PROJECT PRESENTATION

E-COMMERCE SALES AND CUSTOMER INSIGHTS ANALYSIS SQL PART

1. **Sales Performance Analysis:**
   - Write a query to calculate total sales revenue per category, sub-category, and region.
   - Identify the top 5 best-selling products by both sales revenue and quantity sold.
2. **Customer Insights:**
   - Find the most loyal customers by calculating their purchase frequency and total spend.
   - Identify customers with the highest average order value (AOV).
3. **Operational Efficiency:**
   - Analyze delivery performance by calculating the average delivery time by region.
   - Identify regions or products with the highest return rates.
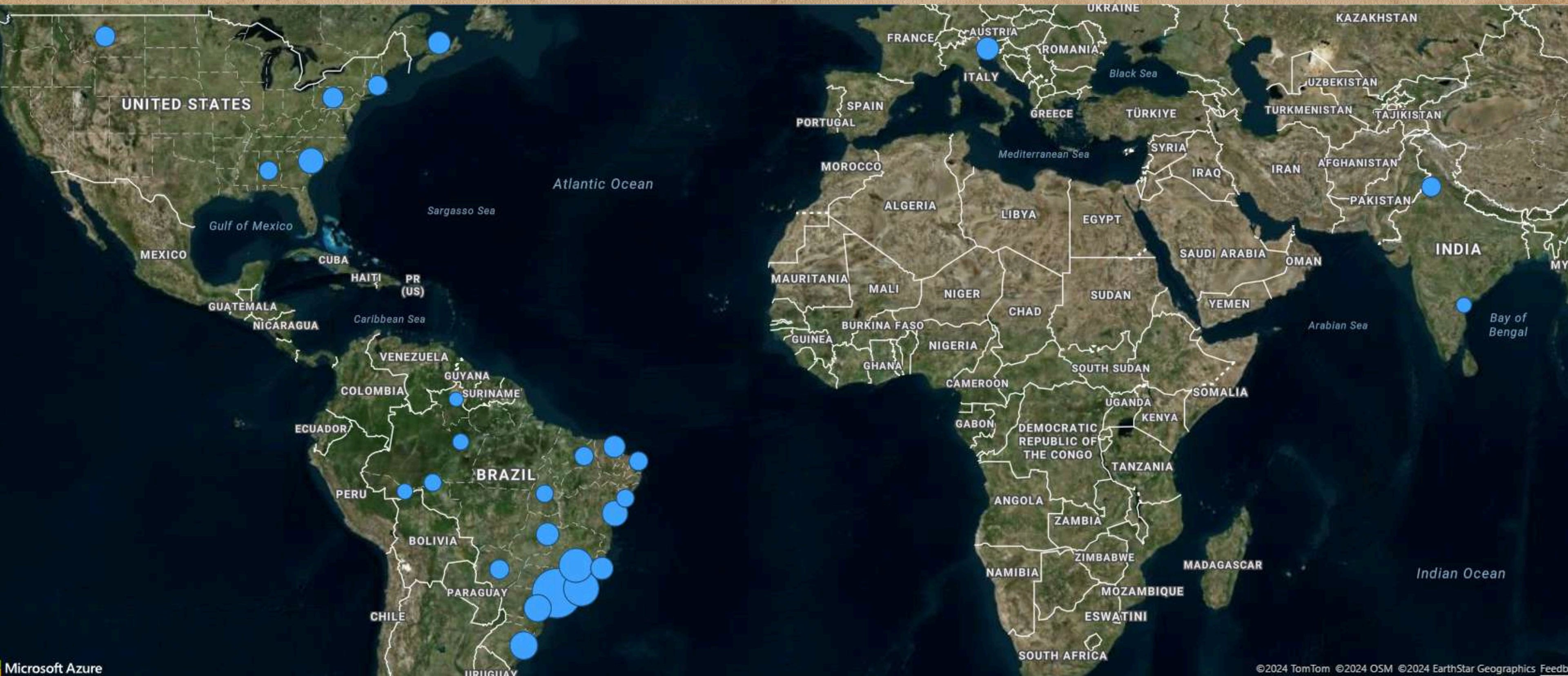4. **Date and Time Analytics:**
   - Write a query to find the monthly sales trend for the last two years.
   - Analyze the seasonality of sales to identify peak months.
5. **Advanced SQL Queries:**
   - Use window functions to rank products based on their sales within each category.
   - Calculate month-to-date (MTD) and year-to-date (YTD) sales metrics.

COMPANY PRODUCT CATEGORIES
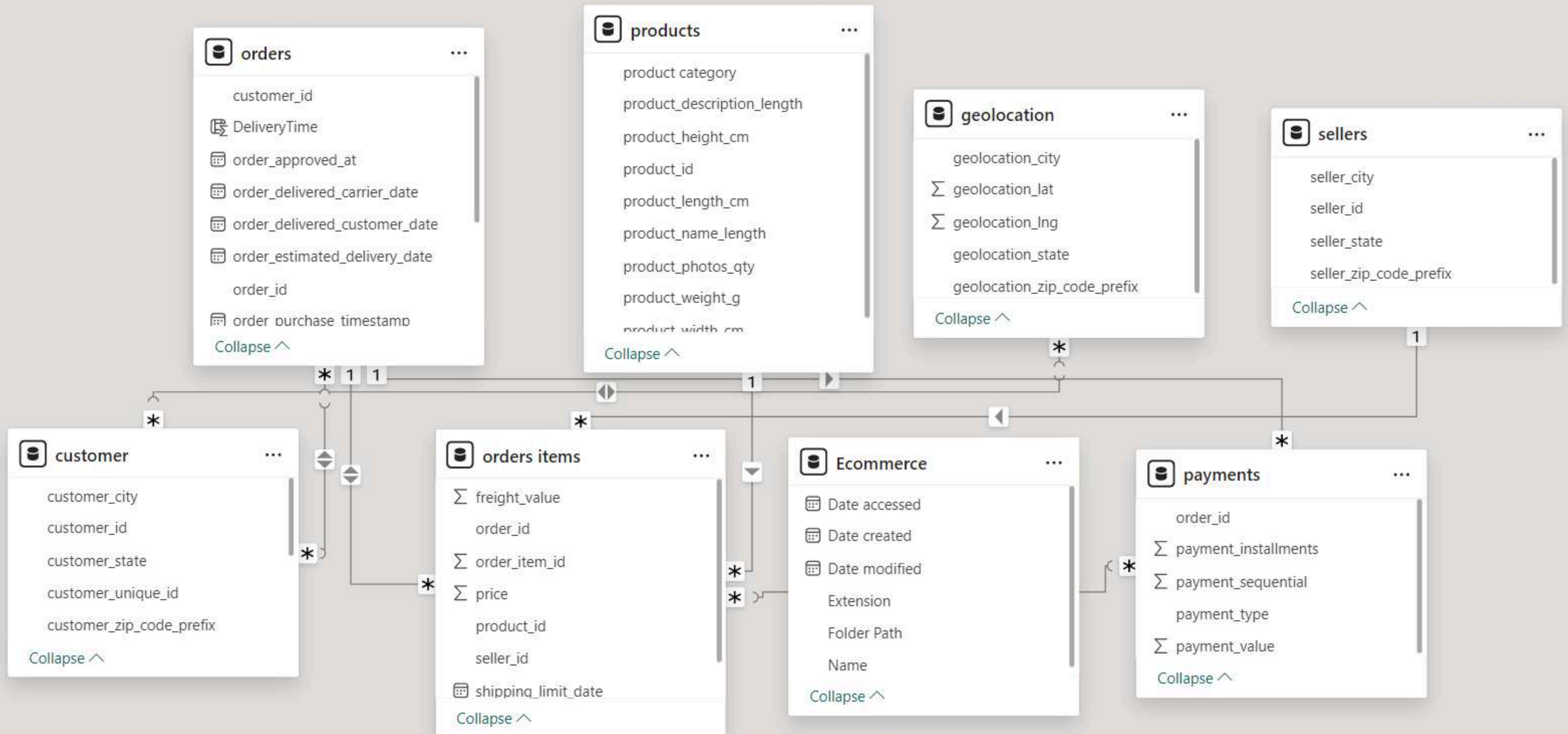
product category
HEALTH BEAUTY
Watches present
bed table bath
sport leisure
computer accessories
Furniture Decoration
housewares
Cool Stuff
automotive
Garden tools
toys
babies
perfumery
telephony
Furniture office
stationary store
pet Shop

