BUSINESS CASE 2.1

Future Retailer

Heading for the future: Data Analysis Southern - Team: beDAta

EXECUTIVE SUMMARY

Q4/2022:

3000 Total Orders	**998** Total Customers
$25.3M Total Revenue	**$4.2M** Total Profit

01 PRODUCT

Based on highest/lowest revenue products, develop a strategy for inventory allocation, taking into timing factor.

02 CUSTOMER

Evaluate customer purchasing behavior based on objection reasons to improve customer service quality and identify core issues.

03 SALES AGENT

Evaluate performance, revenue and profit each employee brings. Build SIP program to reward commission.

PROBLEM

Find the answer to Retail Future's upcoming development strategy through some objectives.

STRATEGY

METHOD

Explore about data sets using Excel & Python - Use Power BI for cleaning, transforming & modeling - Use a 4-step analysis approach to find insights - Build a dashboard & make a suggestion

SOLUTION

Provide solutions to the stated goals and messages to the business

DASHBOARD OVERVIEW

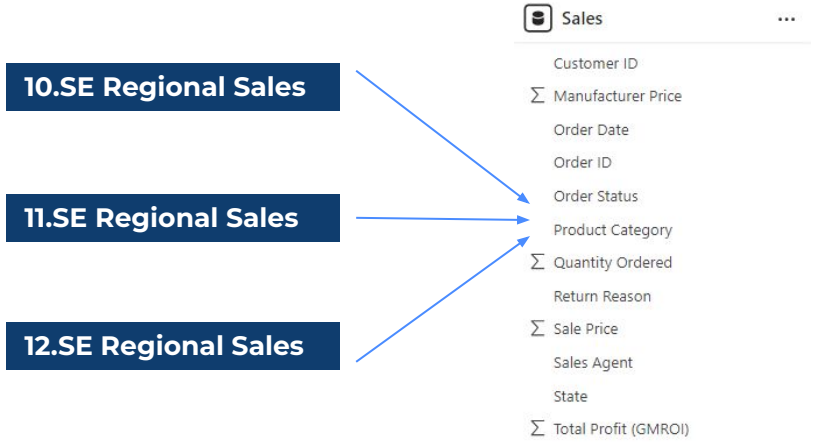
PDF: Dashboard Tour PDF

LINK DASHBOARD: Dashboard (but you must request access)

DOWNLOAD: Here

CLEANING & TRANSFORMATION

Sales Table

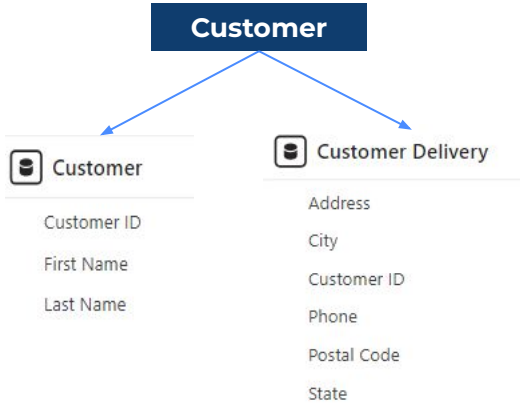


- **Append 3 tables**: 10.SE Regional Sales - 10.SE Regional Sales - 10.SE Regional Sales -> **Sales Table**.

