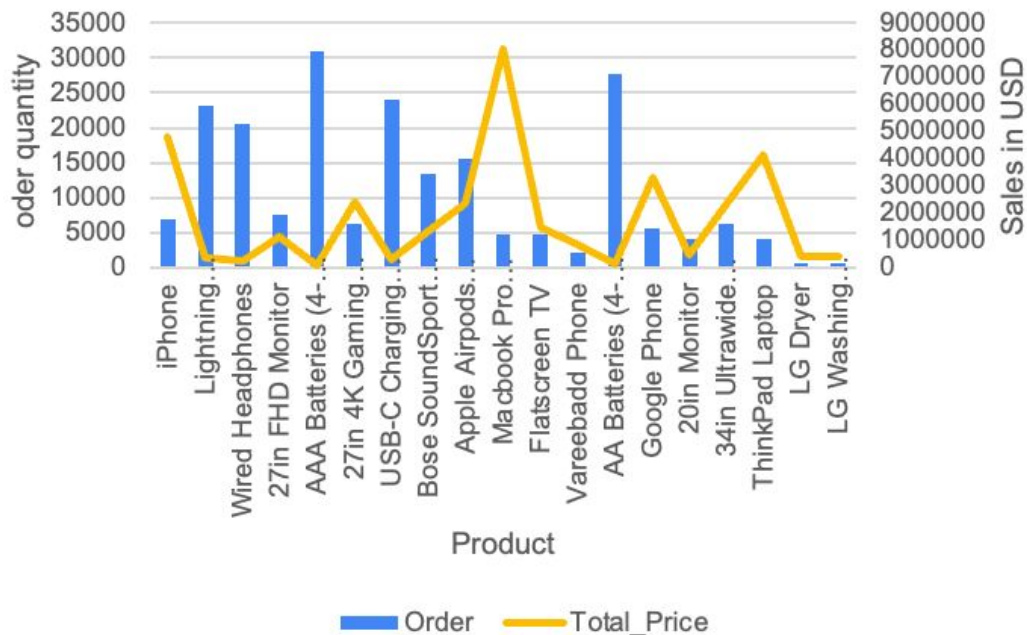
ThinkPad Laptop

Insights:

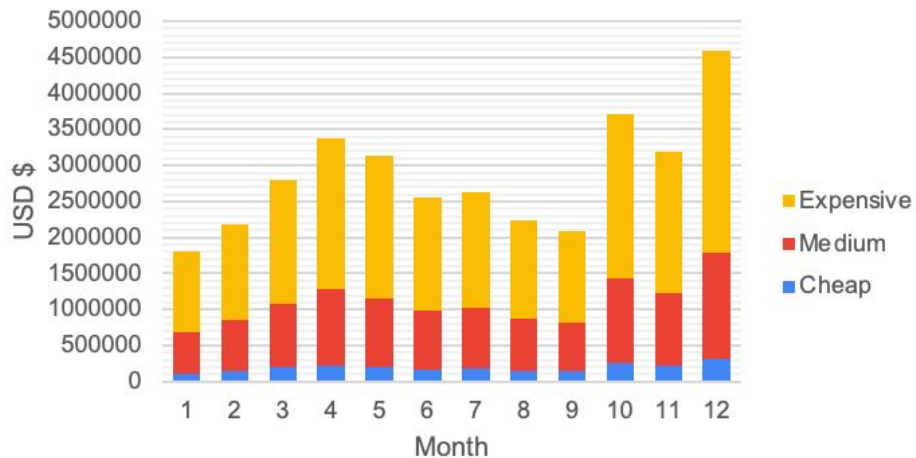
The three products with a significant amount of orders are all very low in terms of sales; and the three products with the largest sales don't have many orders

The product price has big difference, so I decided to do product grouping based on price.