product category
HOUSE PASTALS OVEN AND CAFE
Industry Commerce and Business
CONSTRUCTION SECURITY TOOLS
foods
Market Place
Construction Tools Garden
drinks
Art
Fashion Calcados
SIGNALIZATION AND SAFETY
Furniture
technical books
Drink foods
Construction Tools Tools
Fashion Men's Clothing
Christmas articles
Fashion Underwear and Beach Fashion
IMAGE IMPORT TABLETS

product category
electronics
musical instruments
electrostile
Fashion Bags and Accessories
Games consoles
Bags Accessories
Construction Tools Construction
ELECTRICES 2
Casa Construcao
home appliances
Room Furniture
Agro Industria e Comercio
House comfort
fixed telephony
climatization
Furniture Kitchen Service Area Dinner and Garden
audio
General Interest Books

COMPANY DATA MODEL

orders
- customer_id
- DeliveryTime
- order_approved_at
- order_delivered_carrier_date
- order_delivered_customer_date
- order_estimated_delivery_date
- order_id
- order_purchase_timestamp

products
- product category
- product_description_length
- product_height_cm
- product_id
- product_length_cm
- product_name_length
- product_photos_qty
- product_weight_g
- product_width_cm

geolocation
- geolocation_city
- geolocation_lat
- geolocation_lng
- geolocation_state
- geolocation_zip_code_prefix

sellers
- seller_city
- seller_id
- seller_state
- seller_zip_code_prefix

customer
- customer_city
- customer_id
- customer_state
- customer_unique_id
- customer_zip_code_prefix

orders items
- freight_value
- order_id
- order_item_id
- price
- product_id
- seller_id
- shipping_limit_date

Ecommerce
- Date accessed
- Date created
- Date modified
- Extension
- Folder Path
- Name

payments
- order_id
- payment_installments
- payment_sequential
- payment_type
- payment_value

- WRITE A QUERY TO CALCULATE TOTAL SALES REVENUE PER CATEGORY, SUB-CATEGORY, AND REGION.

QUERY-1

```
SELECT
    p.`product category` AS category,
    s.seller_state AS region,
    SUM(oi.price) AS total_sales_revenue
FROM order_items oi
JOIN products p ON oi.product_id = p.product_id
JOIN sellers s ON oi.seller_id = s.seller_id
GROUP BY p.`product category`, s.seller_state;
```

OUTPUT-1

category	region	total_sales_revenue
sport leisure	SP	610096.6100000154
Cool Stuff	SP	445749.44999999437
Furniture Decoration	SP	498629.4100000255
HEALTH BEAUTY	SP	697858.5000000027
housewares	PR	35795.02000000007
Fashion Underwear and Beach Fashion	SP	9421.949999999986
Watches present	SP	971086.6000000155
Furniture Decoration	PR	134750.9399999983
bed table bath	SP	909463.04000005
perfumery	SP	227363.6099999961

- IDENTIFY THE TOP 5 BEST-SELLING PRODUCTS BY BOTH SALE REVENUE AND QUANTITY SOLD.

QUERY-2

```sql
SELECT
    p.`product category` AS category,
    p.product_id,
    SUM(oi.price) AS total_sales_revenue,
    SUM(oi.order_item_id) AS total_quantity_sold
FROM order_items oi
JOIN products p ON oi.product_id = p.product_id
GROUP BY p.product_id, p.`product category`
ORDER BY total_sales_revenue DESC
LIMIT 5;
```

OUTPUT-2

category	product_id	total_sales_revenue	total_quantity_sold
HEALTH BEAUTY	bb50f2e236e5eea0100680137654686c	63885	215
HEALTH BEAUTY	6cdd53843498f92890544667809f1595	54730.200000000106	164
PCs	d6160fb7873f184099d9bc95e30376af	48899.34	35
computer accessories	d1c427060a0f73f6b889a5c7c61f2ac4	47214.50999999998	369
bed table bath	99a4788cb24856965c36a24e339b6058	43025.56000000037	542

- FIND THE MOST LOYAL CUSTOMERS BY CALCULATING THEIR PURCHASE FREQUENCY AND TOTAL SPEND.

QUERY-3

```sql
SELECT
    c.customer_unique_id AS customer,
    COUNT(o.order_id) AS purchase_frequency,
    SUM(oi.price) AS total_spend
FROM customers c
JOIN orders o ON c.customer_id = o.customer_id
JOIN order_items oi ON o.order_id = oi.order_id
GROUP BY c.customer_unique_id
ORDER BY total_spend DESC, purchase_frequency DESC;
```

OUTPUT-3

customer	purchase_frequency	total_spend
0a0a92112bd4c708ca5fde585afaa872	8	13440
da122df9eeddfedc1dc1f5349a1a690c	2	7388
763c8b1c9c68a0229c42c9fc6f662b93	4	7160
dc4802a71eae9be1dd28f5d788ceb526	1	6735
459bef486812aa25204be022145caa62	1	6729
ff4159b92c40ebe40454e3e6a7c35ed6	1	6499
4007669dec559734d6f53e029e360987	6	5934.6
eebb5dda148d3893cdaf5b5ca3040ccb	1	4690
5d0a2980b292d049061542014e8960bf	2	4599.9
48e1ac109decbb87765a3eade6854098	1	4590
a229eba70ec1c2abef51f04987deb7a5	2	4400

- IDENTIFY CUSTOMERS WITH THE HIGHEST AVERAGE ORDER VALUE (AOV).

QUERY-4

```sql
SELECT
    c.customer_unique_id AS customer,
    AVG(p.payment_value) AS average_order_value
FROM customers c
JOIN orders o ON c.customer_id = o.customer_id
JOIN payments p ON o.order_id = p.order_id
GROUP BY c.customer_unique_id
ORDER BY average_order_value DESC
LIMIT 10;
```

OUTPUT-4

customer	average_order_value
0a0a92112bd4c708ca5fde585afaa872	13664.08
763c8b1c9c68a0229c42c9fc6f662b93	7274.88
dc4802a71eae9be1dd28f5d788ceb526	6929.31
459bef486812aa25204be022145caa62	6922.21
ff4159b92c40ebe40454e3e6a7c35ed6	6726.66
4007669dec559734d6f53e029e360987	6081.54
5d0a2980b292d049061542014e8960bf	4809.44
eebb5dda148d3893cdaf5b5ca3040ccb	4764.34
48e1ac109decbb87765a3eade6854098	4681.78
edde2314c6c30e864a128ac95d6b2112	4513.32

- ANALYZE DELIVERY PERFORMANCE BY CALCULATING THE AVERAGE DELIVERY TIME BY REGION.