- **Remove** some columns about Customer: **First Name, Last Name**

- Data type: Order ID, Customer ID -> **text**

Customer Table

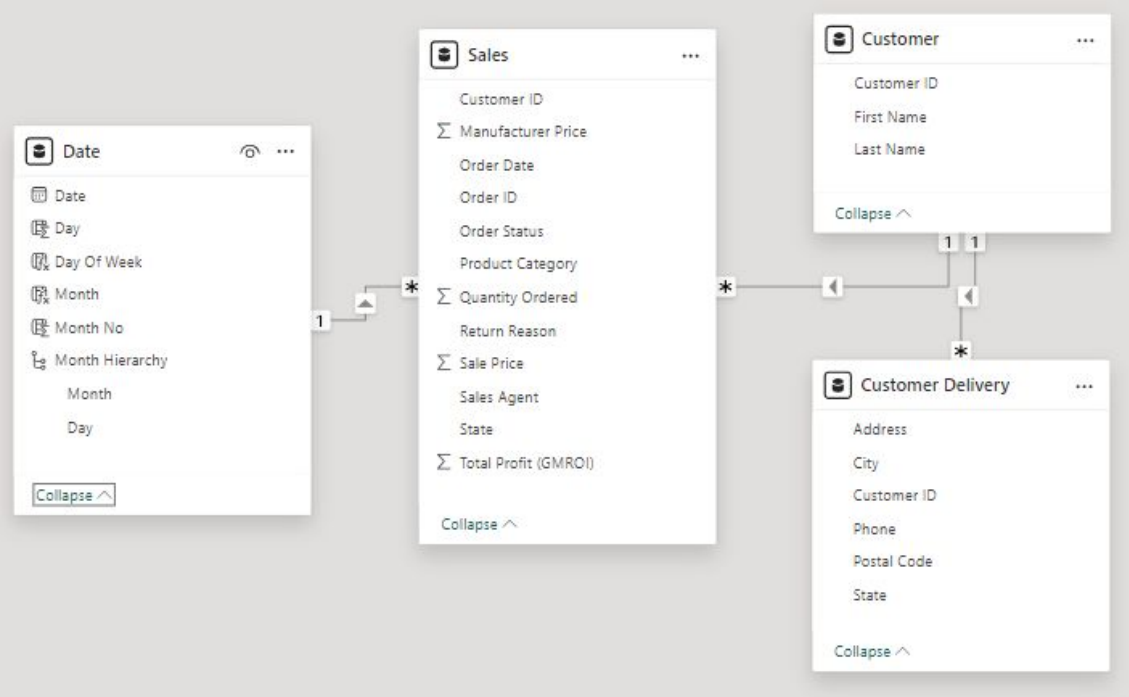


- Remove some redundant columns: **Product Category, Order Date, Quantity Ordered, Order Status**.

- Handle **duplicate** primary key (**Customer ID 1373, 1588**) -> **separate the Customer Delivery table** to contain only delivery information.

- Data type: CustomerID -> **text**

DATA MODELLING



Create a **Date table** to contain information about dates. After establishing relationships between tables, we get the **data model as above**.

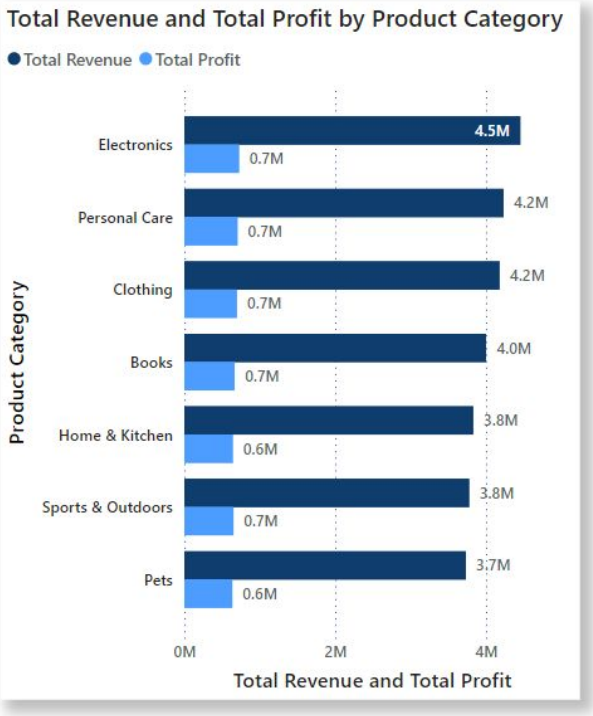
ANALYZE & PERFORM MISSION

We will analyze the following three problems through four main steps of analysis: describe, diagnose, predict, and recommend

- **Problem 1:** Evaluate the business performance of each product category
- **Problem 2:** Evaluate the customer purchasing behavior
- **Problem 3:** Evaluate the performance of the consulting team

PROBLEM 1

Evaluate the business performance of each product category



Descriptive Analysis

Clustered bar chart showing total revenue and total profit by product category, with:

- **Average sales quantity** by product category is approximately **5 product units**
- **Average revenue** by product category is approximately **4,028,199 USD**
- **Average profit** by product category is approximately **673,006 USD**

Overview: The difference in revenue and profit between product categories is insignificant.

Best Quantity

Electronics

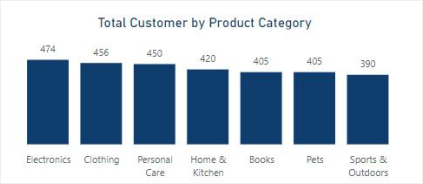
Best Revenue

Electronics

Best Profit

Electronics

Diagnostic Analytics



- The number of customers for each product category is **not significantly different from its average**
- The distribution of customers by product is **quite even**

-> **reflects** the fact that the **diversity in product categories** has created the **success** of the brand over the past time.