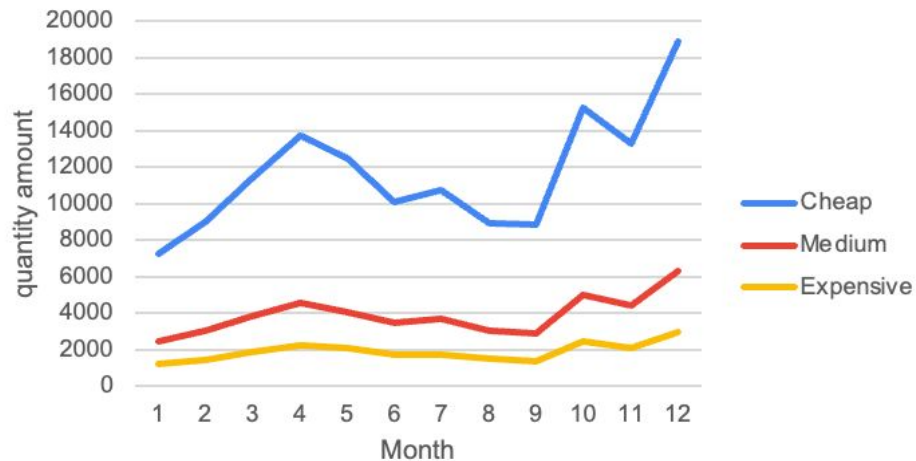
Order quantity and sales of each product



Sales



Order Quantity



Cheap: \$0~\$100, 6 data

Medium: \$100~500, 7 data

Expensive: >\$600, 6 data

In a year, high-priced products contribute the most sales in each month, followed by mid-priced products, and low-priced products

Low-priced products has large growth rate, but the growth rate of high-priced products is very flat

The reason for the downward trend in the average order value is **most people buy more low-priced products, but those are not generating much revenue.**

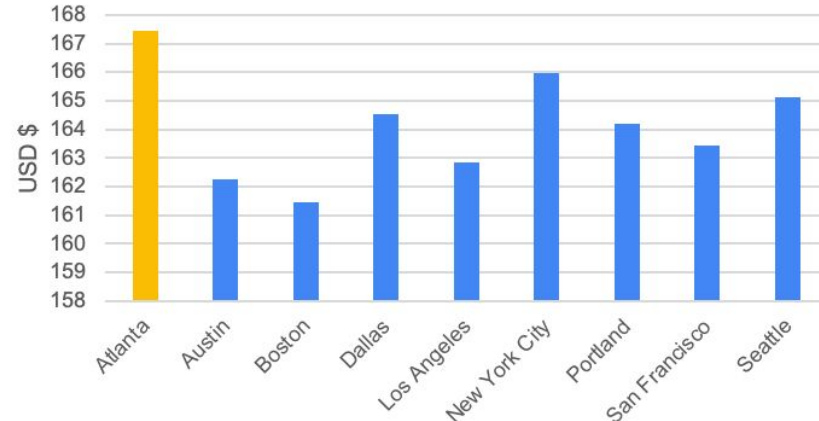
Most of the consumers are from San Francisco. San Francisco had the highest total sales in 2019, accounting for about 24% of the annual orders and sales

The average order price is highest in Atlanta. It shows that its consumers may prefer to consume products with high unit prices, but it does not have a lot of orders or total sales. **The companies should develop more into potential city with high consumption power**

