

# Supply Chain Infographics

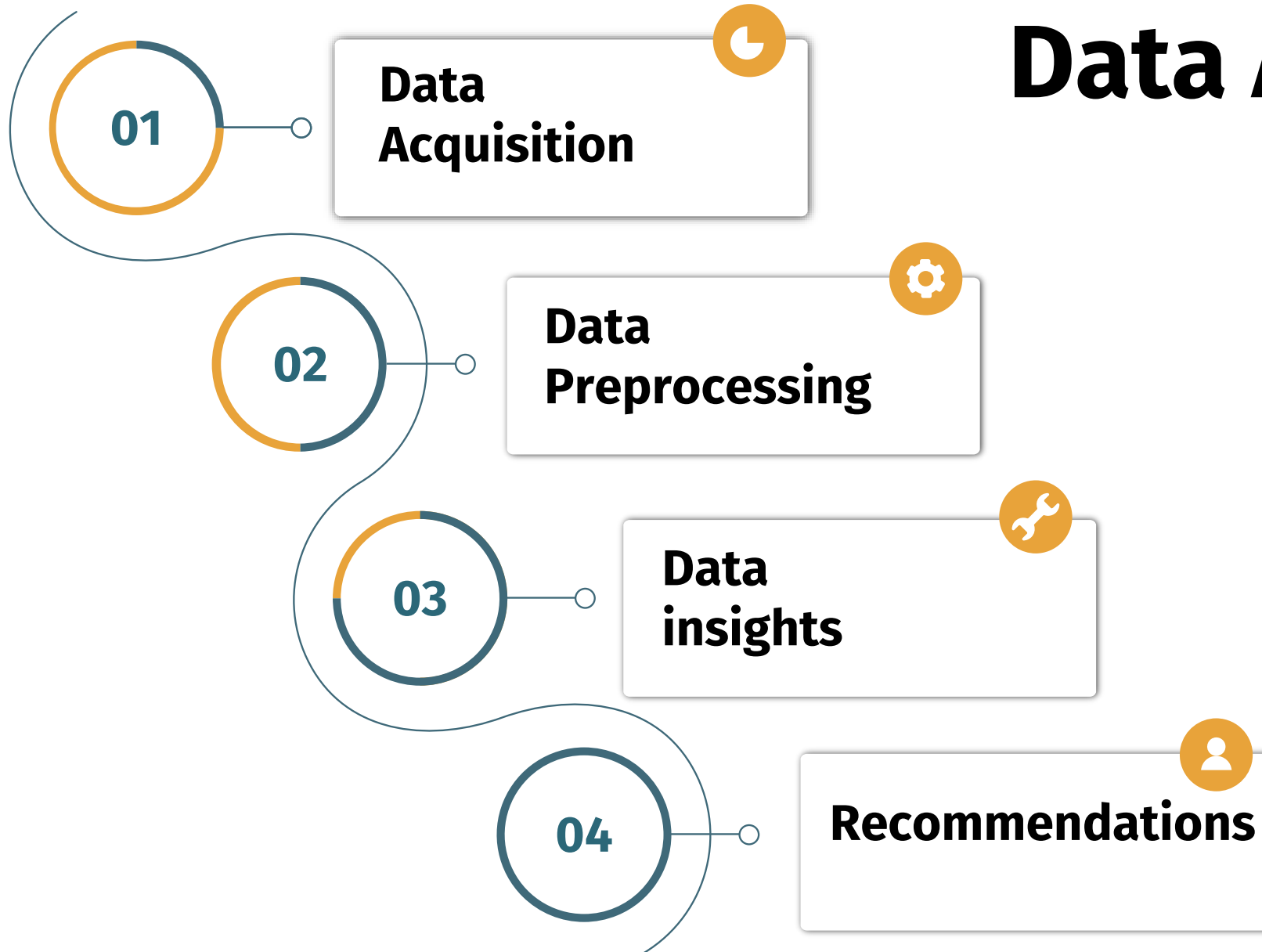
Loo Guan Yee  
October 2024



# Objective

- Data Co Global is an e-commerce platform offering end-to-end product fulfilment to customers with its integrated supply chain.
- Each stage in the supply chain plays a pivotal role in reducing operational costs, maximizing customer satisfaction, and maintaining a healthy profit margin.
- For e-commerce platforms like DataCo, it is essential to use data analytics to analyse the DataCo Global operations.
- This presentation will:
  - Outline the data collected from various supply chain stages and the preprocessing methods applied.
  - Uncover key insights by analysing the upstream and downstream supply chain processes.
  - Provide recommendations based on the derived insights to enhance overall efficiency, optimize costs, and improve customer satisfaction.

