

# Understanding the retail dynamics using Superstore data

## 1 ABOUT DATA

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The superstore store orders data is taken from <https://www.kaggle.com/>. It captures all the aspects of an order right from order placement to delivery. Further, it also captures return data. In the orders table there are total 10194 observations with no null values and 21 features. Features includes categorical features like Ship Mode, Segment, Country/Region, City , State/Province, Postal Code, Region, Category, Sub-Category, Product ID, Product Name and numerical features like Sales, Quantity, Discount, Profit . Whereas return table captures only Order ID and return status. The tools used to understand the dynamics includes Python (with its libraries like Pandas, matplotlib). The data has time span from 2021 to 2024.

Data source: <https://www.kaggle.com/datasets/aditirai2607/super-market-dataset>

## 2 KEY INSIGHTS

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This section describes the key insights associated with various important features like Orders, Products, Customer, Delivery, Return, Finances etc.

### 2.1 ORDERS

- The superstore has executed 5111 orders in total.
- The orders have increased by 65% i.e. 2051 nos in the year 2021 to 3379 nos in the year 2024. The change was at the minimal of 3% in the year 2021-22. However, it has got a steep increase in the Year 2022-23 (24%) and 2023-24 (28%).
- Maximum orders fall in the months November and December i.e (1474) and the minimum being in January and February (300-400).
- 60% of the orders were delivered through Standard Class, 20% through Second class, first class (15%) and lowest being same day (5%).
- 50% of the orders belong to Consumer segment, 30% to Corporate, 20% to home office.
- Maximum orders come from 9% New York City and its interesting to note that 40% of the orders come from these 10 cities (New York City, Los Angeles, Philadelphia, San Francisco, Seattle, Houston, Chicago, Columbus, San Diego, Springfield) out of total 542 cities.
- 70% of orders comes from these States ( California, New York, Texas, Pennsylvania, Washington, Illinois, Ohio, Florida, Michigan, North Carolina) out of total 59 states.
- Maximum orders per customer is 41 Nos.
- Sub-category wise there are 600 orders on average.
- 75% of the sub-categories have less than 856 orders
- 75% of the orders have been processed with process time of 5 days.

## 2.2 PRODUCTS

- There is total 1862 products wherein 75% of the products are ordered less than 7 times and on an average a product is orders 5 times.
- Products like wall clock and desk accessories were orders more than 20 times.
- Products which belong to Binders, papers, Furnishings subcategories have more than 1000 orders. Minimum orders come from Copiers sub-category.
- Top 5 selling products -
  1. Canon imageCLASS 2200 Advanced Copier
  2. Fellowes PB500 Electric Punch Plastic Comb Binding Machine with Manual Bind
  3. Cisco TelePresence System EX90 Videoconferencing
  4. HON 5400 Series Task Chairs for Big and Tall
  5. GBC DocuBind TL300 Electric Binding System
- Top 5 profitable products –
  1. Canon imageCLASS 2200 Advanced Copier
  2. Fellowes PB500 Electric Punch Plastic Comb Binding Machine with Manual Bind
  3. Hewlett Packard LaserJet 3310 Copier
  4. Canon PC1060 Personal Laser Copier
  5. HP Designjet T520 Inkjet Large Format Printer - 24" Color
- Top 2 selling products have highest profitability.
- Top 5 products in terms of order volume
  1. Staples
  2. Staple envelope
  3. Easy-staple paper
  4. Staples in misc. colors
  5. Nu-Dell Executive Frame
- Categorywise top products in terms of order volume and sales

Category	Product Name	Sales
Furniture	Nu-Dell Executive Frame	HON 5400 Series Task Chairs for Big and Tall
Office Supplies	Staples	Fellowes PB500 Electric Punch Plastic Comb Bin...
Technology	iKross Bluetooth Portable Keyboard + Cell Phone Stand Holder + Brush for Apple iPhone 5S 5C 5, 4S 4	Canon imageCLASS 2200 Advanced Copier