QUERY-5

```sql
SELECT
    s.seller_state AS region,
    AVG(TIMESTAMPDIFF(DAY, o.order_delivered_carrier_date, o.order_delivered_customer_date)) AS avg_delivery_time
FROM orders o
JOIN order_items oi ON o.order_id = oi.order_id
JOIN sellers s ON oi.seller_id = s.seller_id
WHERE o.order_delivered_customer_date IS NOT NULL
GROUP BY s.seller_state;
```

OUTPUT-5

region	avg_delivery_time
SP	8.5263
MG	9.0885
DF	9.0430
SC	10.0160
RJ	8.6944
PR	9.4088
RS	7.6187
RN	8.1071
GO	9.7323
BA	9.9359
MT	11.0000

IDENTIFY REGIONS OR PRODUCTS WITH THE HIGHEST RETURN RATES.

QUERY-6

```sql
SELECT
    p.`product category` AS category,
    s.seller_state AS region,
    COUNT(CASE WHEN o.order_status = 'returned' THEN 1 END) AS return_count,
    COUNT(o.order_id) AS total_orders,
    (COUNT(CASE WHEN o.order_status = 'returned' THEN 1 END) / COUNT(o.order_id)) * 100 AS return_rate
FROM orders o
JOIN order_items oi ON o.order_id = oi.order_id
JOIN products p ON oi.product_id = p.product_id
JOIN sellers s ON oi.seller_id = s.seller_id
GROUP BY p.`product category`, s.seller_state
ORDER BY return_rate DESC;
```

OUTPUT-6

category	region	return_count	total_orders	return_rate
housewares	SP	0	4952	0.0000
HEALTH BEAUTY	SP	0	6404	0.0000
babies	SP	0	2164	0.0000
Watches present	SP	0	4830	0.0000
Furniture Decoration	SP	0	6256	0.0000
perfumery	SP	0	2287	0.0000
bed table bath	SP	0	9818	0.0000
musical instruments	SP	0	411	0.0000
pet Shop	MG	0	410	0.0000
computer accessories	MG	0	1575	0.0000
flowers	SP	0	32	0.0000

- ANALYZE THE SEASONALITY OF SALES TO IDENTIFY PEAK MONTHS.

QUERY-7

```sql
SELECT
    MONTH(o.order_purchase_timestamp) AS month,
    SUM(oi.price) AS total_sales
FROM orders o
JOIN order_items oi ON o.order_id = oi.order_id
GROUP BY month
ORDER BY total_sales DESC;
```

OUTPUT-7

month	total_sales
5	1502588.819999901
8	1428658.0099999176
7	1393538.699999928
3	1357557.7399999497
4	1356574.979999948
6	1298162.9099999587
2	1091481.7300000244
1	1070343.2300000393
11	1010271.3700000389
12	743925.0700000194
10	713727.0900000224

- USE WINDOW FUNCTIONS TO RANK PRODUCTS BASED ON THEIR SALES WITHIN EACH CATEGORY.

QUERY-8

```sql
SELECT
    p.`product category` AS category,
    p.product_id,
    SUM(oi.price) AS total_sales_revenue,
    RANK() OVER (PARTITION BY p.`product category` ORDER BY SUM(oi.price) DESC) AS rank_within_category
FROM order_items oi
JOIN products p ON oi.product_id = p.product_id
GROUP BY p.`product category`, p.product_id;
```

OUTPUT-8

product_id	total_sales_revenue	rank_within_category
5a848e4ab52fd5445cdc07aab1c40e48	24229.030000000075	1
eed5cbd74fac3bd79b7c7ec95fa7507d	9945	2
b1d207586fca400a2370d50a9ba1da98	7152	3
76d1a1a9d21ab677a61c3ae34b1b352f	5712.640000000003	4
ad88641611c35ebd59ecda07a9f17099	4515.330000000001	5
3b60d513e90300a4e9833e5cda1f1d61	4393.330000000001	6
4c50dcc50f1512f46096d6ef0142c4a9	3980	7
17823ffd2de8234f0e885a71109613a4	2969.8899999999994	8
0e030462875259ec0cb868f7ecf1fd5e	2740	9
b36f3c918c91478c4559160022d3f14e	2550	10
f58e45b16a42a325c144eb2c46a2bc57	2359.91	11

- CALCULATE MONTH-TO-DATE (MTD) AND YEAR-TO-DATE (YTD) SALES METRICS.

QUERY-9

```sql
    daily_sales,
    SUM(daily_sales) OVER (
        PARTITION BY YEAR(order_date), MONTH(order_date)
    ) AS mtd_sales,
    SUM(daily_sales) OVER (
        PARTITION BY YEAR(order_date)
    ) AS ytd_sales
FROM (
    SELECT
        DATE(o.order_purchase_timestamp) AS order_date,
        SUM(oi.price) AS daily_sales
    FROM orders o
    JOIN order_items oi ON o.order_id = oi.order_id
    GROUP BY DATE(o.order_purchase_timestamp)
) daily_data;
```

OUTPUT-9

date	daily_sales	mtd_sales	ytd_sales
2016-09-15	134.97	267.36	49785.91999999998
2016-09-04	72.89	267.36	49785.91999999998
2016-09-05	59.5	267.36	49785.91999999998
2016-10-07	7228.049999999997	49507.659999999974	49785.91999999998
2016-10-04	9940.959999999986	49507.659999999974	49785.91999999998
2016-10-05	8343.249999999996	49507.659999999974	49785.91999999998
2016-10-09	3336.99	49507.659999999974	49785.91999999998
2016-10-06	7960.509999999994	49507.659999999974	49785.91999999998
2016-10-03	463.48	49507.659999999974	49785.91999999998
2016-10-10	3692.5699999999997	49507.659999999974	49785.91999999998
2016-10-08	8441.849999999997	49507.659999999974	49785.91999999998

RECOMMENDATION

1. BOOST AOV: USE UPSELLING, BUNDLING, AND DISCOUNTS TO INCREASE ORDER VALUE.

2. CATEGORY GROWTH: PROMOTE UNDERPERFORMING CATEGORIES FOR BALANCED SALES.

3. OPTIMIZE LOGISTICS: IMPROVE DELIVERY TIMES IN THE NORTH AND NORTHEAST.

4. CUSTOMER RETENTION: TARGET LOW SPENDERS WITH LOYALTY PROGRAMS

E-COMMERCE SALES AND CUSTOMER INSIGHTS ANALYSIS -POWER BI

Tasks and Key Metrics to Visualize:

1. Sales Performance:
- **Total Sales Revenue:** Overall revenue generated.
- **Average Order Value (AOV):** Average revenue per order.
- **Sales by Category and Sub-Category:** Revenue breakdown by product categories.
- **Top-Selling Products:** Display the top 5 products by sales revenue.

2. Customer Insights:
- **Customer Lifetime Value (CLV):** Total revenue generated per customer.
- **Top 10 Loyal Customers:** Customers with the highest purchase frequency and spend.
- **Customer Segments:** Categorize customers based on purchasing behavior (e.g., high spenders, one-time buyers).

3. Regional Analysis:
- **Revenue by Region:** Comparison of sales by region.
- **Return Rates by Region:** Percentage of orders returned per region.
- **Average Delivery Time by Region:** Assess operational performance.