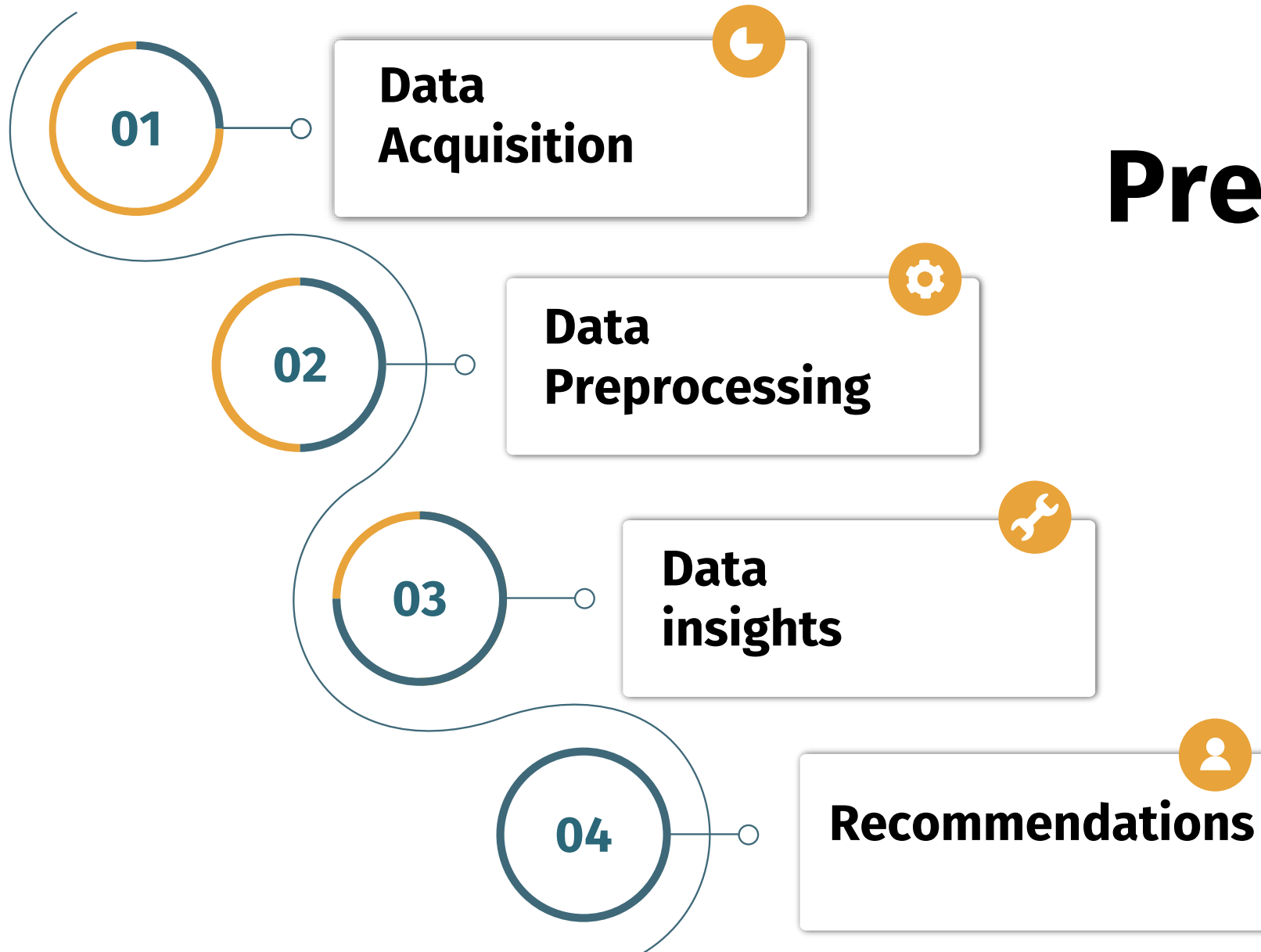
# Data Acquisition



# Data Description

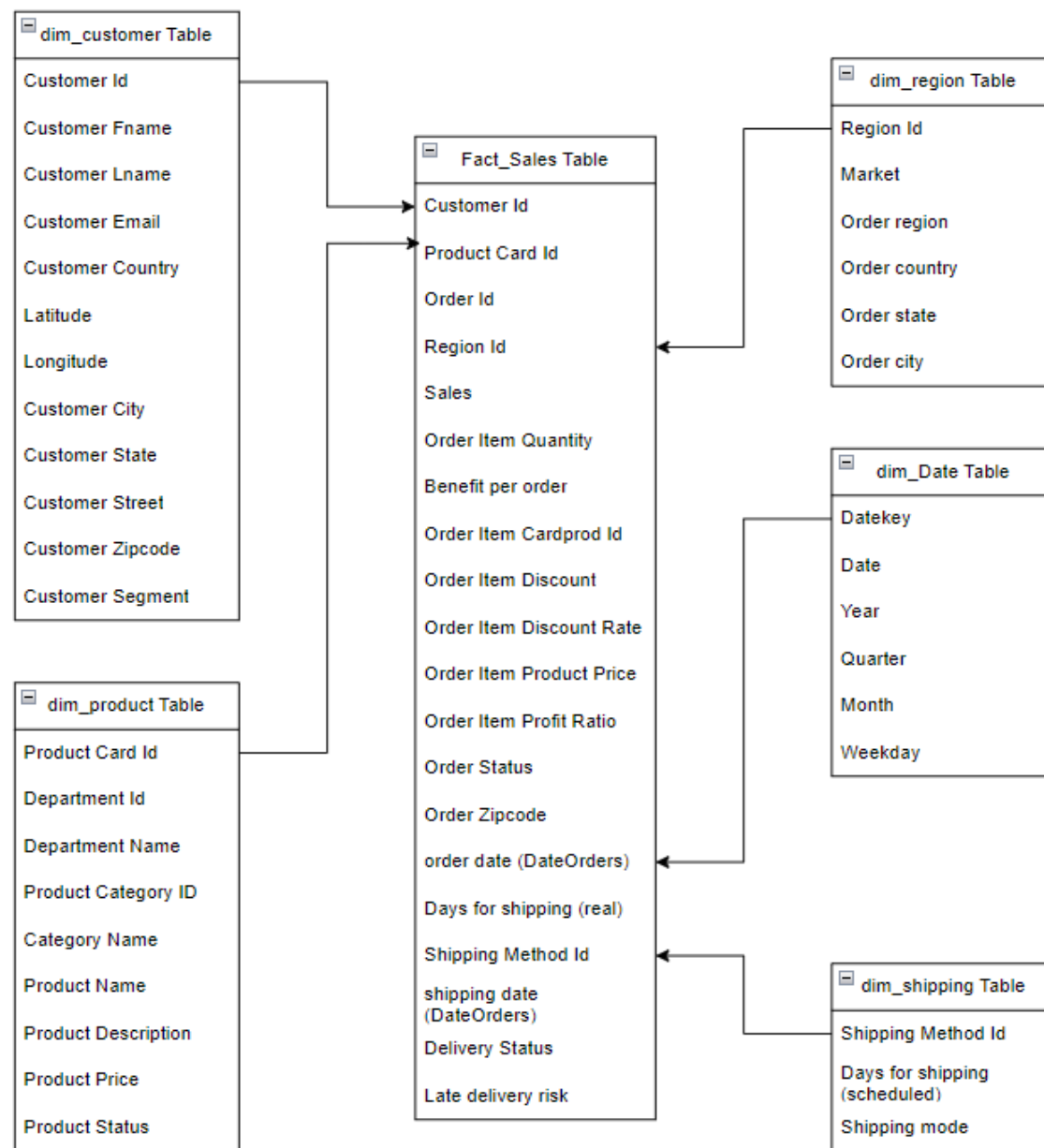
- Contained 180,519 Data Co orders from January 2015 to February 2018 based in the USA and Puerto Rico collected by [Universidad Central del Ecuador](#)
- Contained the Sales and Profits (Benefit per order) and the following information with their respective hierarchies
  - Product Purchased
    - Product Department
    - Product Category Department
    - Product Name
  - Payment Method
    - Transfer
    - Cash
    - Debit
    - Payment
  - Shipping Method
    - Same Day
    - First Class
    - Second Class
    - Standard
  - Order Destination
    - Market
    - Market Region
    - Market Country

# Data Preprocessing

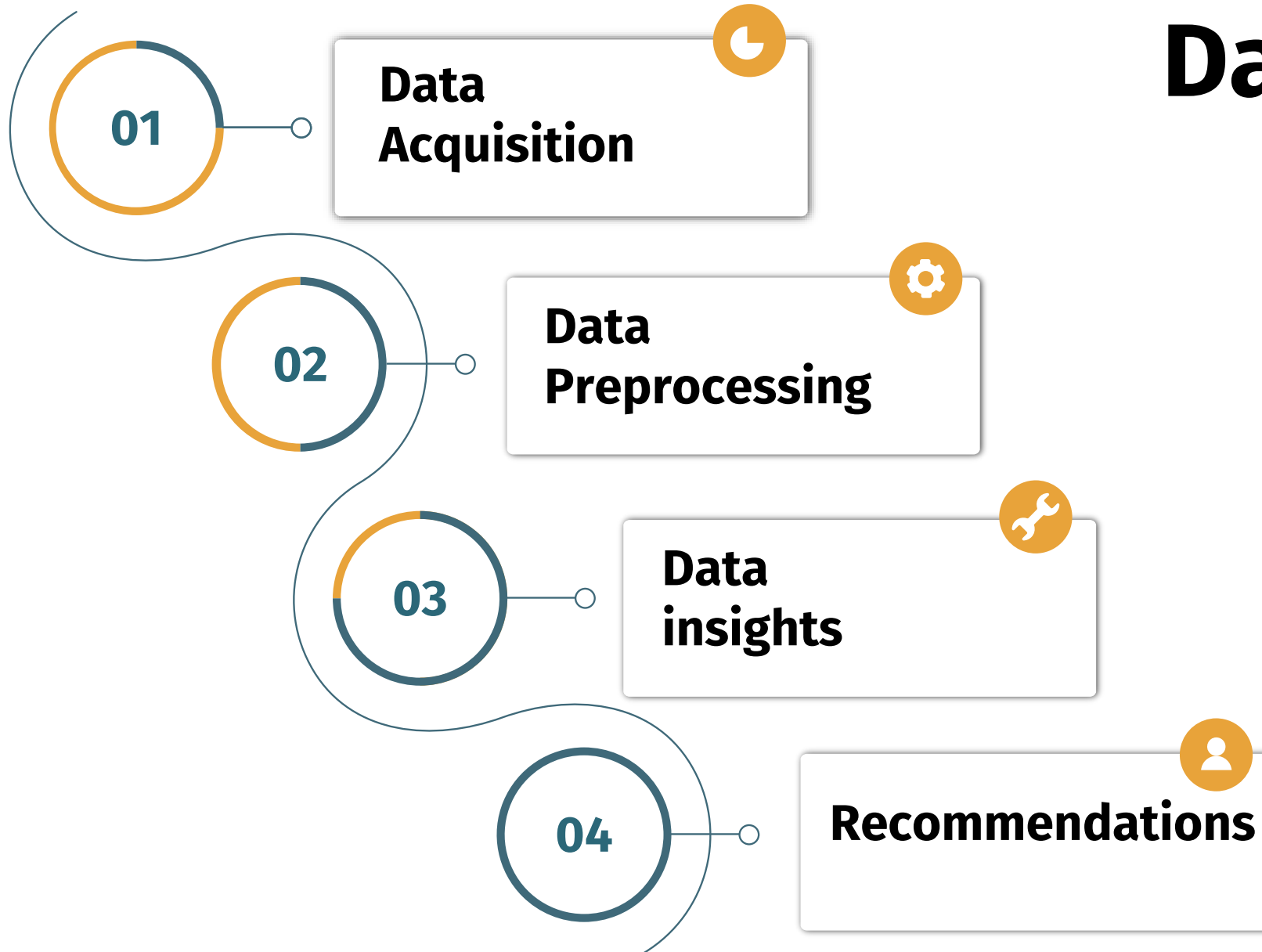


# Data Preprocessing

- Converted the dataset into the star schema for faster analytics workload
- Stored the data and star schema in the PostgreSQL server
- Processed the respective dimension and fact tables in Power BI
  - Customer (Dimension)
    - Combined Customer First and Last Name
    - Replaced erroneous Customer State 91732 (El Monte) and 95738 (Elk Grove) with the correct state CA
  - Product (Dimension)
    - Changed product price to Price Category
  - Region (Dimension)
    - Replaced the Spanish countries' names with their English names
    - Reordered Pacific Asia to Asia Pacific
  - Shipping (Shipping)
  - Sales (Fact)
    - Rounded off the Sales, Benefits Per Order, and Order Item Discount to 2 decimal places
    - Cleaned the Payment Type and Delivery Status text columns