- Region wise top and bottom selling products

Region	Top selling product	Sales	Least selling product	Sales
Central	Canon imageCLASS 2200 Advanced Copier	17499.950	Acco Economy Flexible Poly Round Ring Binder	1.044
East	Canon imageCLASS 2200 Advanced Copier	30099.914	Design Ebony Sketching Pencil	2.780
South	Cisco TelePresence System EX90 Videoconferenci...	22638.480	OIC Binder Clips, Mini, 1/4" Capacity, Black	1.984
West	Canon imageCLASS 2200 Advanced Copier	13999.960	Acco Banker's Clasps, 5 3/4"-Long	2.880

## 2.3 SALES AND PROFITABILITY

- Superstore does total sales of 23.26 Mn in the year 2021 to 2024 with profit of 2.93 Mn (12.56%)
- On an average discount of 15% ( $\pm 20\%$ ) were offered, also 75% of orders offered had discount of less than 20%.
- Average profit margin is 12% ( $\pm 46\%$ ) and 75% of the orders had profit margin less than 36%.
- Category wise regional sales (West region in both the Countries brings highest sales and least being Central)

Country/Region	Region	Sales
Canada	West	14355.7840
Canada	East	13046.9280
Canada	Central	1930.7820
United States	West	725457.8245
United States	South	391721.9050
United States	East	678781.2400
United States	Central	501239.8908

- Year wise sales (There is dip in sales in the year 2022 by 4%)

Year	Sales	Change
2021	4.940402	NaN
2022	4.729930	-4.260216
2023	6.139336	29.797595
2024	7.455675	21.441074

- **March, June, September, October November, and December** are hotspot for sales across years, contributing to 80% of the yearly sales.
- **Category wise top selling subcategories**

Category	Sub-Category	Sales
Furniture	Tables	208020.182
Office Supplies	Supplies	46725.498
Technology	Phones	331842.640

- Profitable categories across regions

Region	Category	Profit	Sales
Central	Technology	33697.4320	170416.312
East	Technology	48441.7758	267938.071
South	Technology	19991.8314	148771.908
West	Office Supplies	54070.2292	226366.891

- Top 2 profitable category region wise

Region	Category	Profit	Sales
Central	Technology	33697.4320	170416.312
Central	Office Supplies	8970.0817	168216.709
East	Technology	48441.7758	267938.071
East	Office Supplies	42996.7397	211658.401
South	Technology	19991.8314	148771.908
South	Office Supplies	19986.3928	125651.313
West	Office Supplies	54070.2292	226366.891
West	Technology	44412.3364	252766.988

Technology and office supplies are the category leaders across regions.

- The subcategories which get 80% of sales across the above said profitable categories

Category	Sub-Category	Sales
Office Supplies	Storage	224644.554
Office Supplies	Binders	207354.881
Office Supplies	Appliances	108213.185
Office Supplies	Paper	79540.538
Office Supplies	Supplies	46725.498
Office Supplies	Art	27659.014
Office Supplies	Envelopes	16528.362
Office Supplies	Labels	12695.042
Office Supplies	Fasteners	8532.240
Technology	Phones	331842.640
Technology	Machines	189925.031
Technology	Accessories	167380.318
Technology	Copiers	150745.290

- Subcategories which fetched overall profit margin greater than 30%

Sub-Category	Overall Profit margin
Labels	78.244474
Paper	76.642793
Envelopes	73.247145
Copiers	59.263745
Fasteners	39.790192
Accessories	33.430648
Art	31.673112

- Average order value across superstore is 218 \$
- Top 3 products in each category by year over year sales growth in year 2024

Category_x	Product Name	Sales_2023	Sales_2024	YOY
Furniture	Balt Split Level Computer Training Table	2.210	235.875	10573.076923
Furniture	Deflect-o RollaMat Studded, Beveled Mat for Me...	73.784	1549.464	2000.000000
Furniture	Tenex B1-RE Series Chair Mats for Low Pile Car...	45.980	496.584	980.000000
Office Supplies	3.6 Cubic Foot Counter Height Office Refrigerator	58.924	2710.504	4500.000000
Office Supplies	Acco Banker's Clasps, 5 3/4"-Long	2.304	85.120	3594.444444
Office Supplies	Acco 3-Hole Punch	2.628	79.716	2933.333333
Technology	RCA Visys Integrated PBX 8-Line Router	6.480	180.216	2681.111111
Technology	Logitech G13 Programmable Gameboard with LCD D...	63.992	975.878	1425.000000
Technology	Nortel Networks T7316 E Nt8 B27	108.784	1631.760	1400.000000