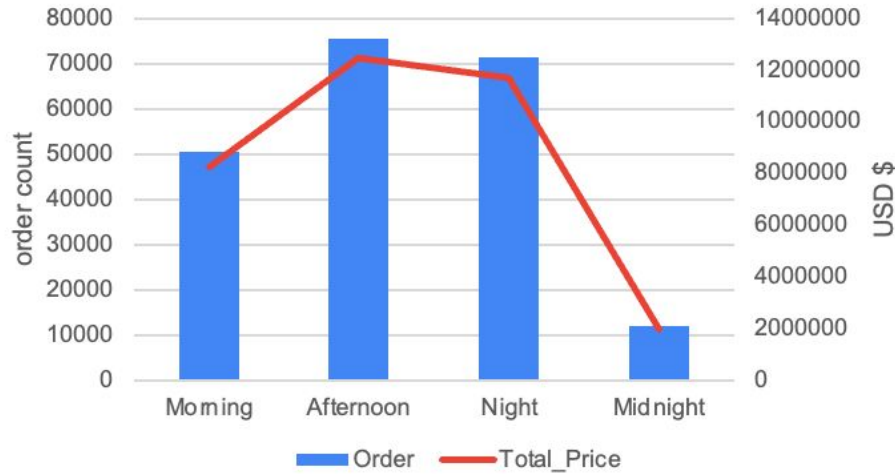
Order quantity and Sale in each city



Average order value in each city



Order quantity and sales in each time period



I divide the ordering time into four periods, which are

06:00~11:59: Morning

12:00~17:59: Afternoon

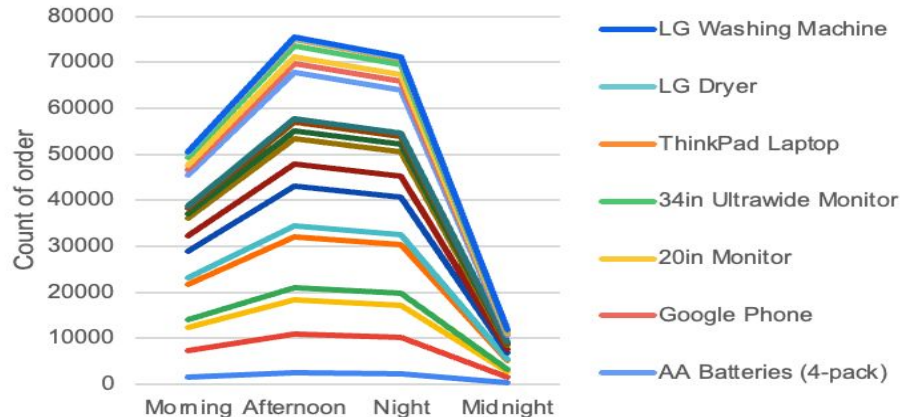
18:00~23:59: Night

24:00~05:59: Midnight

According to the table, it can be seen that the largest number of orders and sales are in the afternoon and night; while least people order items in midnight.

In order to know whether there is a situation where the sales of a certain product are particularly prominent in a certain period of time, I have done a sales analysis of the product and time period. The results show that all products sell the most in the afternoon and evening.

Order trend of products in each time period



Bundle	Order Quantity	Price
Iphone, Lightning Charging Cable	801	Expensive+Cheap
Google Phone, USB-C Charging Cable	784	E+C
Iphone Wired Headphones	355	E+C
Google Phone Wired Headphones	332	E+C
iPhone Apple Airpods Headphones	283	Expensive+Medium
Vareebadd Phone USB-C Charging Cable	282	M+C
Google Phone Bose SoundSport Headphones	172	E+C
Wired Headphones USB-C Charging Cable	152	C+C
Vareebadd Phone USB-C Charging Cable	119	M+C
Wired Headphones	101	C+C

Product Bundling

- Conduct the top 10 combinations that consumers placed orders together.
- List of product bundle:
Phone, Charging Cable and Earphone
- Each combination has at least one “cheap” product
- Consumers who buy mobile phones seem to be more likely to order other products at the same time, which is related to the complementary combination of products

Of the nearly 180,000 orders, only 5,600 have bundled purchases, which shows that **consumers usually only buy a single product in this company.**

Insights

- The total sales in 2019 were **USD 34.483.365** with **209.038 products sold**.
- **May** has the highest average revenue with **USD 190.305852**, while **September** has the lowest average revenue with **USD 180.497387**.
- **December** is the best month for sales with **USD 4.613.443** total revenue.
- **San Francisco** had the highest total sales in 2019 with **USD 8.259.719** total revenue.
- **AAA Batteries (4-pack)** are the most sold product with **31.012** products ordered.
- **iPhone and Lightning Charging Cable** are the most often products sold together with **1004** transactions, Google Phone and USB-C Charging Cable came second with 987 transactions.
- I recommend advertising the product before 12 PM and 7 PM, which could be at **9—11 AM** and **4—6 PM**.

Business Suggestion

Product Marketing Strategies	Goal	Action
Increase sales of high unit price products	High profit product directly affect our total revenue. The company should develop its marketing strategy to promote more high-priced products to increase revenue.	<ul style="list-style-type: none">- Advise more high-price product and optimize ads to attract consumers.- Target consumers with high purchasing power.
Geotargeting: reach customers in different cities	<ul style="list-style-type: none">- Consolidate major cities to make consumption continue to grow- Promote high profit product in high consumption potential cities- If the company is not making positive economic profit, consider to exit the market in those cities with low order volume	<ul style="list-style-type: none">- Reward consumers(discounts, cash back) to increase brand loyalty- Advertise high unit price products in cities with high consumption power.
Promote Product Bundle: increase sales	<p>Only 3.1% of consumers buy products together. Since the company sell electronic products, the ratio of product bundling should be higher</p> <p>Enabling consumer choices of buying one and more products together. This will bring revenue to a higher level</p>	<ul style="list-style-type: none">- Set product bundle price lower than what the products would have cost individually.- When consumers buy a mobile phone, we can recommend them to purchase additional wireless earphones on the website- Think about whether other products have tie-in promotion features