# Data Insights



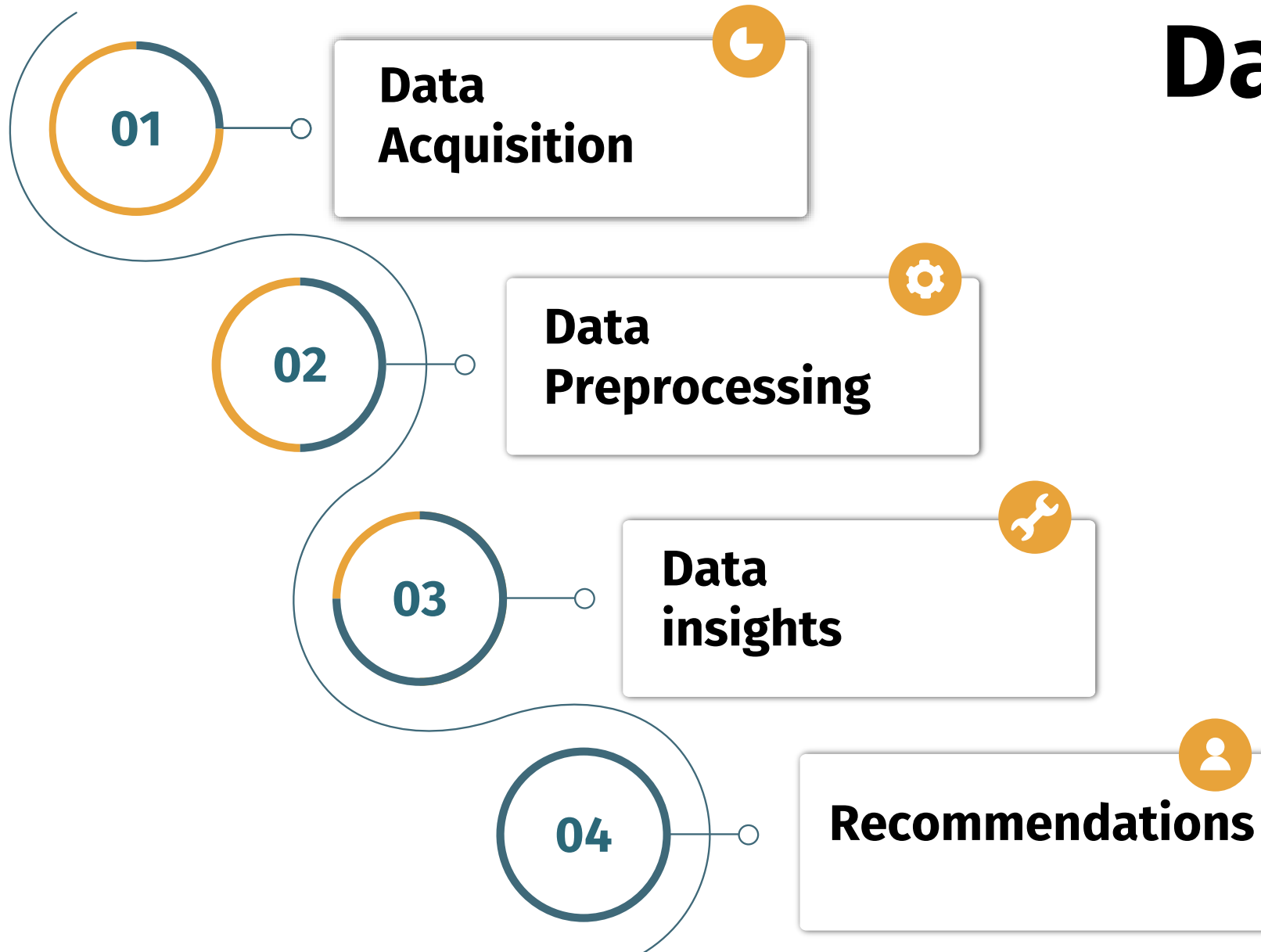
# Data Fusion Methodology

- The DataCo analysis prioritised the Market and products with complete data from 2015 to 2017.
- The DataCo dataset was analysed in the following order.
  - Sales
  - Profit Margin derived from the Benefit Per Order and Sales column
  - On-Time Performance (OTP) of Shipping Method from the Delivery Status column
  - Suspected Fraud transaction monitoring from the Order Status column



# Data Insights

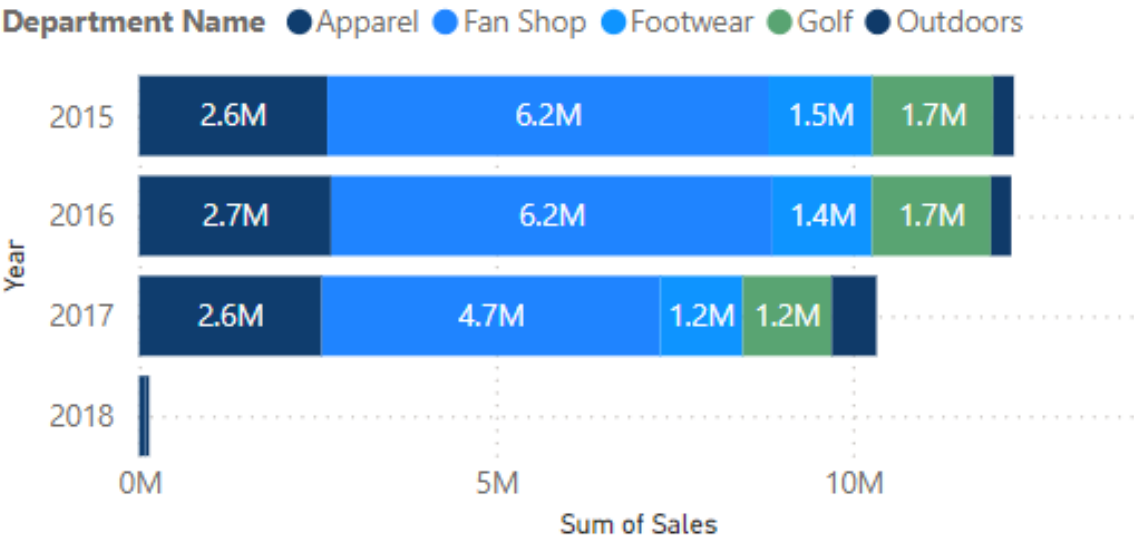
DataCo Ecommerce  
Platform Sales



# The fan shop revenue has decreased from 2016 to 2017.

- The Camping & Hiking, and Fishing, contributing to most of the fan shop revenue had decreased significantly from 2016 to 2017.
  - Caused by a reduction in revenue of these Product Categories in Asia Pacific and African markets due to the Cholera/Ebola epidemic or extreme natural weather events.
  - Prioritise Product Departments and Categories with less volatility

Sum of Sales by Year and Department Name

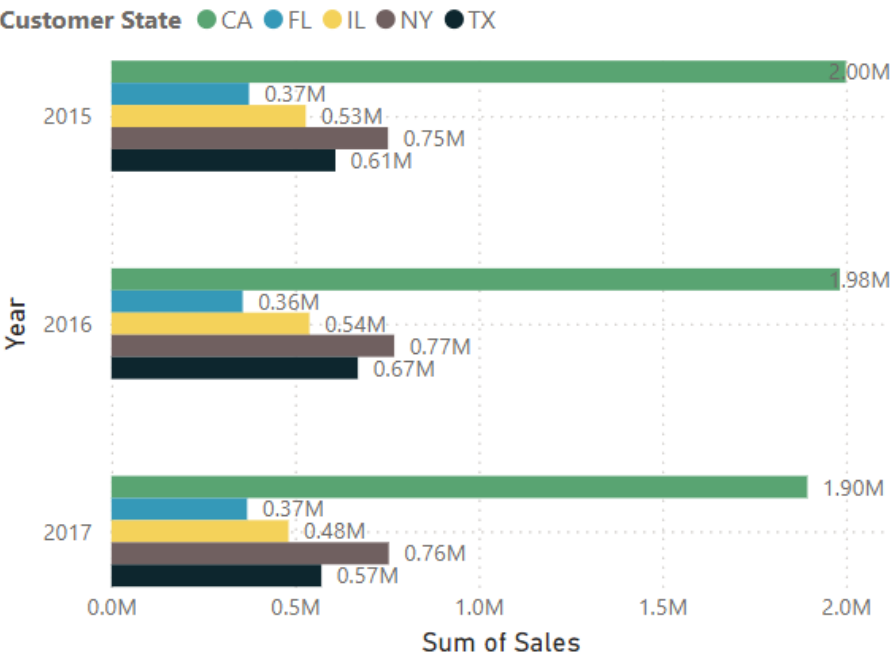


Department Name	2015	2016	2017
<b>Fan Shop</b>	<b>6,184,120.97</b>	<b>6,185,674.14</b>	<b>4,740,890.39</b>
<b>Camping &amp; Hiking</b>	<b>1,480,101.32</b>	<b>1,478,301.44</b>	<b>1,160,022.66</b>
Consumer	755,949.60	763,749.08	593,060.46
Corporate	460,469.30	438,270.78	365,075.66
Home Office	263,682.42	276,281.58	201,886.54
<b>Fishing</b>	<b>2,496,275.18</b>	<b>2,533,073.34</b>	<b>1,900,304.98</b>
Consumer	1,288,335.58	1,346,732.66	973,951.30
Corporate	765,961.70	744,362.78	584,370.78
Home Office	441,977.90	441,977.90	341,982.90
<b>Hunting &amp; Shooting</b>	<b>12,925.69</b>	<b>12,625.79</b>	<b>31,296.94</b>
<b>Indoor/Outdoor Games</b>	<b>1,060,875.48</b>	<b>1,051,929.06</b>	<b>776,189.40</b>
<b>Toys</b>			<b>2,919.62</b>
<b>Water Sports</b>	<b>1,133,943.30</b>	<b>1,109,744.51</b>	<b>870,156.79</b>
<b>Total</b>	<b>6,184,120.97</b>	<b>6,185,674.14</b>	<b>4,740,890.39</b>

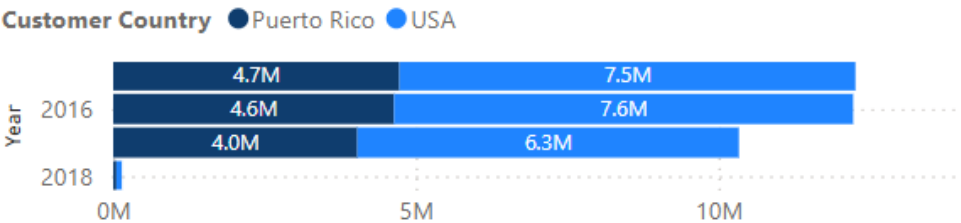
# The average revenue per customer has increased from 2016 to 2017 despite revenue decreases from the USA and Puerto Rico.