4. Operational Metrics:
- **Delivery Time Analysis:** Average, minimum, and maximum delivery times.
- **Product Return Rates:** Percentage of returned products across categories.

5. Time Trends:
- **Monthly Sales Trends:** Visualization of revenue trends over time.
- **Seasonality Analysis:** Highlight peak sales periods (e.g., festive months).

TARGET SALES COMPANY

TOTAL SALES

16.01M

Sum of payment_value

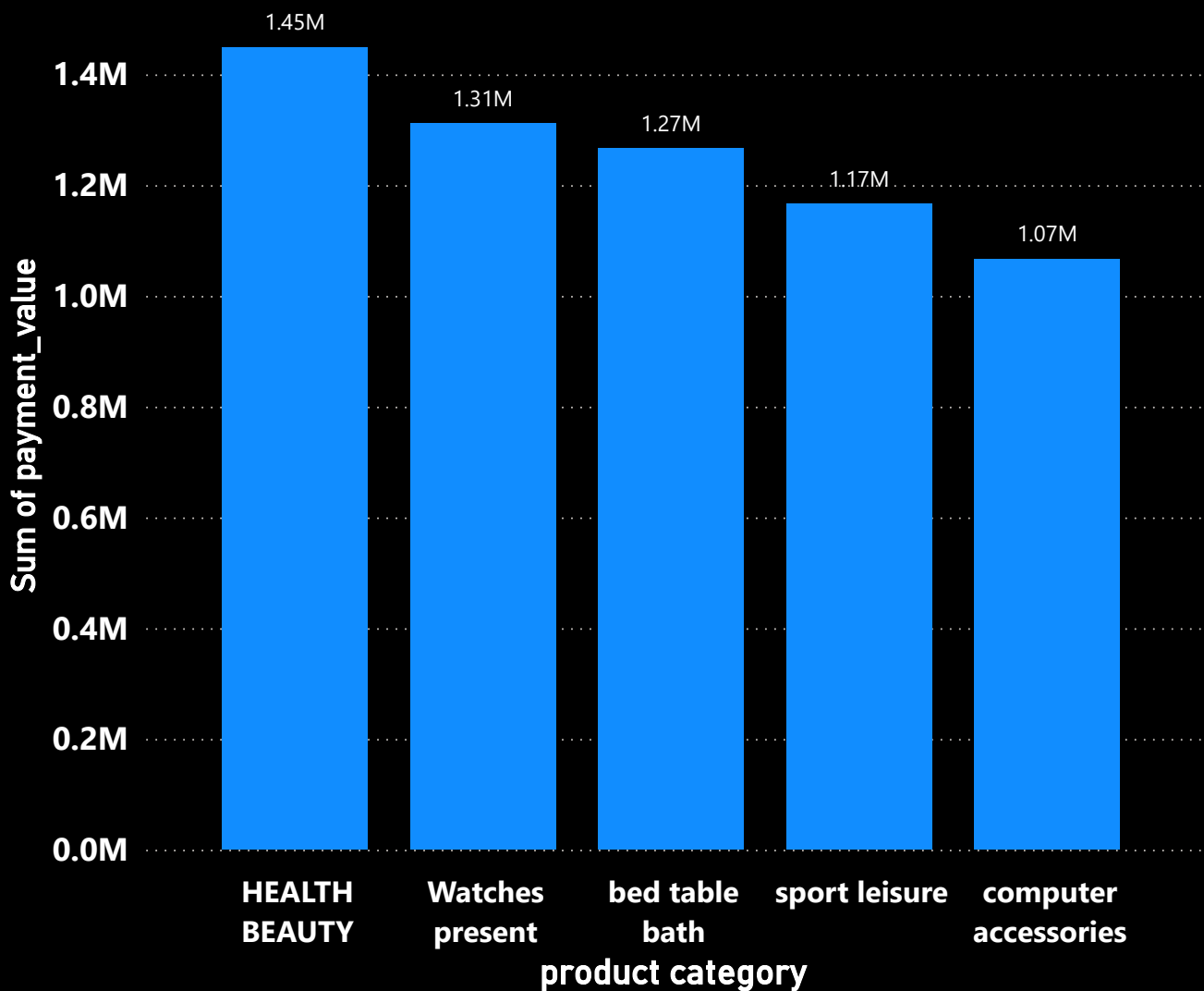## AVERAGE VALUE PER ORDER

154.10

Average of payment_value

REGION SLICER

Region ⌄

- ☐ Central-West
- ☐ North
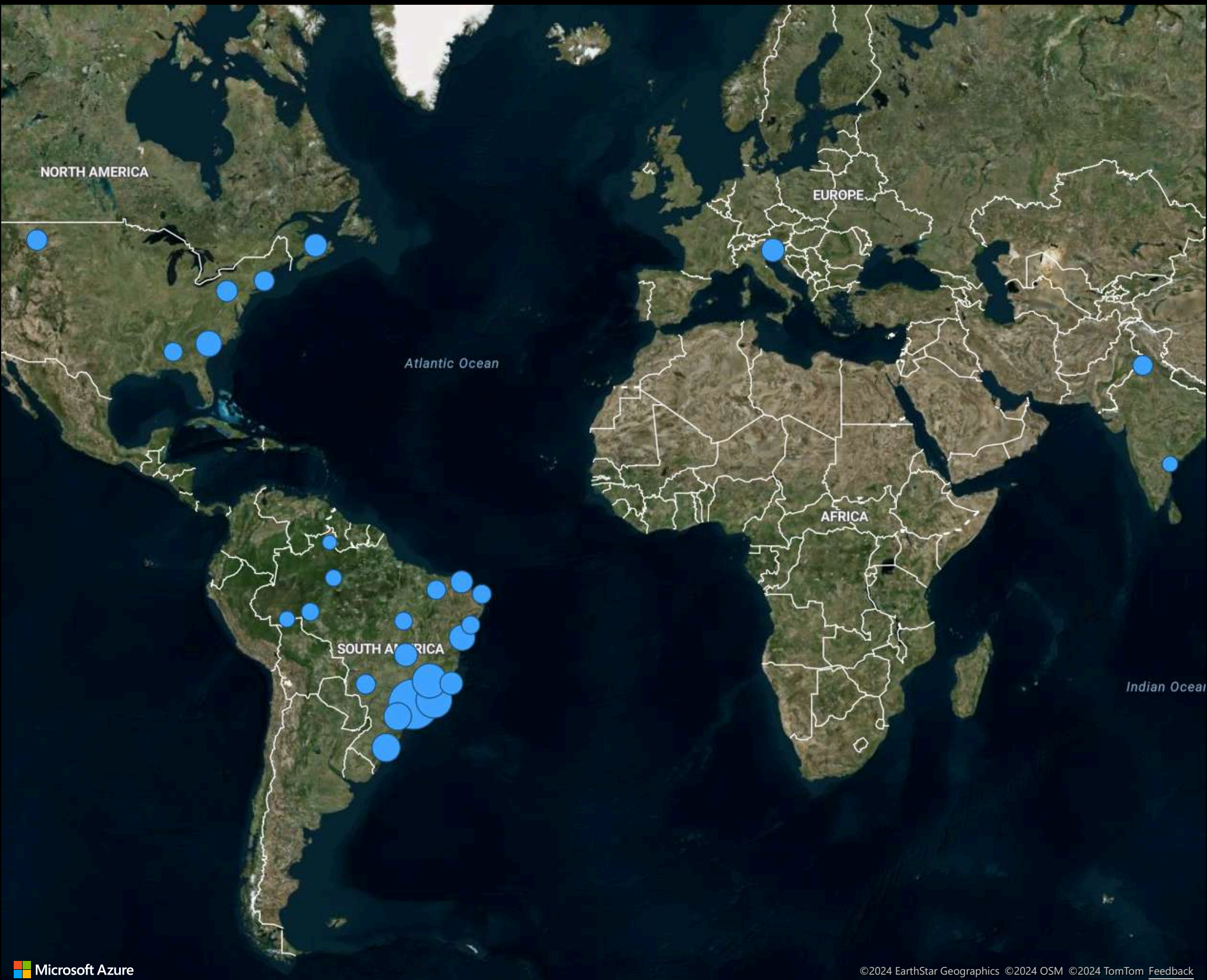- ☐ Northeast
- ☐ South
- ☐ Southeast

