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Data Analysis

PROPOSED BY

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PROPOSED TO

Mentor Data Future Program Batch V Track Data

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BUSINESS QUESTION No. 1

Background

Reviewing the distribution of data from the customer side. So, we can find out:

- What are the most frequently used payment methods
- What product categories are often purchased and make a big profit
- Which provinces are quite consumptive

Purpose

Knowing the initial description of the data so we can dig deeper about the things that need to be asked in data.

Hypothesis

1. Payment methods done in each region have different trends
2. Consumption needs are the most selling product categories in every region
3. Java Island is the region with the most buying of goods online

How are payment types, product categories, and sales used in each region?

Hypothesis 1: Payment methods done in each region have different trends

What is visualized is the overall data, 6 provinces from different islands (Banten, North Sumatra, East Kalimantan, South Sulawesi, West Nusa Tenggara, and Papua), and 29 of 34 provinces throughout Indonesia.

1. The most **widely used** payment method is a **credit card** with a total transaction of **73.77%** from all transactions.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Payment Method % by Location

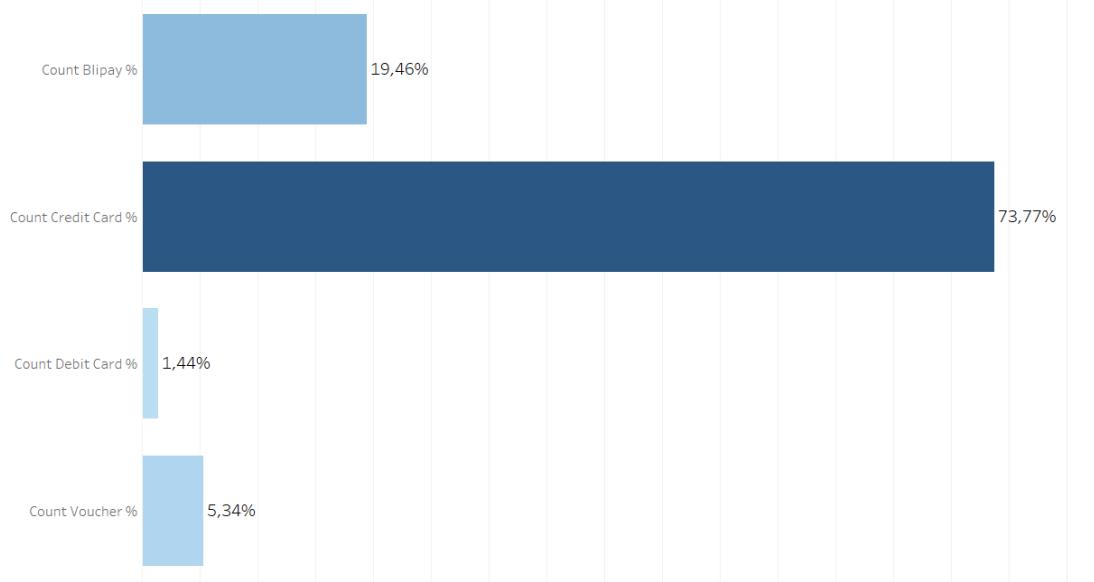


Figure 1: The Most Used Payment Method Overall

2. The most **widely used** payment method in **Banten Province** is **credit card** with a total of **75.24%** transactions.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Payment Method % by Location