- The overall revenue decreased for both the USA and Puerto Rico from 2016 to 2017
  - In the USA, the Majority Revenue generator states CA, FL, IL, NY and TX have decreased from 2016 to 2017
- However, the average spending per transaction has increased from 2016 to 2017. This might indicate:
  - Customers shifting preference towards premium or quality products
  - Success marketing of the Data Co platform in instilling customer confidence to purchase expensive products for their safety and convenience

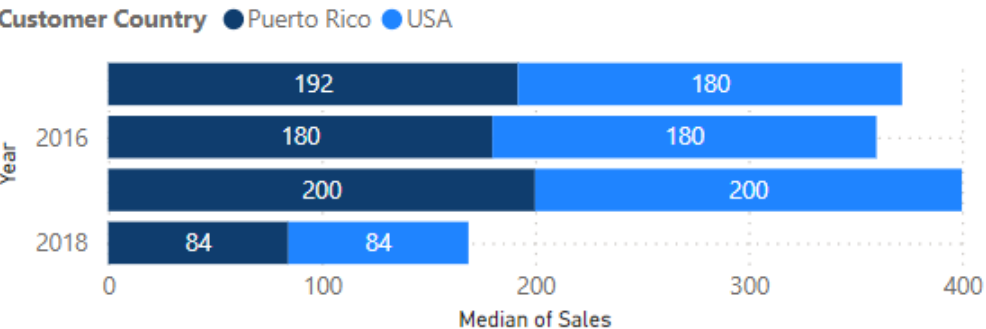
Sum of Sales by Year and Customer State



Sum of Sales by Year and Customer Country

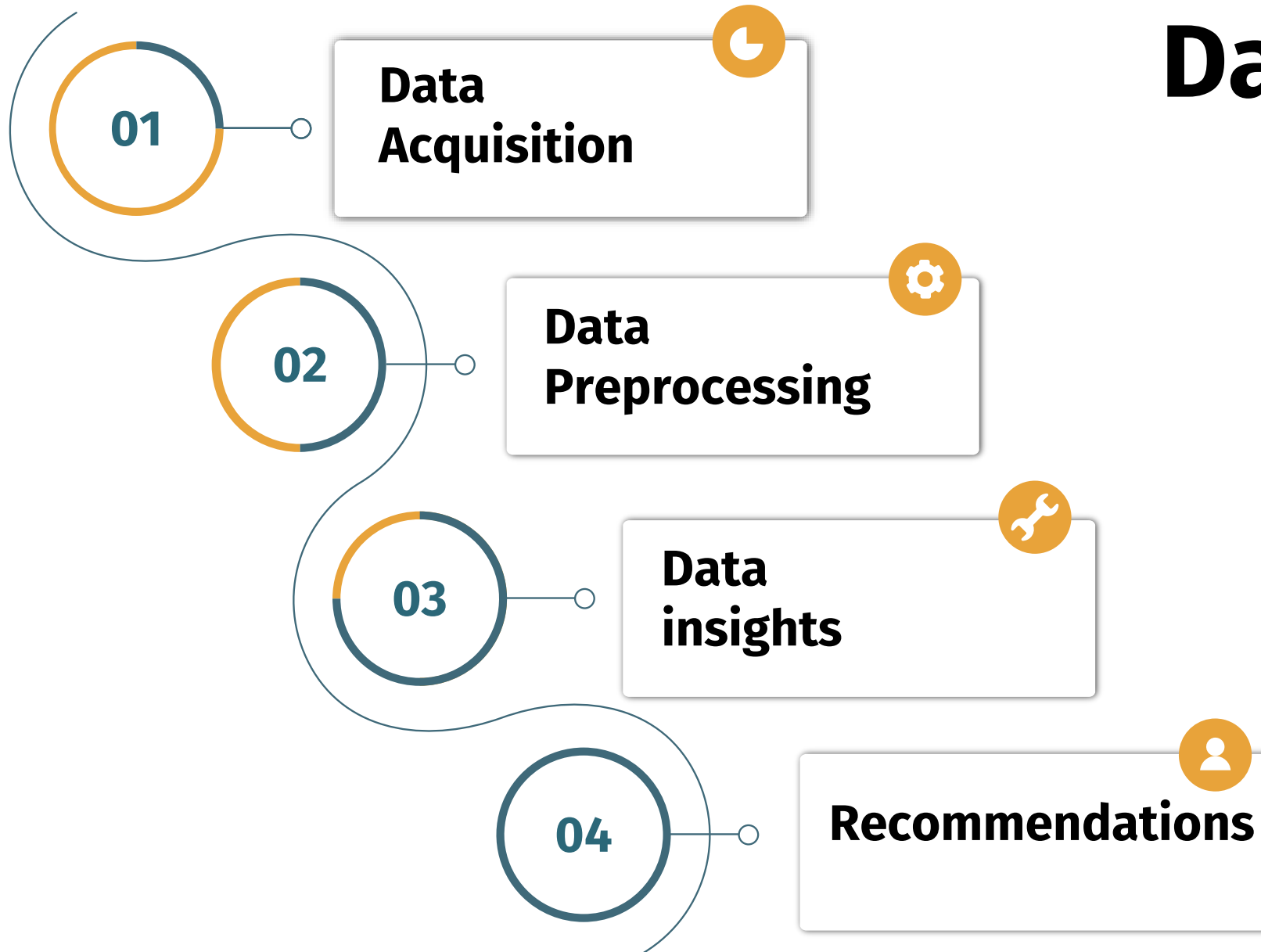


Median of Sales by Year and Customer Country



# Data Insights

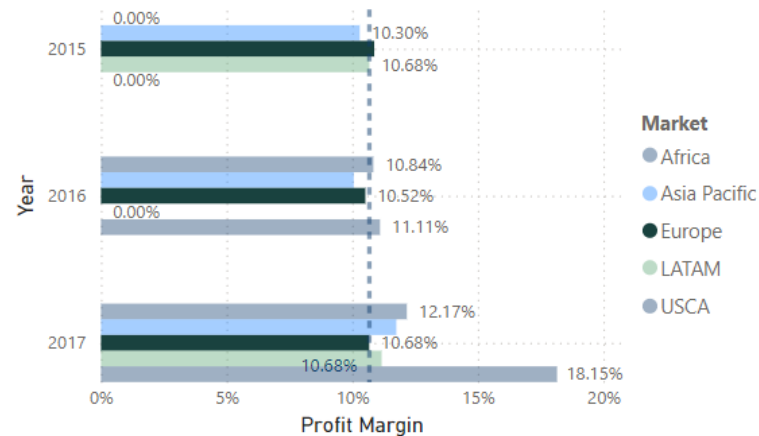
DataCo E-commerce  
Profit Margin



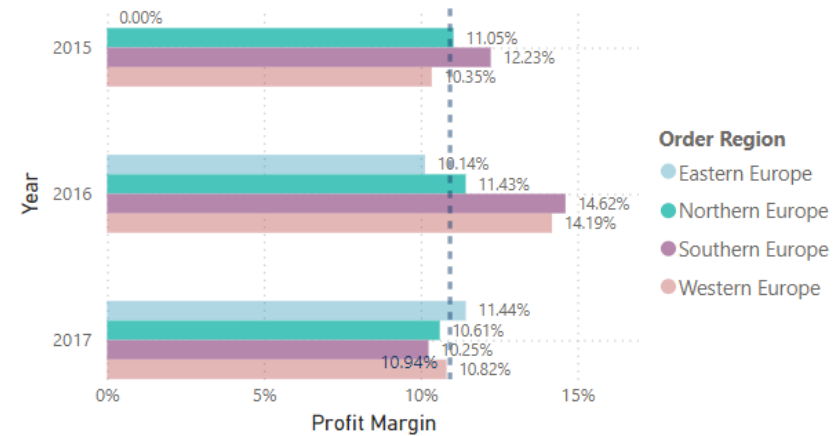
# Europe has the lowest profit margin from 2015 to 2017.