- **Personal Care** is not the category for the highest proportion of revenue/profit. However, it has the **highest number of cancelled orders because unsatisfied & quantity issue.**

-> customers tend to be **more fastidious** when they **buy personal care** products.

Predictive Analytics

- **Data** was collected in the fourth quarter of 2022, which is the **end of the year** and **preparation for the new year**

- In **December 2022**, **Clothing** was the item with the **highest revenue and profit** -> these items often have **year-end shopping demand**

- From the above trends, it is possible to **predict the trend** for the coming time, which is also the **beginning of the new year,** customers will tend to cut spending on these items and only spend on essential items, such as **Personal Care**

Prescriptive Analytics

1. The number of customers: although the brand is successful due to the diversity of product categories, at different times there may be fluctuations in revenue on different product categories, such as the end of the year. Therefore, it is not advisable to stock up on the same amount of goods but to consider the time as well as other factors.

2. Strategy for the next time: promote essential items, such as Personal Care, try to maintain items that are likely to decrease in sales, such as Electronics, Clothing

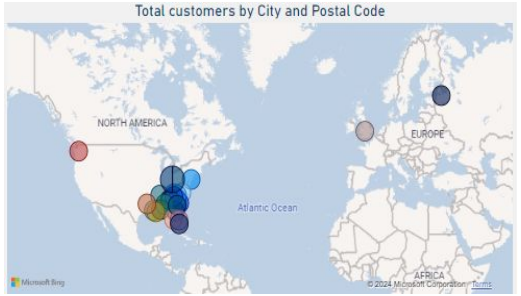
PROBLEM 2

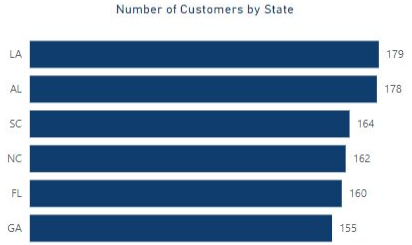
Evaluate of customer purchasing behavior

Descriptive Analysis

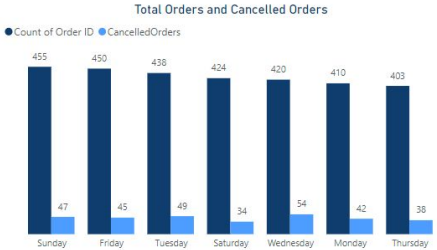
Within 3 months of Q4 2020, Future Retailer attracted **998 customers** across **26 cities** and **27 postcode** in **6 states** across South America and Northern Europe

Total Customer	Total State	City	Postal Code
998	6	26	27

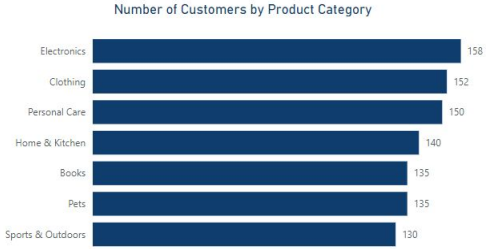




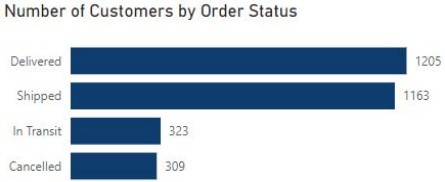
The number of customers in the states is quite similar, the **most is LA** (178) and the **least is GA** (155)



Weekends do not affect customers' purchases or returns.



Customers choose to buy **quite evenly** across 6 types of products, **most** of which are **electronics**



In **3000 orders** from **998 customers** with quantity each order status as shown above.

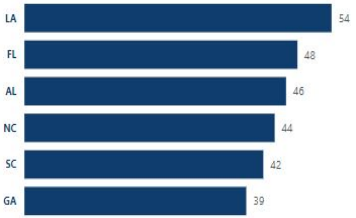
Diagnostic Analytics

Total Customer	Cancelled Customers Rate	Total Orders	Cancelled Rate
998	27.4%	3K	10.3%

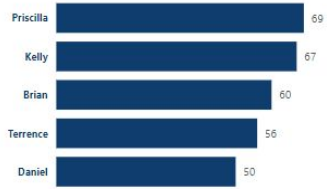
In **Q4/2020** Future Retailer had **273 customers with orders canceling** out of **309 canceled orders** out of **998 customers**. So on **average**, a customer will **cancel 1-2 orders** and the rate of **customer cancellations** per total number of customers is **27.4%**

Number of customers canceling orders does not differ significantly between product categories, sales agents and states

32 - 50 for each product category. The **most** is **personal care** and the **least** is **pets**.