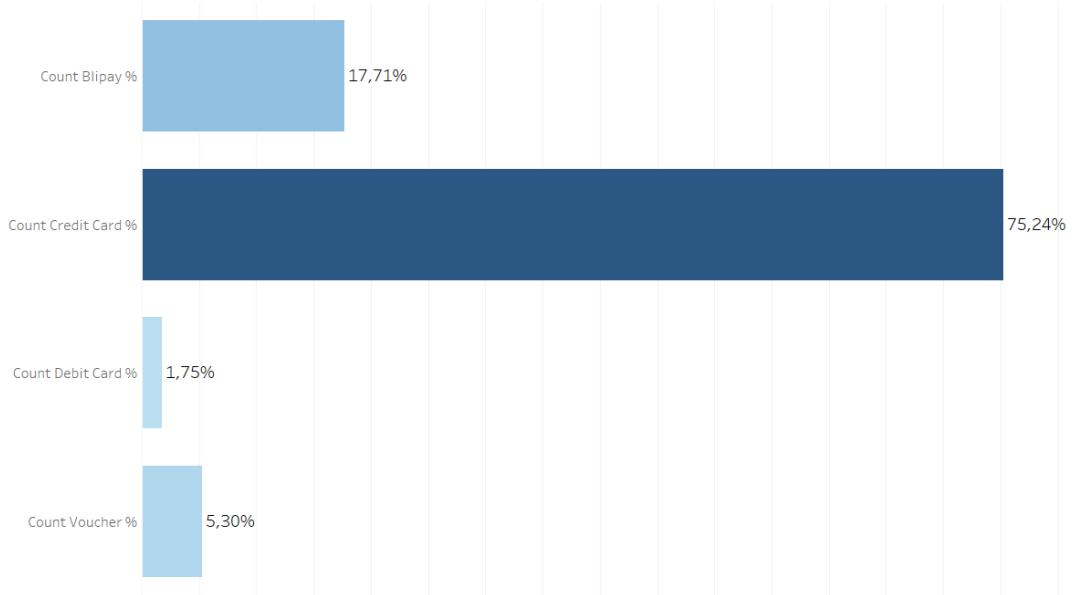


Figure 2: The Most Used Payment Method in Banten Province in 2016-2018

3. The most **widely used** payment method in **North Sumatera Province** is **credit card** with a total of **71,67%** transactions.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Payment Method % by Location

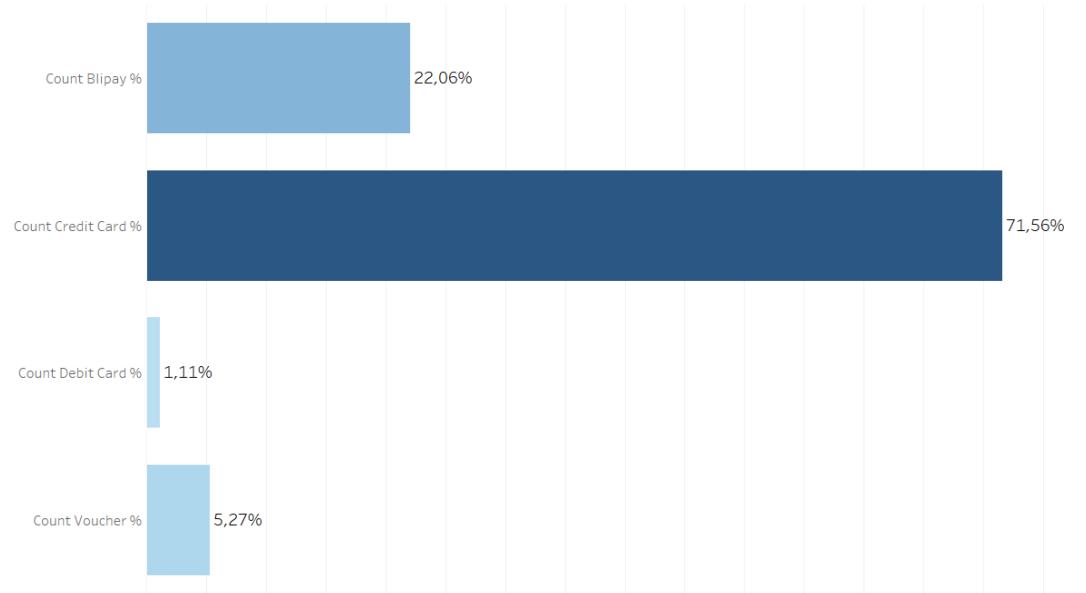


Figure 3: The Most Used Payment Method in North Sumatera Province in 2016-2018

4. The most **widely used** payment method in **East Kalimantan Province** is **credit card** with a total of **70,82%** transactions.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Payment Method % by Location