- All markets have an average of 10.68% profit margin from 2015 to 2017.
- Europe's profit margin decreased from 2015 to 2017
  - Northern and Southern Europe with larger sales had lower profit margin in 2017
  - Bookshop (8.74%), Fanshop (9.60%), Footwear (6.84%), Outdoors (8.5%) and Golf (5.17%) contributed to the reduction in the profit margins in 2017
  - Prioritise the products with product margin that are more than 10%

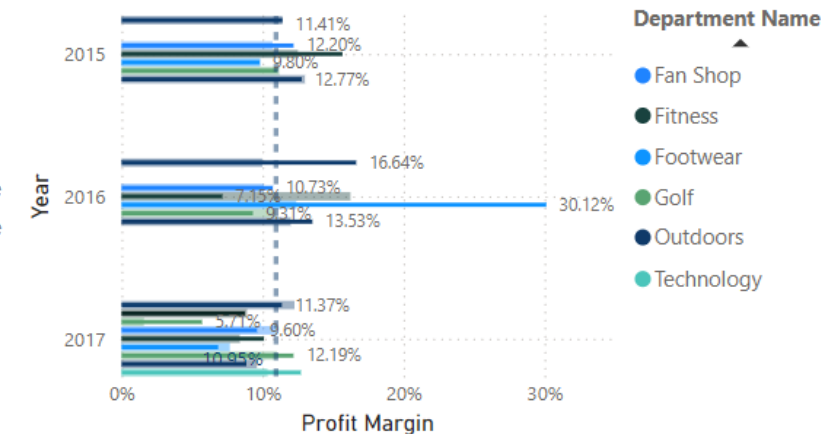
Profit Margin and Count of Sales by Year and Market



Profit Margin, Count of Sales and Sum of Sales by Year and Order Region



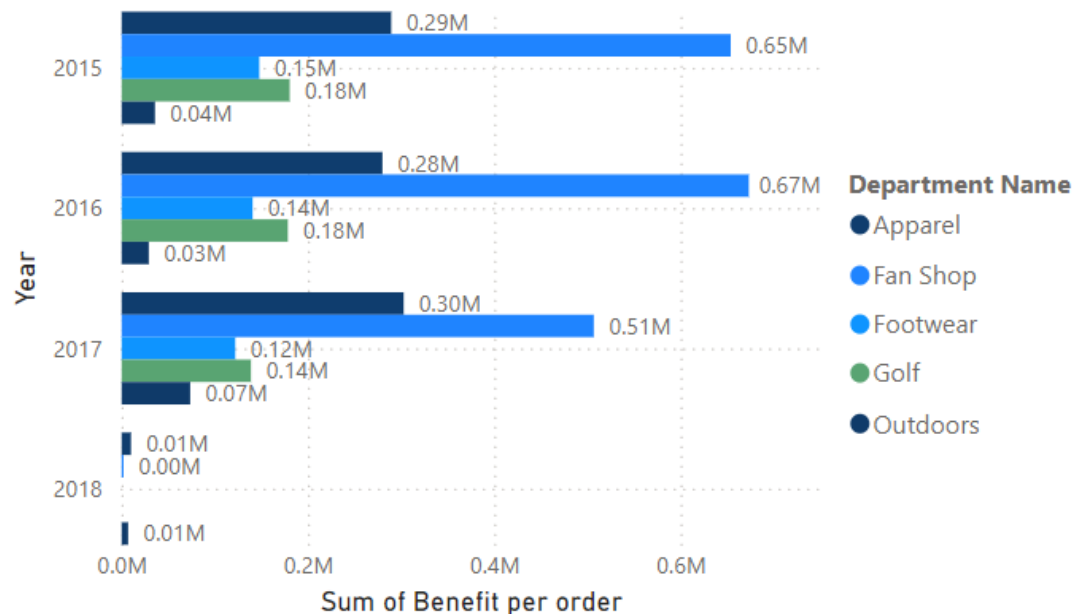
Profit Margin, Count of Sales and Sum of Sales by Year and Department Name



# Except for Bookshop, Petshop and Fitness (2017), most products have profit margins above 10%.

- The DataCo platform hosts products with healthy profits and profit margins
  - The Product Department affects the DataCo profit margins significantly
  - Promote the sales of Products with more than a 10% margin on the DataCo Platform to maintain high profit margins

Sum of Benefit per order by Year and Department Name



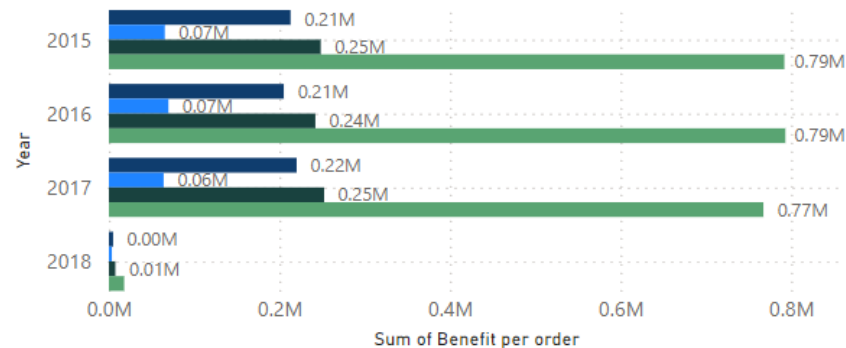
Department Name	2015	2016	2017	2018	Total
Apparel	10.98%	10.40%	11.82%	11.33%	<b>11.06%</b>
Book Shop	0.00%	0.00%	7.02%	0.00%	<b>7.02%</b>
Discs Shop	0.00%	0.00%	10.37%	11.10%	<b>10.57%</b>
Fan Shop	10.57%	10.88%	10.69%	13.93%	<b>10.72%</b>
Fitness	14.75%	11.02%	13.02%	5.94%	<b>11.72%</b>
Footwear	10.15%	10.10%	10.52%	0.00%	<b>10.24%</b>
Golf	10.66%	10.68%	11.13%	0.00%	<b>10.79%</b>
Health and Beauty	0.00%	0.00%	8.32%	10.17%	<b>8.95%</b>
Outdoors	12.29%	10.29%	11.70%	13.48%	<b>11.59%</b>
Pet Shop	0.00%	0.00%	8.89%	8.40%	<b>8.64%</b>
Technology	0.00%	0.00%	10.89%	0.00%	<b>10.89%</b>
<b>Total</b>	<b>10.69%</b>	<b>10.65%</b>	<b>11.04%</b>	<b>10.20%</b>	<b>10.78%</b>

# The shipping and payment methods do not affect the profit margin.

- This means that only the product and region will affect the profit margin
  - This provides flexibility for the DataCo to adapt shipping methods to suit the customers' needs and satisfaction with the product being on time without affecting profit margins

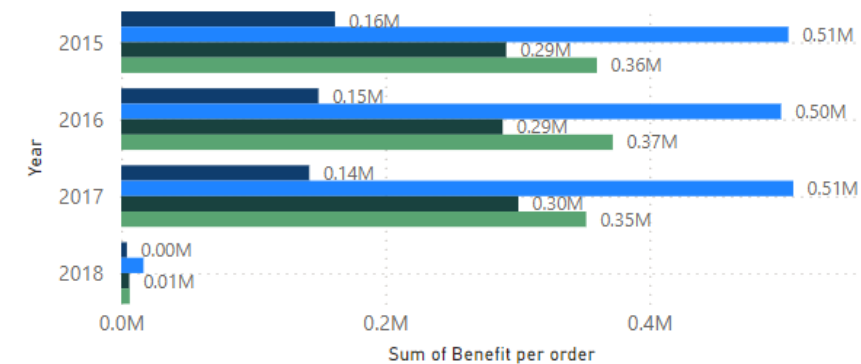
Sum of Benefit per order by Year and Shipping Mode

Shipping Mode ● First Class ● Same Day ● Second Class ● Standard Class



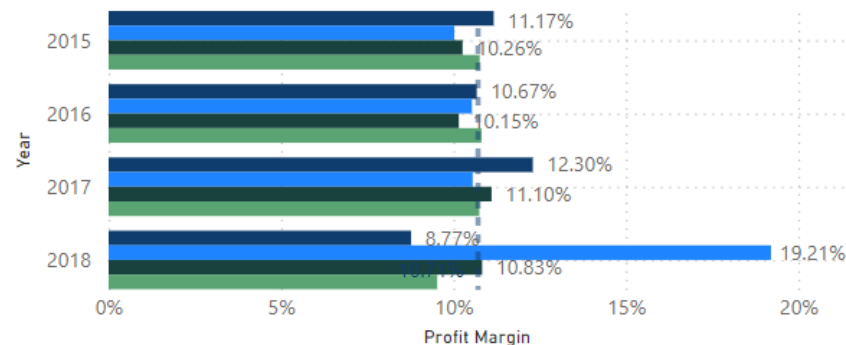
Sum of Benefit per order by Year and Type

Type ● Cash ● Debit ● Payment ● Transfer



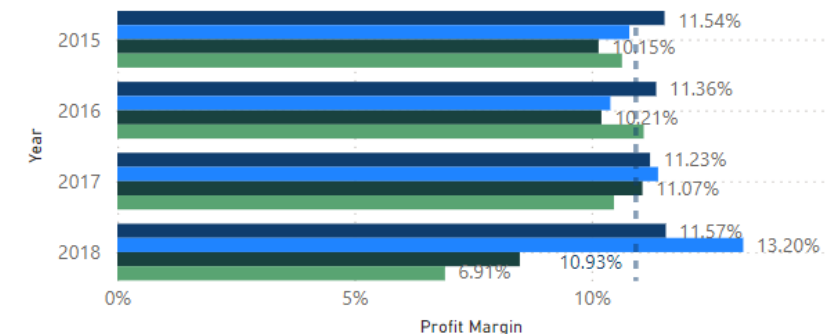
Profit Margin and Count of Sales by Year and Shipping Mode