SALES BASED ON CITY

Microsoft Azure

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EACH PRODUCT CATEGORY SALES

product category	Sum of payment_value
HEALTH BEAUTY	14,48,729.73
Watches present	13,10,893.45
bed table bath	12,65,918.38
sport leisure	11,66,060.50
computer accessories	10,66,263.82
Furniture Decoration	9,32,339.78
housewares	7,93,238.51
Cool Stuff	7,29,806.15
automotive	6,88,628.01
Garden tools	5,96,759.43
toys	5,66,925.14
babies	4,91,207.02
perfumery	4,56,956.17
telephony	3,98,760.08
Furniture office	3,44,879.72
stationary store	2,81,098.93
pet Shop	2,55,330.29
PCs	2,32,937.57
Total	**1,60,08,872.12**

TOP 5 BEST SELLING PRODUCTS

Bar chart of Sum of payment_value by product category:
- HEALTH BEAUTY: 1.45M
- Watches present: 1.31M
- bed table bath: 1.27M
- sport leisure: 1.17M
- computer accessories: 1.07M

TARGET SALES COMPANY

TOTAL SALES BY REGION

0.41M (2.59%)
1.9M (11.86%)
2.33M (14.52%)
10.34M (64.59%)

Region
- Southeast
- South
- Northeast
- Central-West
- North

Average DeliveryTime by Region

Region	Average of DeliveryTime
North	22.54
Northeast	19.95
Central-...	14.95
South	13.98
Southeast	10.69
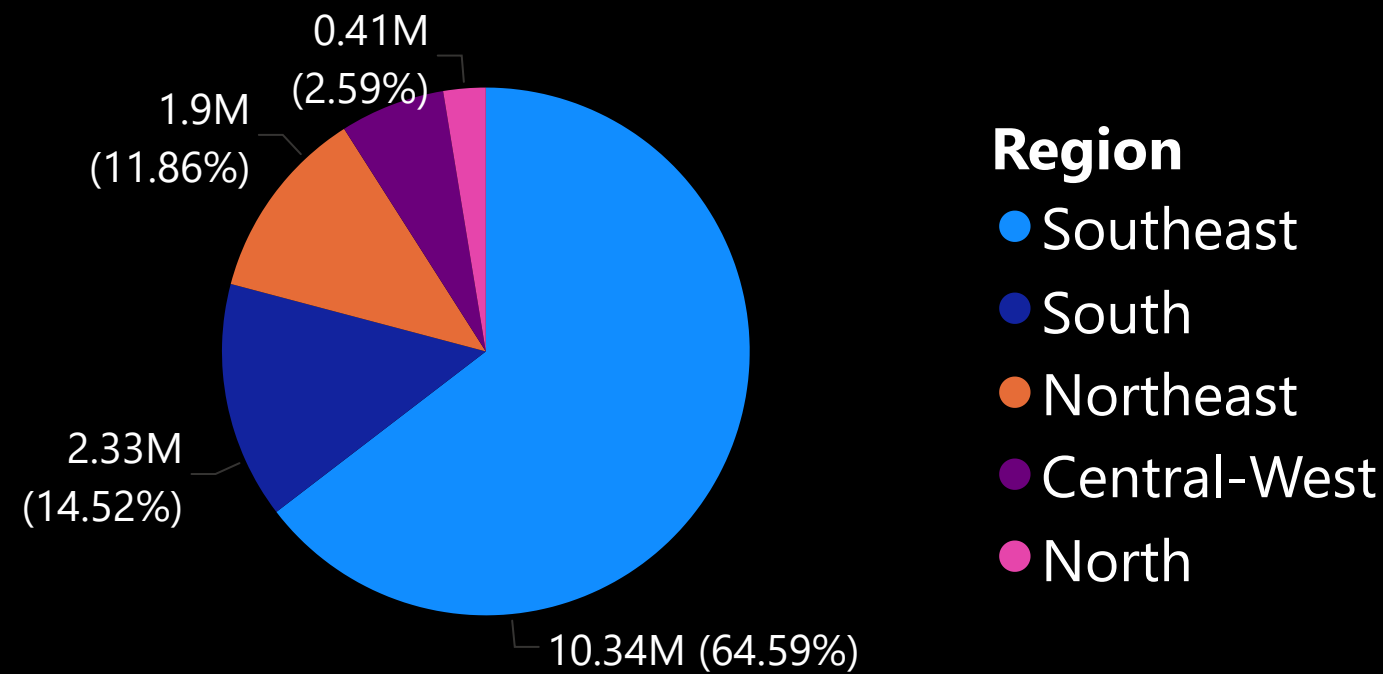
Count of customer_id by CustomerSegment

3.74K (3.76%)
93.31K (93.83%)