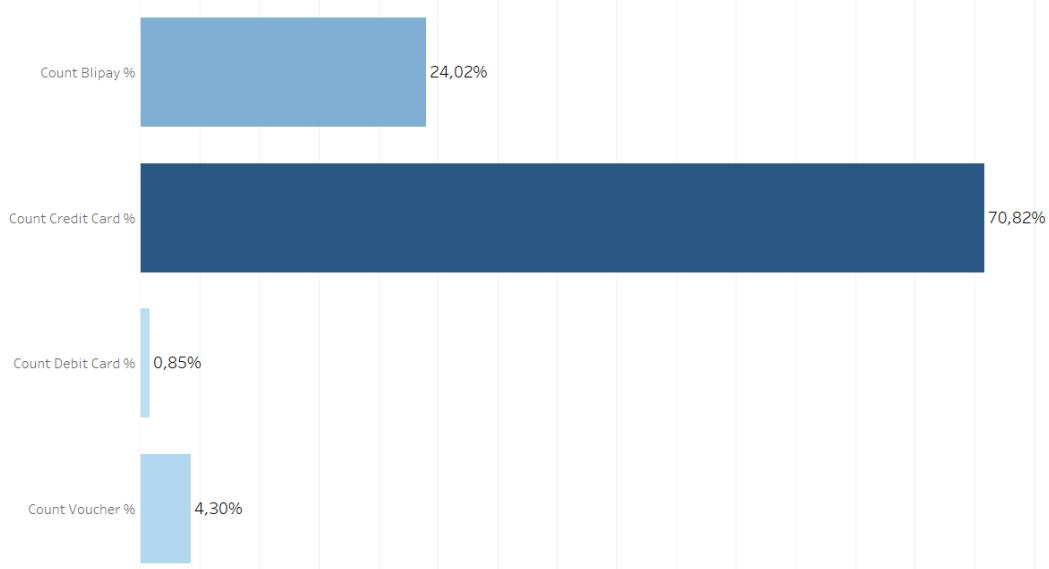


Figure 4: The Most Used Payment Method in East Kalimantan Province in 2016-2018

5. The most **widely used** payment method in **South Sulawesi Province** is **credit card** with a total of **75,95%** transactions

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Payment Method % by Location

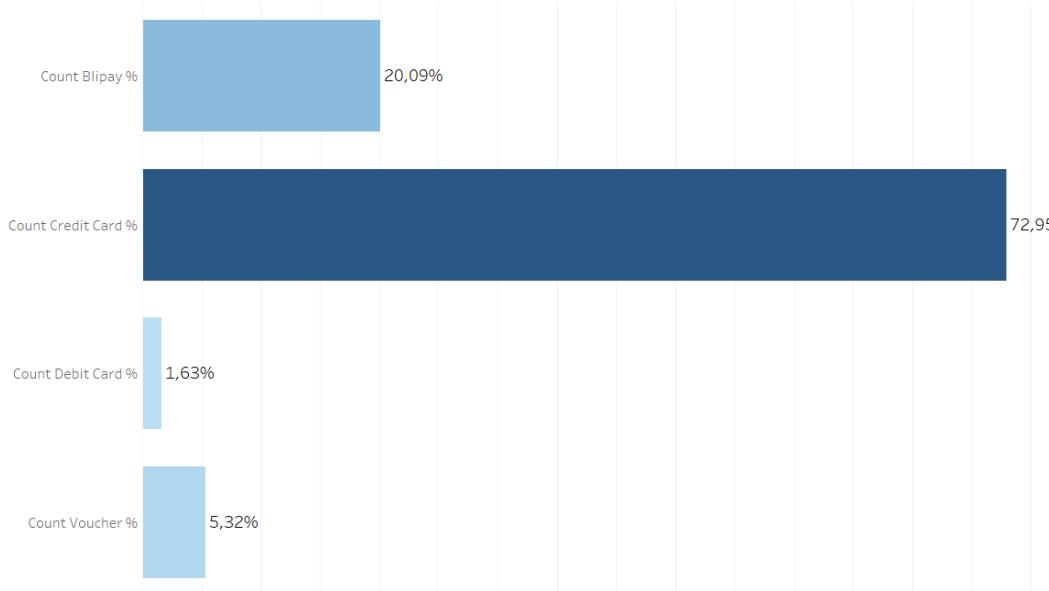


Figure 5: The Most Used Payment Method in South Sulawesi Province in 2016-2018

6. The most **widely used** payment method in **West Nusa Tenggara Province** is **credit card** with a total of **72,62%** transactions

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Payment Method % by Location