Shipping Mode ● First Class ● Same Day ● Second Class ● Standard Class



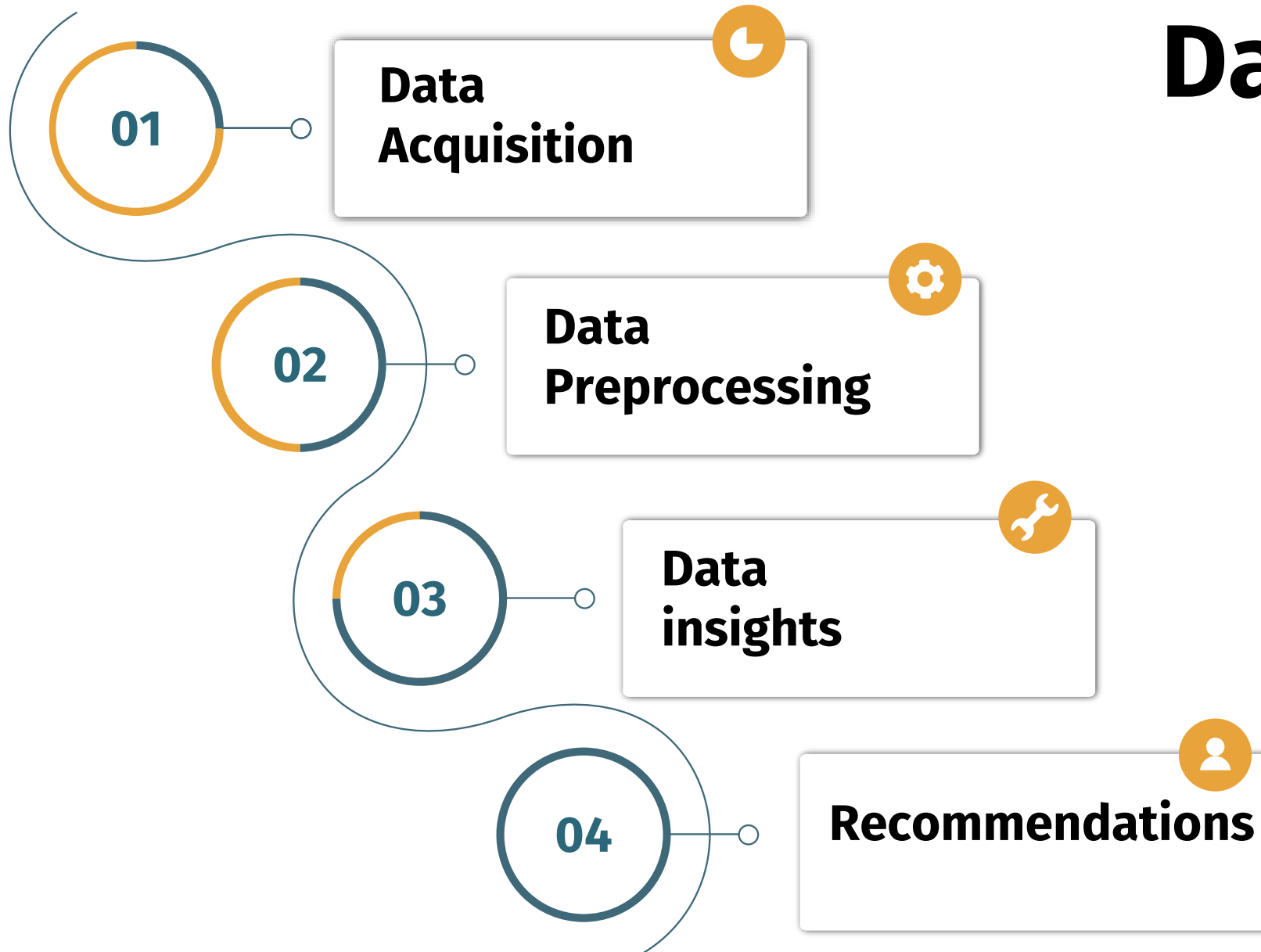
Profit Margin and Count of Sales by Year and Type

Type ● Cash ● Debit ● Payment ● Transfer



# Data Insights

DataCo E-commerce  
On Time Performance



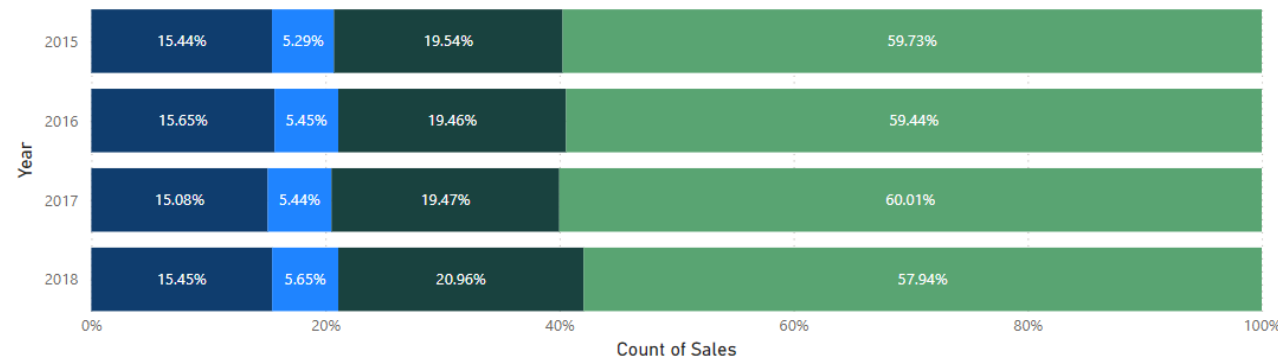


# The OTP for Same-Day shipping method has reduced from 53.3% in 2016 to 44.9% in 2017.

- The Standard Class is the most popular and punctual shipping method on the DataCo Platform.
- There is a reduction in the Same-Day shipping method OTP from 2016 to 2017.
  - Europe contributed to the reduction in the Same Delivery OTP from 2016 to 2017.

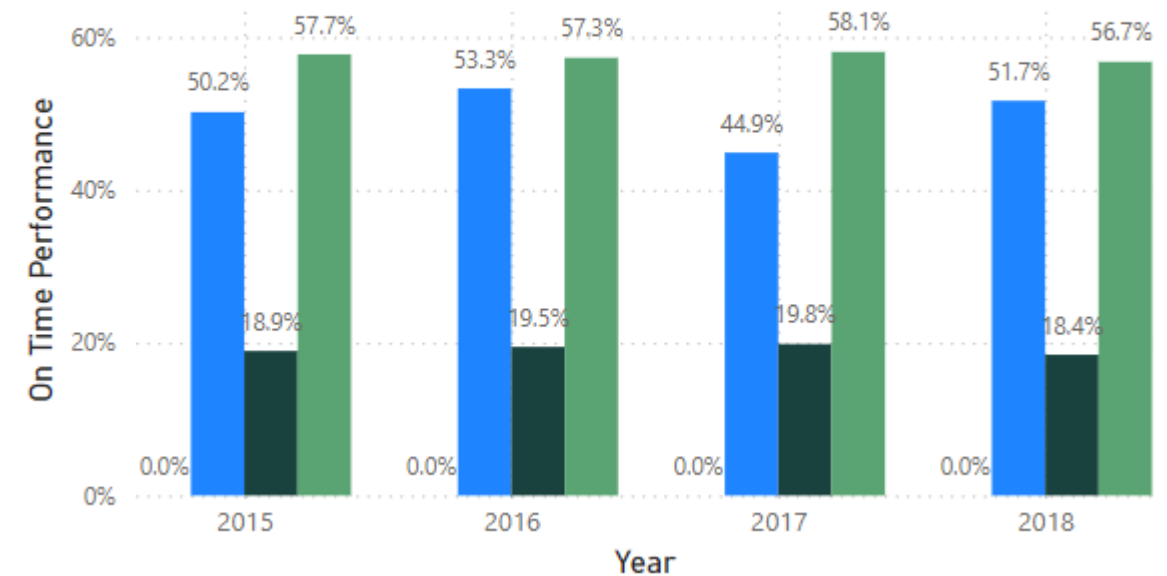
Count of Sales by Year and Shipping Mode