- Top 3 products in each category by highest rolling 3 months total sales for Jan 2024

Category	Product Name	3_month_sales
Furniture	Lesro Sheffield Collection Coffee Table, End T...	221334.4398
Furniture	Eldon Expressions Wood and Plastic Desk Access...	221278.3698
Furniture	Office Star Flex Back Scooter Chair with Alumi...	220878.6978
Office Supplies	GBC Instant Report Kit	436855.4416
Office Supplies	Tenex Personal Project File with Scoop Front D...	433853.6096
Office Supplies	Staples	430213.9936
Technology	Jensen SMPS-640 - speaker phone	440546.3526
Technology	Plantronics Audio 478 Stereo USB Headset	220879.7788
Technology	AT&T 841000 Phone	220720.0828

## 2.4 CUSTOMERS

- Out of 804 customers, 367 have done more orders than average no of orders per customer (i.e. 13)

## 2.5 RETURNS

- Region wise returns (Maximum belongs to West region)

Region	Returned
Central	286
East	757
South	279
West	1904

- top 3 subcategories by sales of returned orders in west region

Sub-Category	Sales
Phones	57261.328
Copiers	50319.688
Appliances	48000.094

- Category wise sales of orders that were not returned.

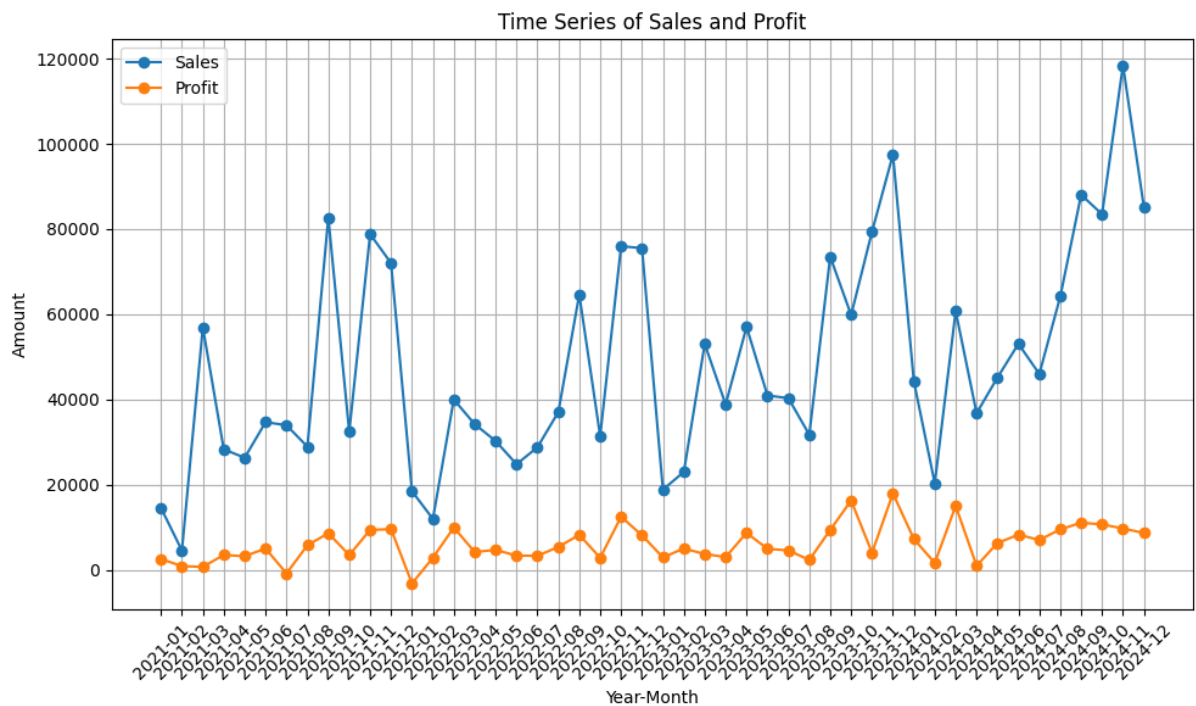
Category	Sales
Furniture	695528.5864
Office Supplies	683316.3850
Technology	767185.1050

- There are 69 cities where only single order was returned.
- Segment wise returns.