CustomerSegm...
- Low Spender
- Medium Spen...
- High Spender
- One-time Buyer

TOTAL SALES BY MONTH

Sum of payment_value

1.25M, 1.28M, 1.61M, 1.58M, 1.75M, 1.54M, 1.66M, 1.70M, 0.73M, 0.84M, 1.19M, 0.88M

January, February, March, April, May, June, July, August, Septem..., October, Novem..., Decem...
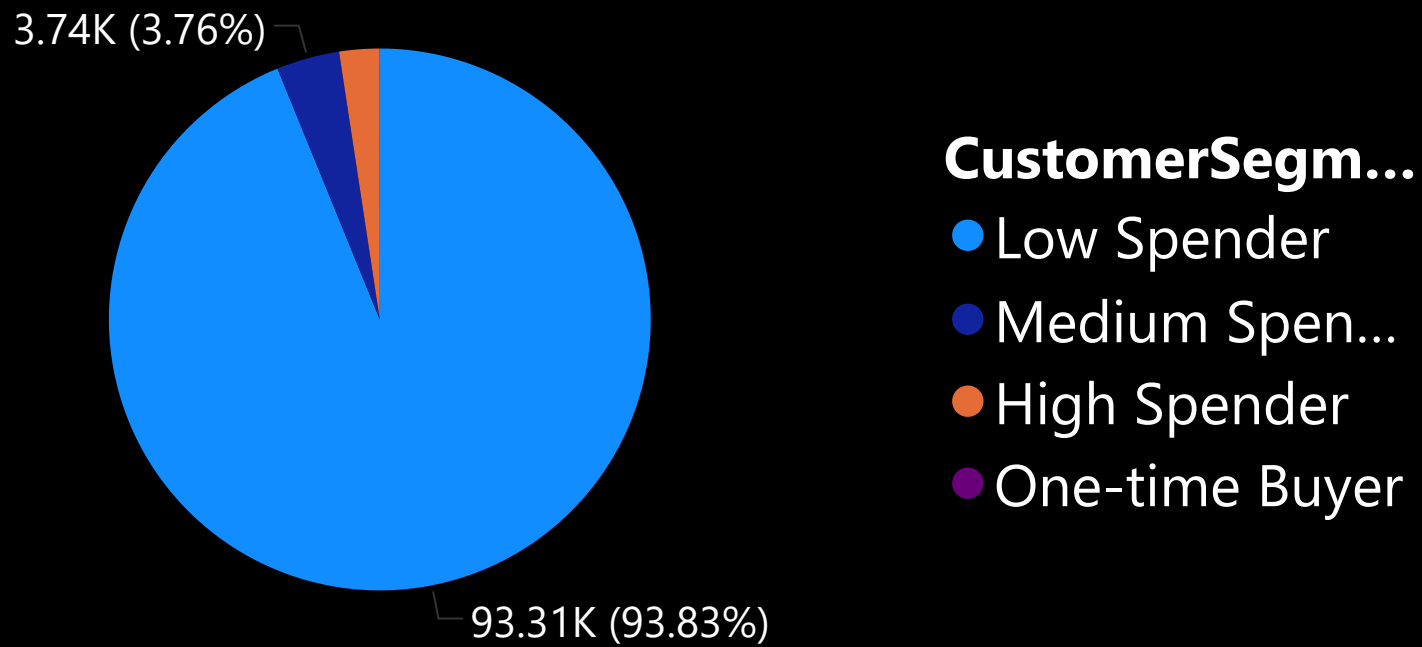
Month

TOTAL SALES BY QUATER

Sum of payment_value

- Qtr 1: 4.1M
- Qtr 2: 4.9M
- Qtr 3: 4.1M
- Qtr 4: 2.9M

Quarter

CLV by customers

CLV

13.7K, 7.3K, 6.9K, 6.1K, 5.0K, 4.8K, 4.5K, 4.2K, 4.2K, 4.0K, 4.0K, 3.8K, 3.7K, 3.6K, 3.4K, 3.4K, 3.3K, 3.2K, 3.2K
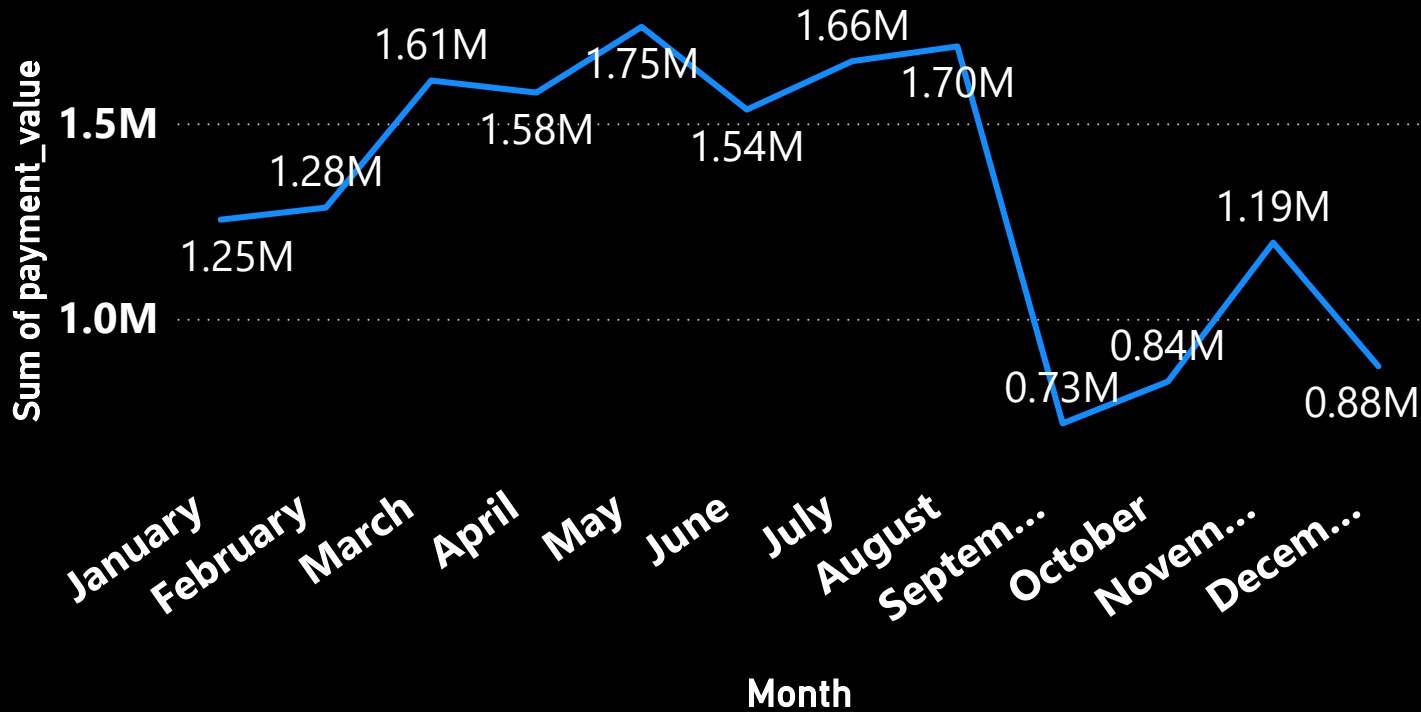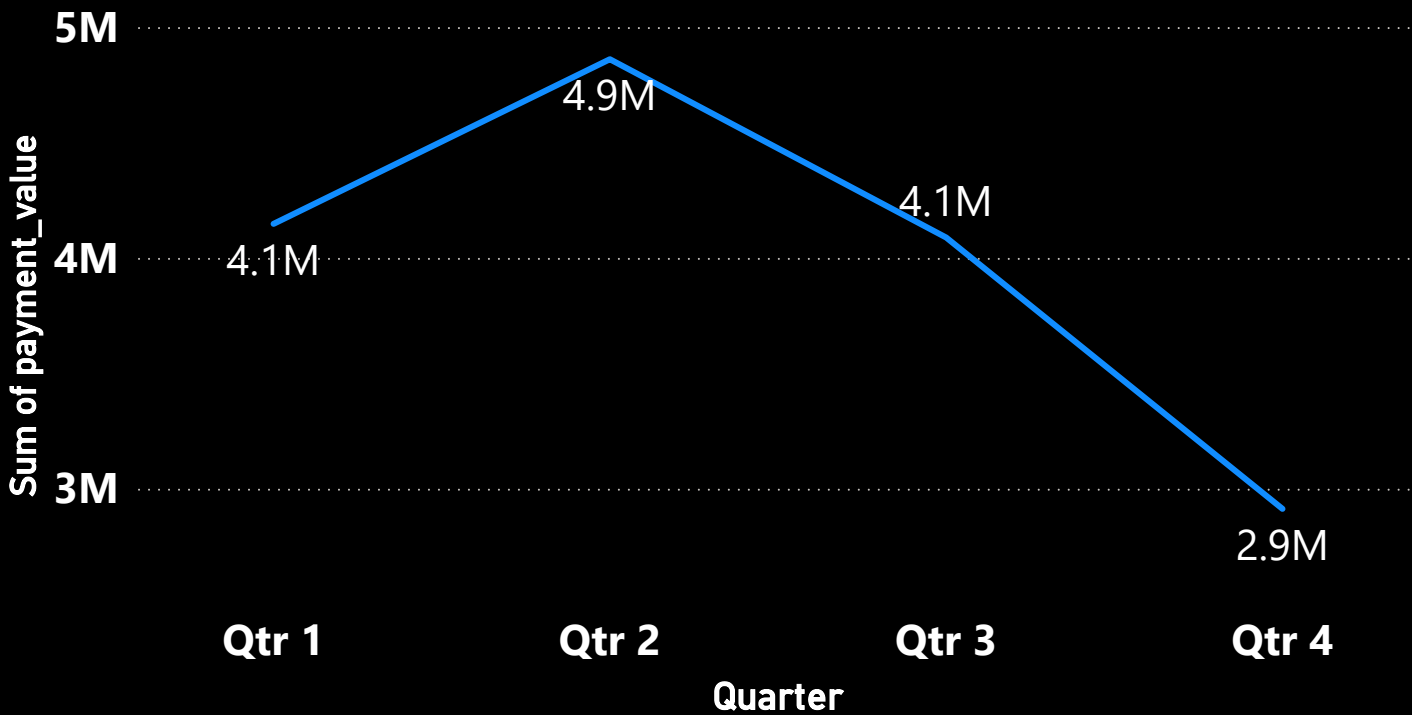
customer_id
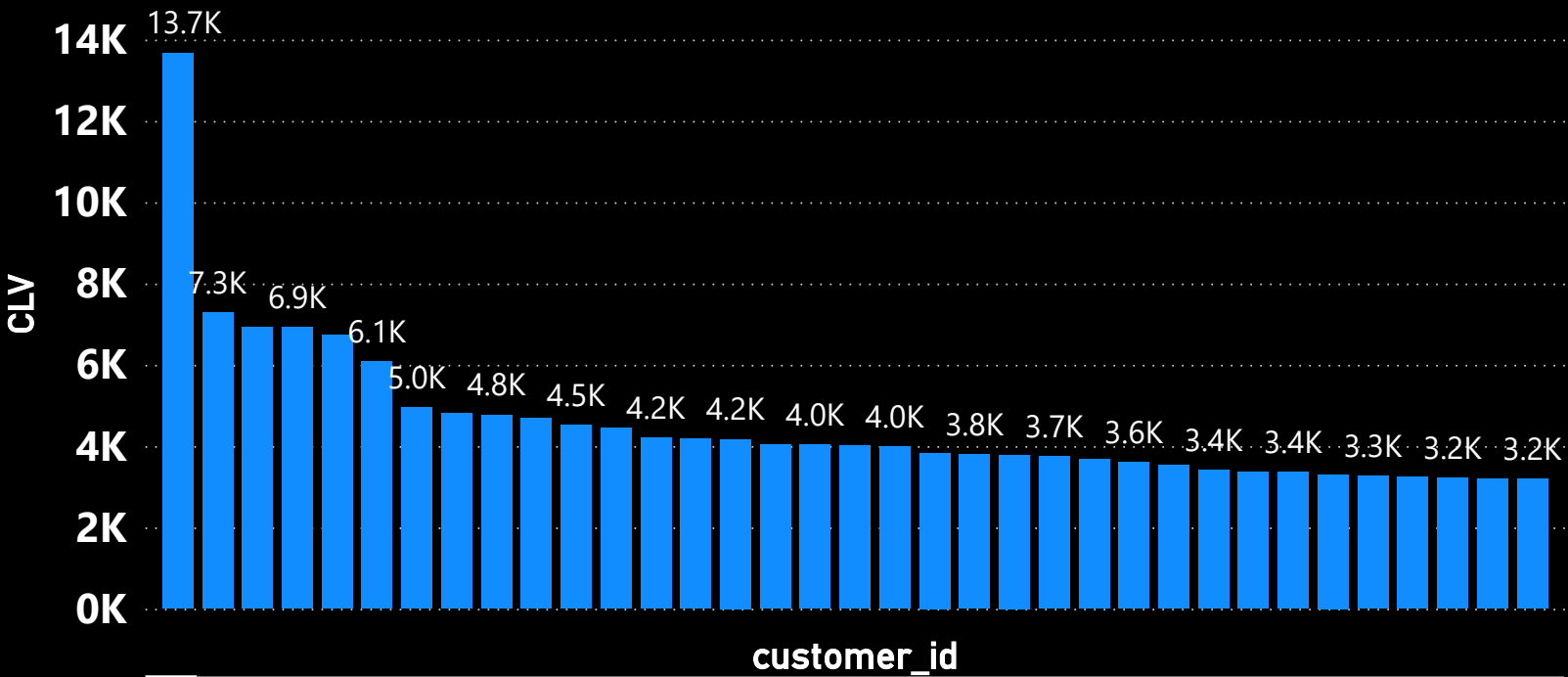
TARGET SALES COMPANY