Shipping Mode ● First Class ● Same Day ● Second Class ● Standard Class



On Time Performance and Count of Sales by Year and Shipping Mode

Shipping Mode ● First Class ● Same Day ● Second Class ● Standard Class

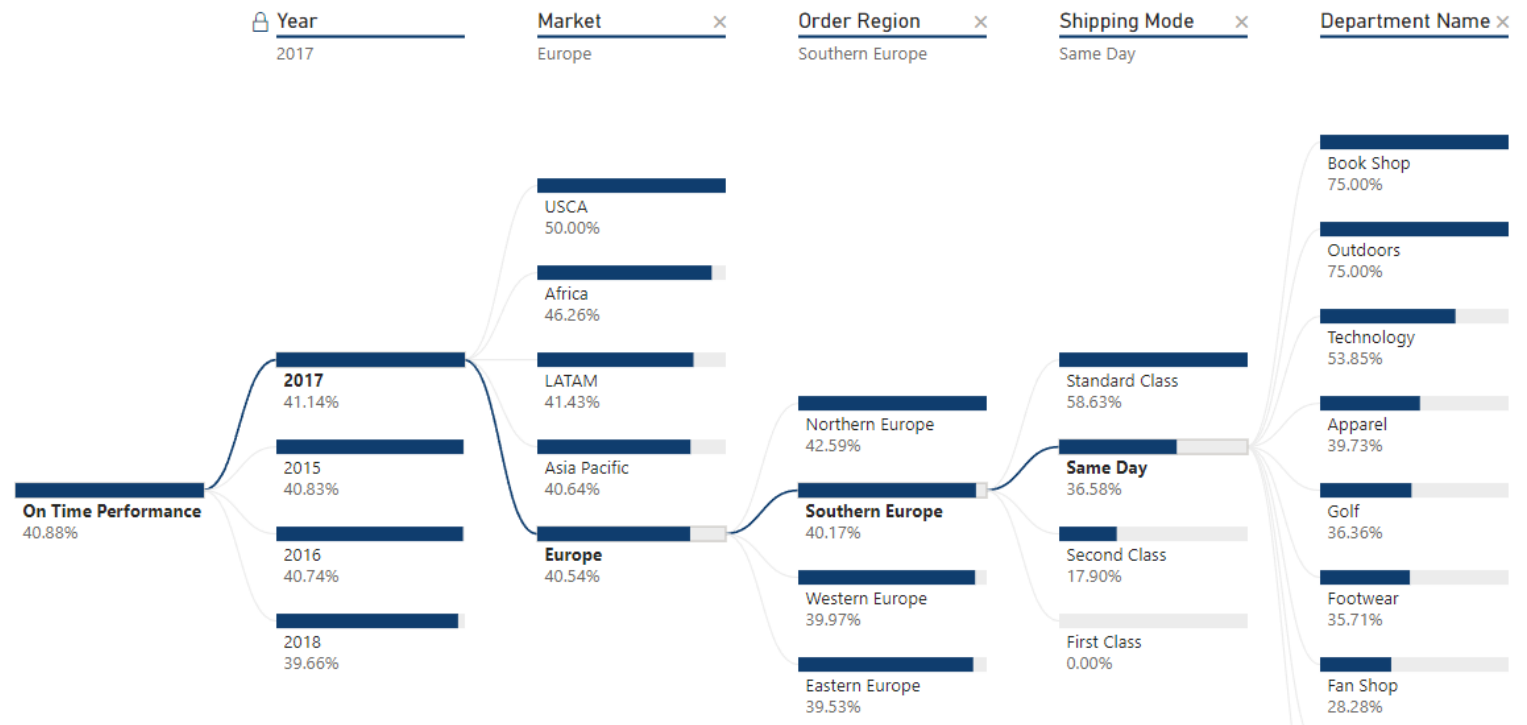
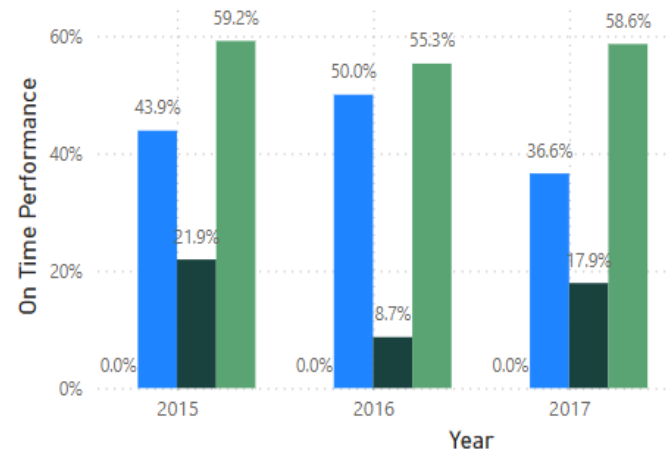


# The Same-Delivery OTP from the Southern Europe Market has dropped from 50% to 36.6%.

- Product Department Apparel, Golf, Footwear and Fan shop contributed to a reduction in the Southern Europe Same Day OTP.
  - This could be due to the [Railway closure](#) in Germany connecting to Southern Europe in late September 2017
  - Providing alternate switches to other shipping modes to anticipate railway closure

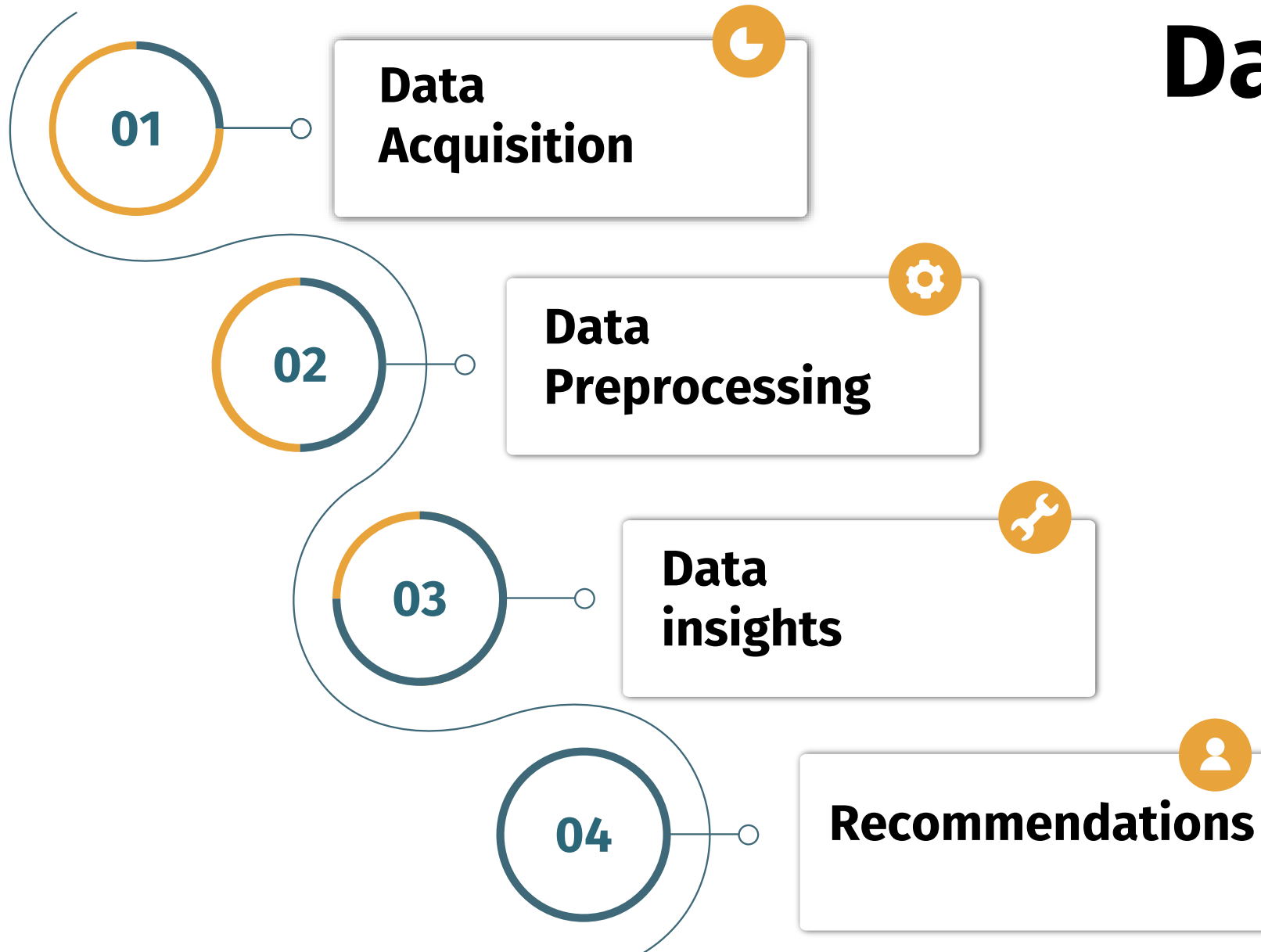
On Time Performance and Count of Sales by Year and Shipping Mode