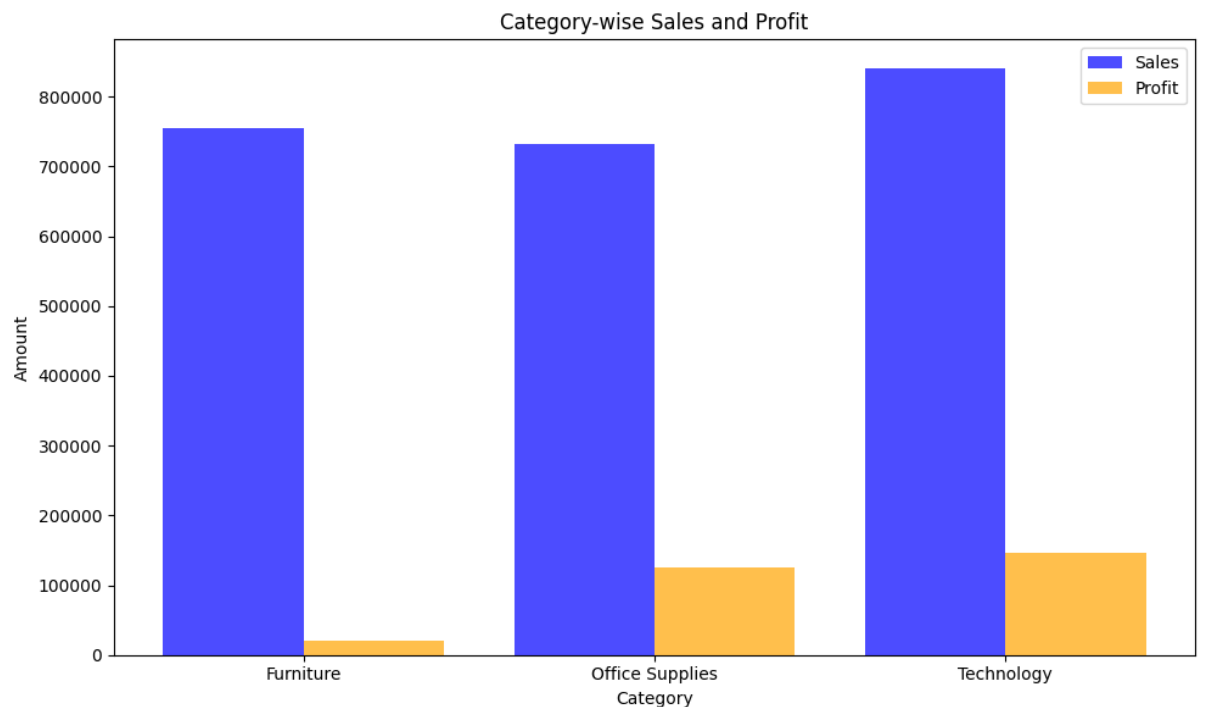
Segment	Returned
Consumer	1850
Corporate	995
Home Office	381