39 - 55 for each state. The **most** is **LA** and the **least** is **GA**.

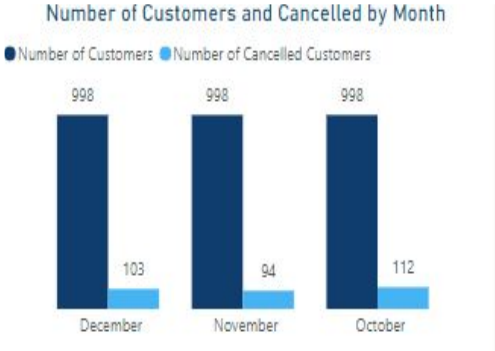


50 - 70 for each sales agent. The **most** is **Priscilla** and the **least** is **Daniel**.

Number of customers returning products ranked by **reasons** from **high to low**: Received Wrong Item → Unsatisfied → Late Delivery → Defective → Quality Issue

Number of customers canceling orders does **not depend** on the **day of week.**

Predictive Analytics



No new customers in the past 3 months. 998 existing customers continue to purchase each month and the **number of cancellations** has **decreased slightly** compared to October.

Cluster 1: Customers in Cluster 1 have the **lowest** total revenue and quantity ordered. These may be **new or infrequent buyers**.

Cluster 2: Customers in Cluster 2 have **moderate** total revenue and quantity ordered. These are likely **regular buyers** but with smaller purchase volumes.

Cluster 3: Customers in Cluster 3 have the **highest** total revenue and quantity ordered. These are **loyal customers** who make large purchases.

Prescriptive Analytics

Identify potential customers based on order history and spending to provide suitable promotional gifts and discount codes.

From reasons for order cancellations and returns, improve processes from consultation to shipping and contact manufacturers for product quality issues.

Predict purchasing needs and adjust inventory to meet current and future customer demand.

Evaluate the impact of location, timing, and sales agents on order cancellations to devise appropriate solutions and improvement strategies.

PROBLEM 3

Evaluation of the performance of the consulting team

Descriptive Analysis

- In the Q4/2022, a total of **5 employees** were in charge of **3,000 orders**. Of these, **309 orders were canceled** (see 3.1)
- Overall, the rate of orders successfully delivered to customers of all 5 employees is **OVER 85%** (see 3.2)
- The difference between the highest and lowest revenue employees is **$1.4M**. However, the difference in profit is **$0.3M** (see 3.3)
- Of the 5 employees, the average order value was **9366**. Only **3/5** exceeded this value (see 3.4)

Fig. 3.1

Successful Order Rate of Each Sales Agent

Month	Brian	Daniel	Kelly	Priscilla	Terrence
October	88.64%	90.15%	88.35%	89.43%	87.23%
November	89.37%	93.14%	91.51%	86.18%	93.65%
December	90.43%	90.72%	88.05%	92.09%	87.01%

Fig. 3.2

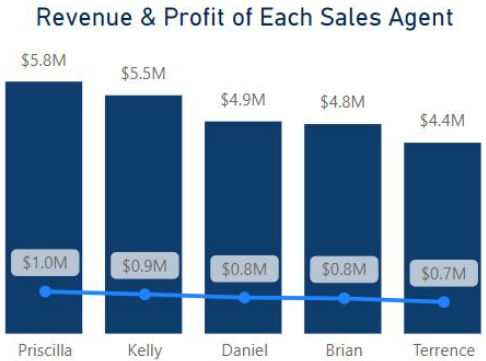


Fig. 3.3

Fig. 3.4

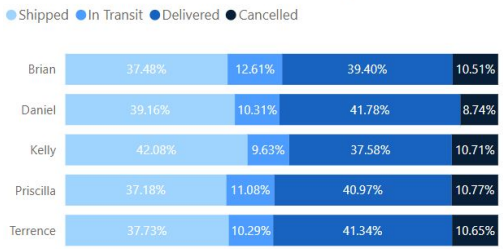
Diagnostic Analytics

- Most of the cancelled orders are due to received wrong item, late delivery and unsatisfied