Returned Orders by Region

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Microsoft Azure
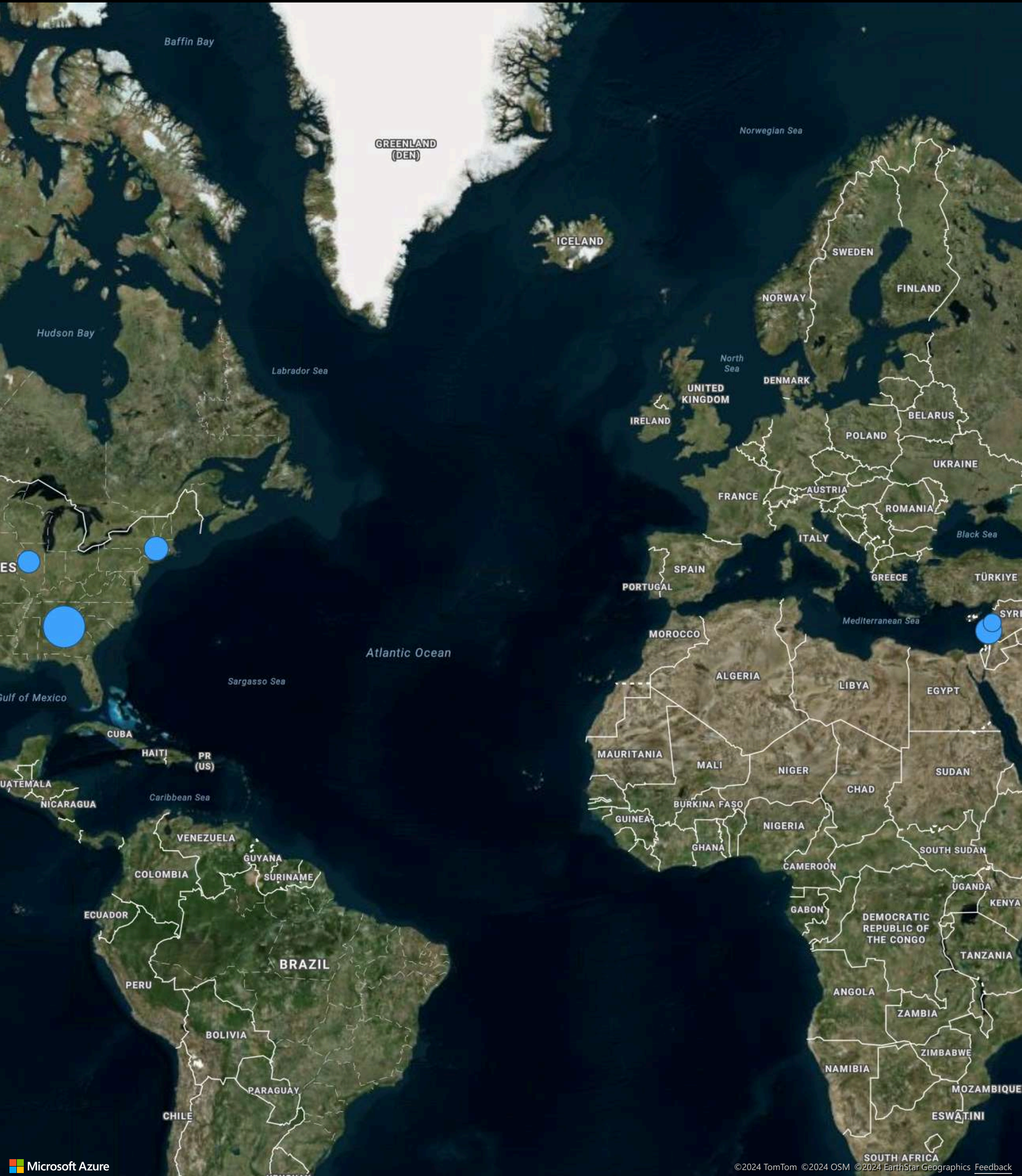
PRODUCT CATEGORY SLICER