### 3 KEY PLOTS

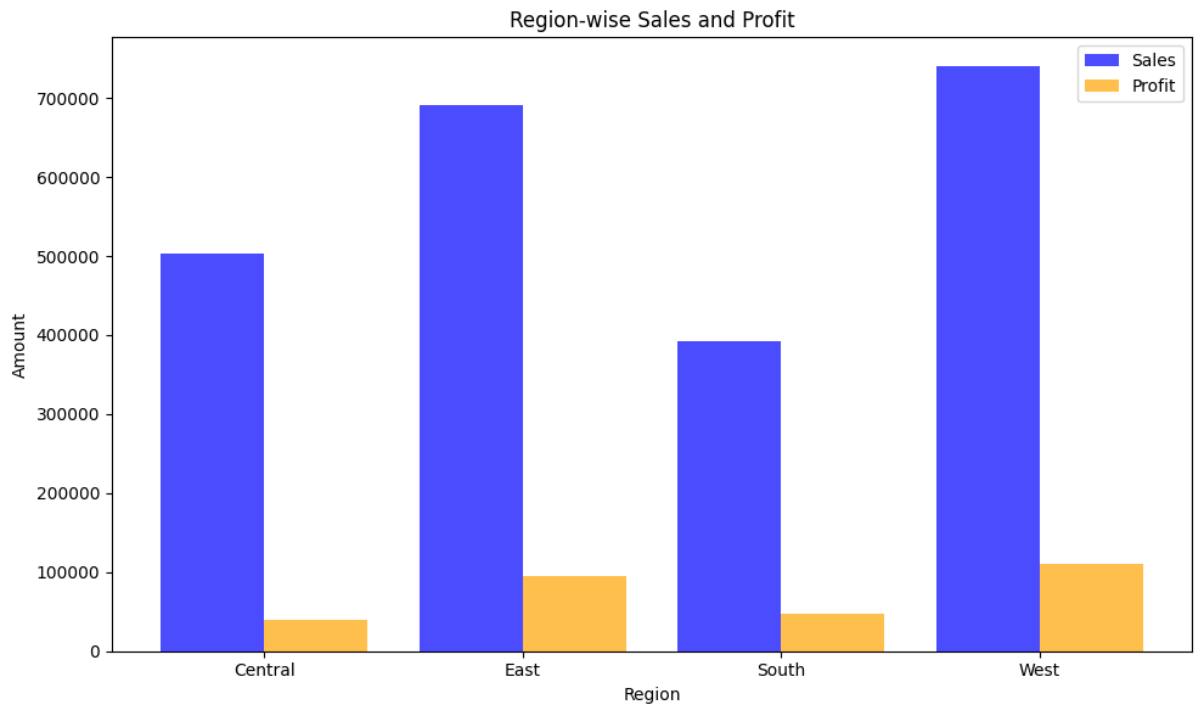
#### 1) Time series of sales and profit



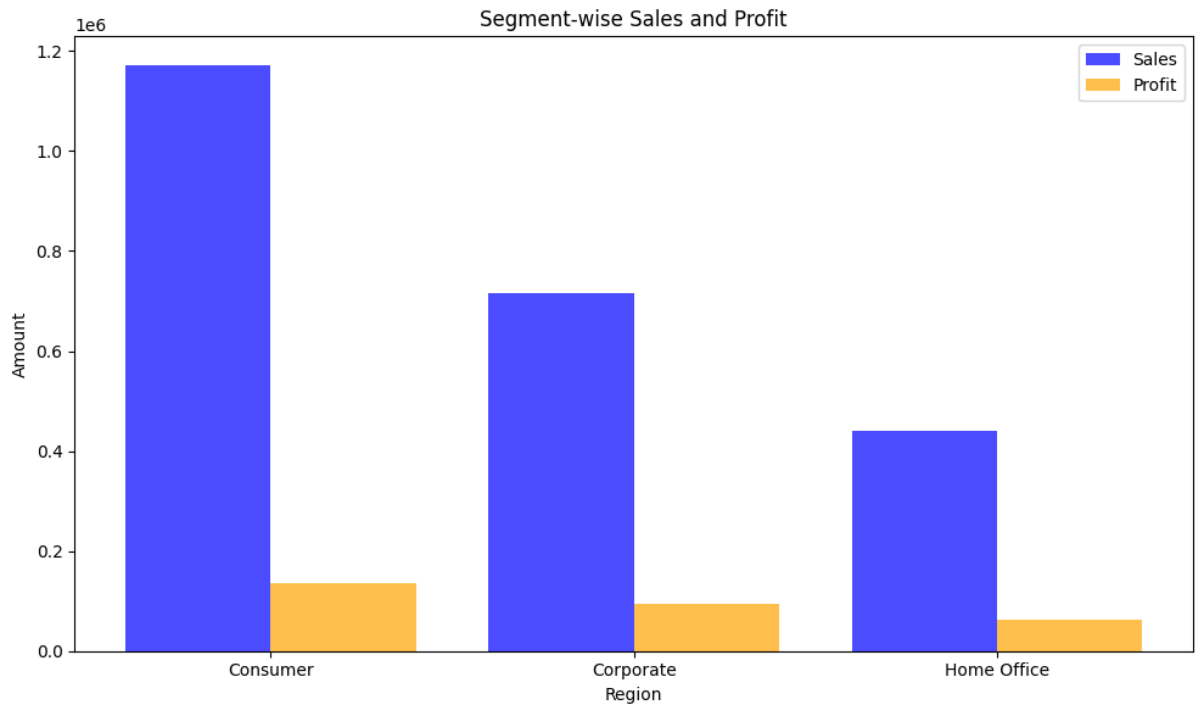
#### 2) Category wise sales and profit



#### 3) Region wise sales and profit

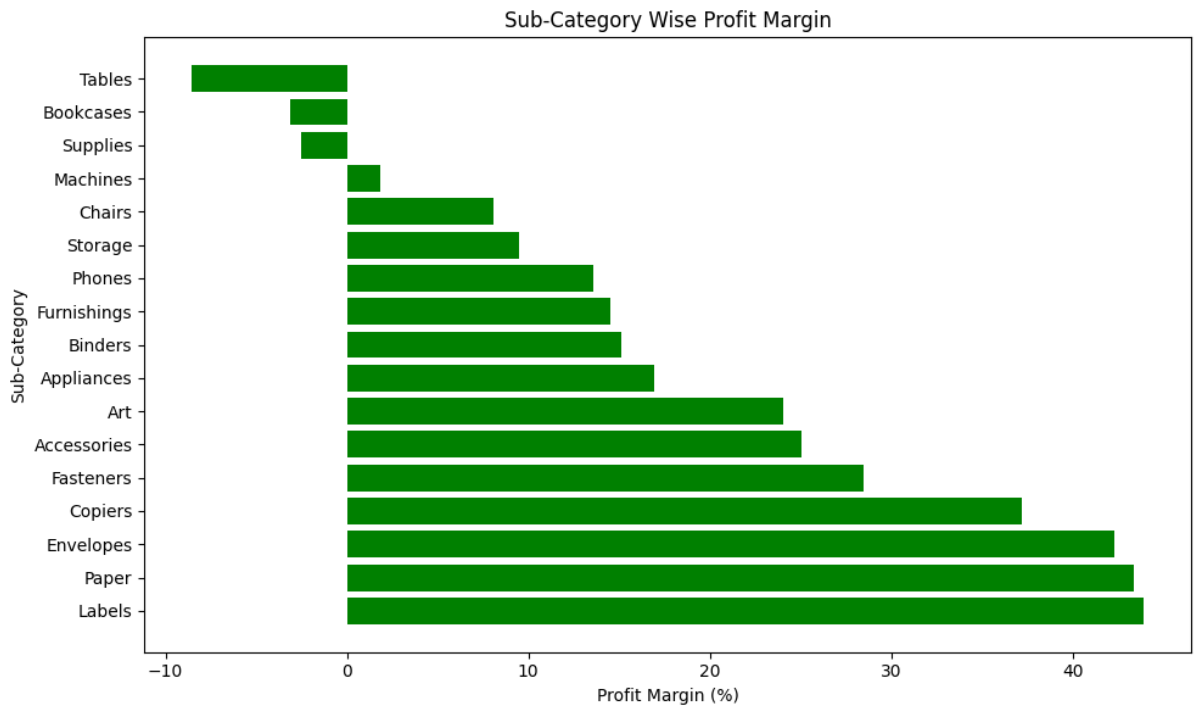


4) Segment wise sales and profit



5) Sub category wise profit margin





## 4 RECOMMENDATIONS

- ❖ **Identify Top Categories/Sub-Categories:** Products like **Technology** and **Office Supplies** often drive higher sales or profit margins.
- ❖ **Expand Product Range:** Increase the variety of top-performing sub-categories.
- ❖ **Regional Promotions:** As its seen that Central region is underperforming, offer targeted discounts or bundles for top performing products to boost sales further.
- ❖ **Return reason to be captured:** There is a need to capture the return reason to understand the real problem behind returns.
- ❖ **Average order value:** AOV can be targeted to bring to 300 \$.
- ❖ There are only 10 states out of 59 which are contributing to orders, so the order states shall be targeted to improve sales.