Shipping Mode ● First Class ● Same Day ● Second Class ● Standar



# Data Insights

DataCo E-commerce  
Fraud Transaction Monitoring

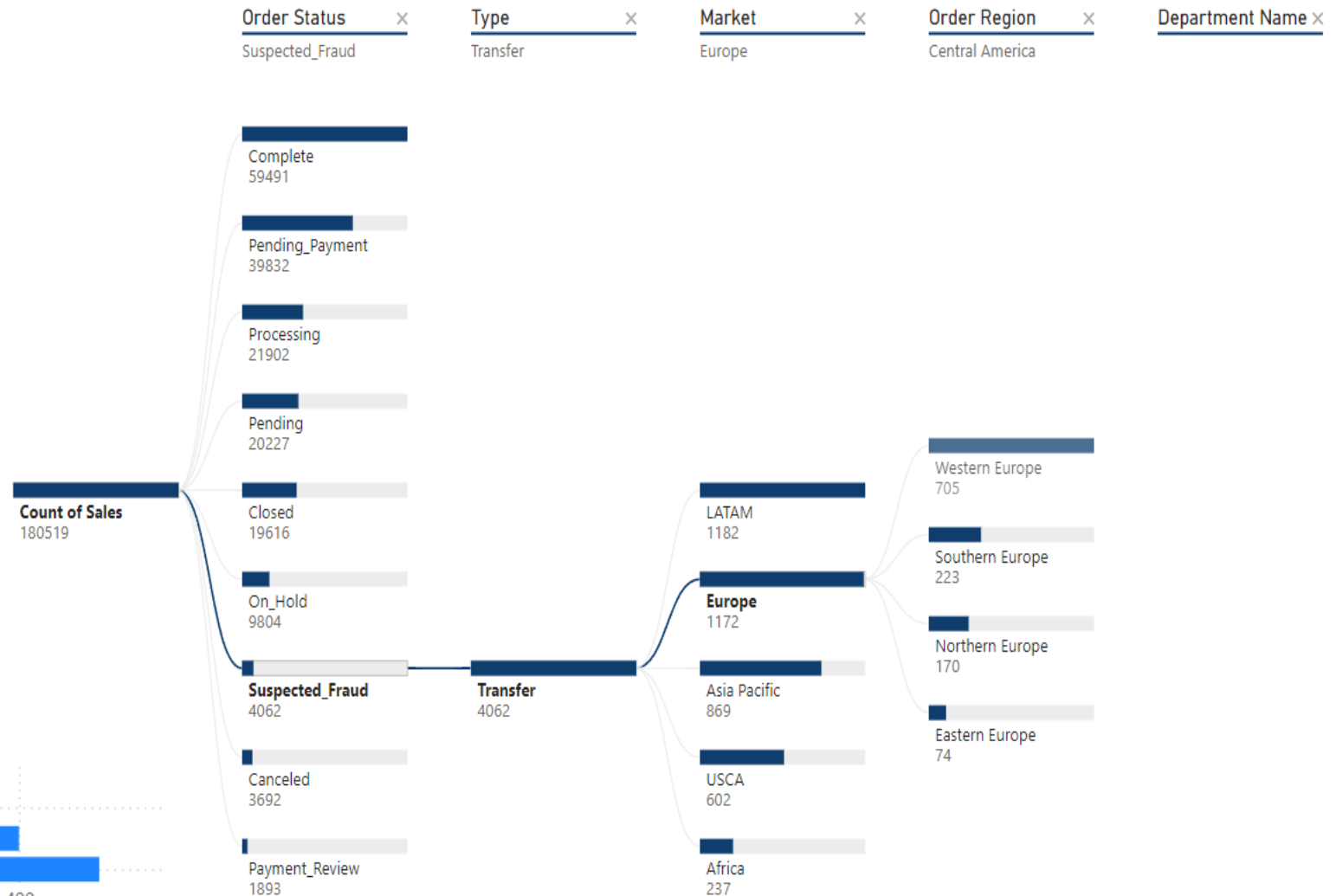
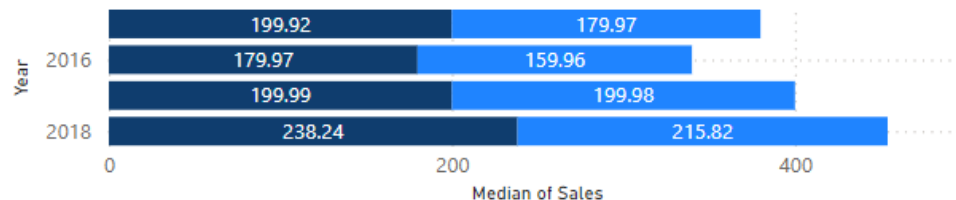


# All the suspected fraud cases came from the Transfer payment method.

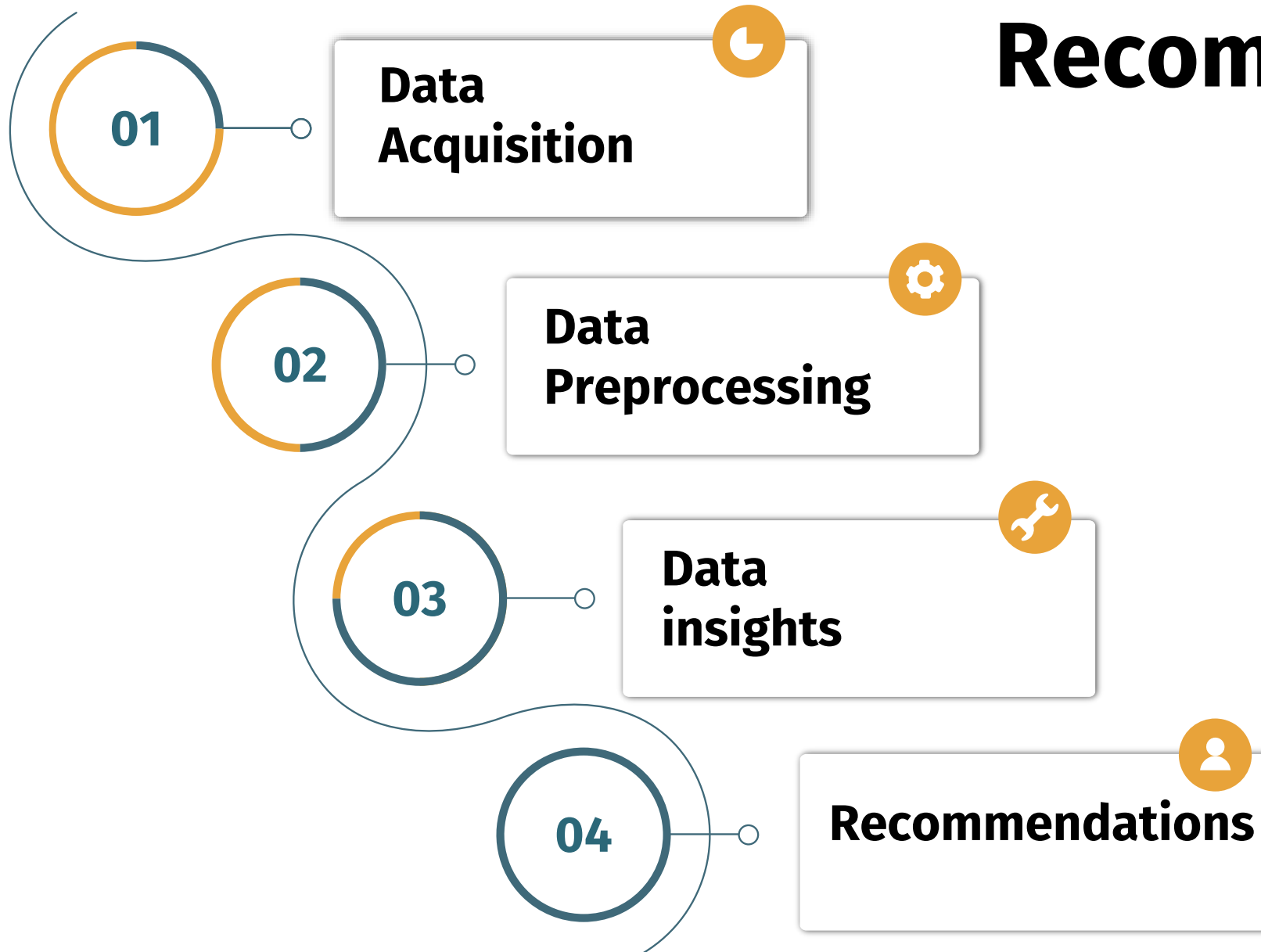
- The flagged orders had lower median sales values compared to those non-flagged orders.
- LATAM and Europe had the most suspected\_fraud cases
  - In particular, most of the orders' market destination with Western Europe was tagged as suspected\_fraud.
  - Perform additional scrutiny of those orders' destination

Median of Sales by Year and Customer Country

Customer Country ● Puerto Rico ● USA



# Recommendations



# Recommendations

- Insight 1: Fan shop products are susceptible to changes in the Asia Pacific and Africa
  - Enhance the marketing of Fan Shop products in other markets to cushion the decrease in Asia Pacific and Africa
- Insight 2: Europe has the lowest profit margin from 2015 to 2017
  - Promote the products with higher profit margins in Europe
- Insight 3: Bookshops, Petshop and Fitness have lower Product department margins
  - Promote bulk sales to increase the profit margins of these departments
- Insight 4: Europe has a dropped in the OTP for Same Day Delivery
  - Plan alternate transportation routes (railway or highway) to account for potential disruption in any connection
- Insight 5: All Suspected fraud transactions come from the transfer payment method
  - Monitor orders towards LATAM market and Western Europe regions in the European Market
  - Monitor origin orders with sales amount that exceeds the median amount of \$84 in 2018

# Limitations

- Missing data for some of the years in the data for products and Market Regions
- Puerto Rico states are not available for analysis