product category

- [ ]
- [ ] Agro Industria e Comer...
- [ ] Art
- [ ] Arts and Crafts
- [ ] audio
- [ ] automotive
- [ ] babies
- [ ] Bags Accessories

DATE SLICER

Year, Quarter, Month, Day ▽

- ∧ [ ] 2016
  - ▽ [ ] Qtr 1
  - ▽ [ ] Qtr 2
  - ▽ [ ] Qtr 3
  - ▽ [ ] Qtr 4
- ∧ [ ] 2017
  - ▽ [ ] Qtr 1
  - ▽ [ ] Qtr 2

AvgDeliveryTime, MaxDeliveryTime and MinDeliveryTime by Quarter

● AvgDeliveryTime ● MaxDeliveryTime ● MinDeliveryTime

Quarter	MaxDeliveryTime	AvgDeliveryTime	MinDeliveryTime
Qtr 1	132	14	1
Qtr 2	173	13	0
Qtr 3	210	10	
Qtr 4	183	13	
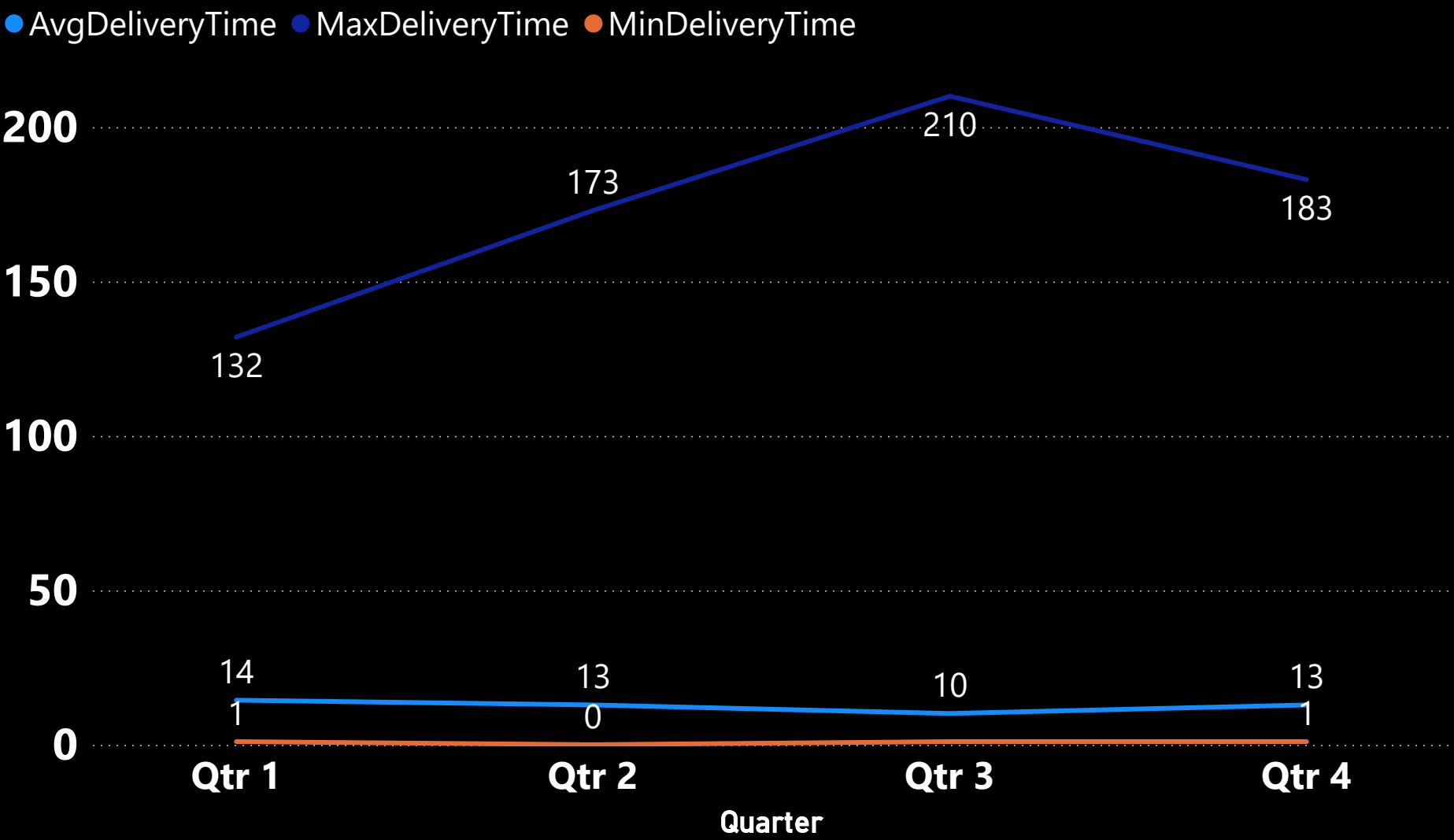
Returned Orders by product category

product category	Returned Orders
sport leisure	47
housewares	37
HEALTH BEAUTY	36
computer accesso...	35
toys	31
automotive	24
Furniture Decorat...	24
Watches present	20
bed table bath	18
babies	16
telephony	16
Cool Stuff	15
	14
perfumery	14
Garden tools	13
stationary store	12
electrostile	8
Games consoles	8
musical instrume...	8
General Interest B...	7
electronics	6
Fashion Bags and ...	6
Bags Accessories	4
pet Shop	4
ELECTRICES 2	3
fixed telephony	3
Blu Ray DVDs	2
climatization	2
CONSTRUCTION ...	2
Construction Tool...	2
Construction Tool...	2
Drink foods	2
Fashion Calcados	2
Furniture Kitchen ...	2
home appliances	2
Room Furniture	2
Art	1
audio	1
Casa Construcao	1
Christmas articles	1
Construction Tool...	1
drinks	1
Fashion Men's Cl...	1
foods	1
Furniture office	1
Hygiene diapers	1
Kitchen portable ...	1
Market Place	1
PC Gamer	1