-> 2/3 of the cause can come from consulting

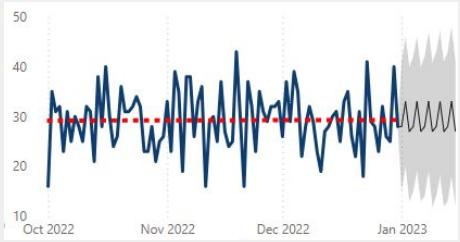
- Priscilla leads in previous chart but she is the employee with the highest rate of canceled orders **(10.77%)**

-> Being given **too many orders can affect work performance.**



Predictive Analytics

- From the data of the number of uncanceled orders of the entire team, **forecast** the number that employees can handle in the **next 15 days** of the following month for reasonable assignment arrangement.



- Even though **Priscilla** has the highest failure rate (and highest number of assignments), she is still **expected to handle the best number of teams**.

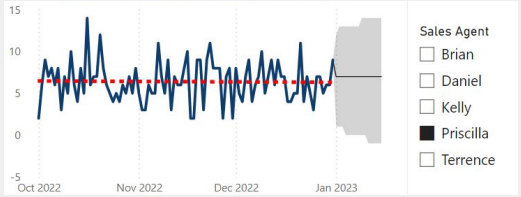


Fig. 3.5

Prescriptive Analytics

Implemented the "**SIP - Sales Incentive Plan**" program that allows employees to r**eceive commissions** based on the profit of successful sales orders.

- **Condition 1:** AOV per employee next month is more than the average of last month (9366) - fig 3.4
- **Condition 2:** Based on the forecasted number of upcoming orders (fig 3.5), if the employee meets the target, give them a commission
- **Condition 3:** The success rate did not decrease too much (fig 3.2) and the profit did not differ too much from the previous month

MESSAGE FROM INSIGHTS

“Improve the quality of Personal Care product consultation and exploit potential + develop strengths”

New Year Event

Personal Care is a popular trend among users at the beginning of the year

Improve Quality

This is the most cancelled product, businesses need to improve product quality.

Improve Personal Care product category

SIP Program

Most customers are not satisfied, so train the team and implement the SIP program.

Give voucher

Send promotional vouchers to customers who cancel for the first time in large numbers

MESSAGE FROM INSIGHTS

“Improve the quality of Personal Care product consultation and exploit potential + develop strengths”

Potential State - City

Most customers are concentrated in South America → Prioritize shipping vouchers and appropriate marketing strategies.

Potential Customers

Implement recommendation systems, personalize customer experience, and give vouchers to potential customers for contributing store revenue.

Exploit Potential + Develop Strengths

Enhance sales agents performance

Create a competitive environment with reward policies, regularly evaluate to identify weaknesses, and provide in-depth training programs to enhance the sales agent's skills.

APPENDIX

Data Analysis Process	- **Step 1:** Use Excel & Python & Power BI to see data types, NULL and duplicates value. Perform cleaning, convert data types as appropriate. Append 3 sales sheets into 1. Customer has been separated - irrelevant information has been deleted. - **Step 2:** Create a Date table containing date information. Build the data model in Power BI as shown. - **Step 3**: From the 3 problems posed, apply drawing related charts to help better understand the dataset. - **Step 4**: Build a dashboard to monitor Future Retailer's business performance and related information for 3 tasks in Power BI. Use some predictive models, clustering to find characteristic patterns by using Python. - **Step 5**: Schedule dashboard refreshes when new data is added. Manage dashboard access (users need to request to view).
Use 4 questions to analyze the problem	Analyze 3 issues about Product, Customer and Sales Agent at 4 levels: - **Descriptive Analytics:** Statistics on what happened over a business period and present the results. - **Diagnostic Analytics**: Insights from descriptive analytics to dig deeper to find the cause of results. - **Predictive Analytics**: Historical data and trends are used for prediction. Note that the goal is not to say what will happen, it is to predict what might happen. - **Prescriptive Analytics**: Analyze past decisions and events, the likelihood of different outcomes.
Tools	- **PowerBI:** step 1-5 - **Excel:** step 1 - **Python:** step 1, 4

beDAta would like to thank the **H4TF** Organizing Committee in particular and **AIESEC** in general for organizing a great playground for those who have a passion for data. Thank you everyone for creating opportunities for us. Wish everyone a good day.