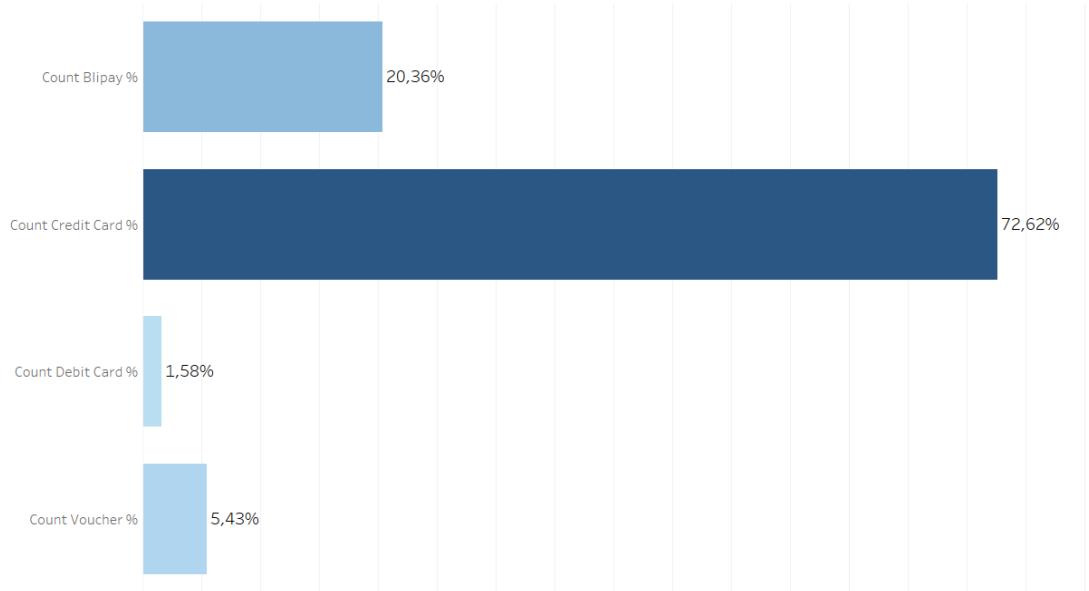


Figure 6: The Most Used Payment Method in West Nusa Tenggara Province in 2016-2018

7. The most **widely used** payment method in **Papua Province** is **credit card** with a total of **72,62%** transactions

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Payment Method % by Location

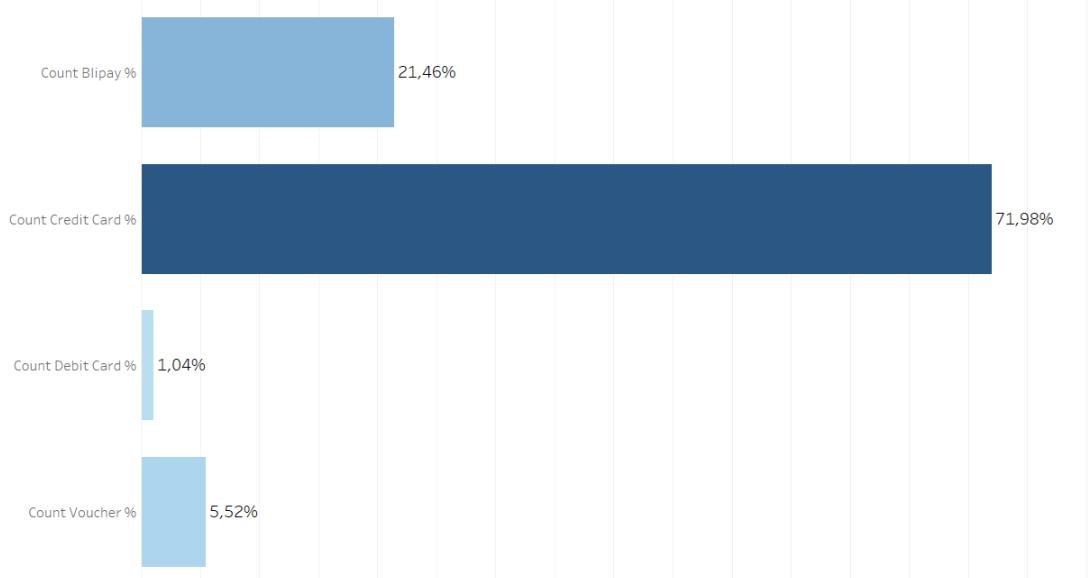


Figure 7: The Most Used Payment Method in Papua Province in 2016-2018

8. The most **widely used** payment method in **29 of 34 provinces** is **credit card** with a total of **73,55%** transactions

Excludes orders that have seller state unknown, order status unavailable, and canceled.

29 out of 34 Province Payment Method %

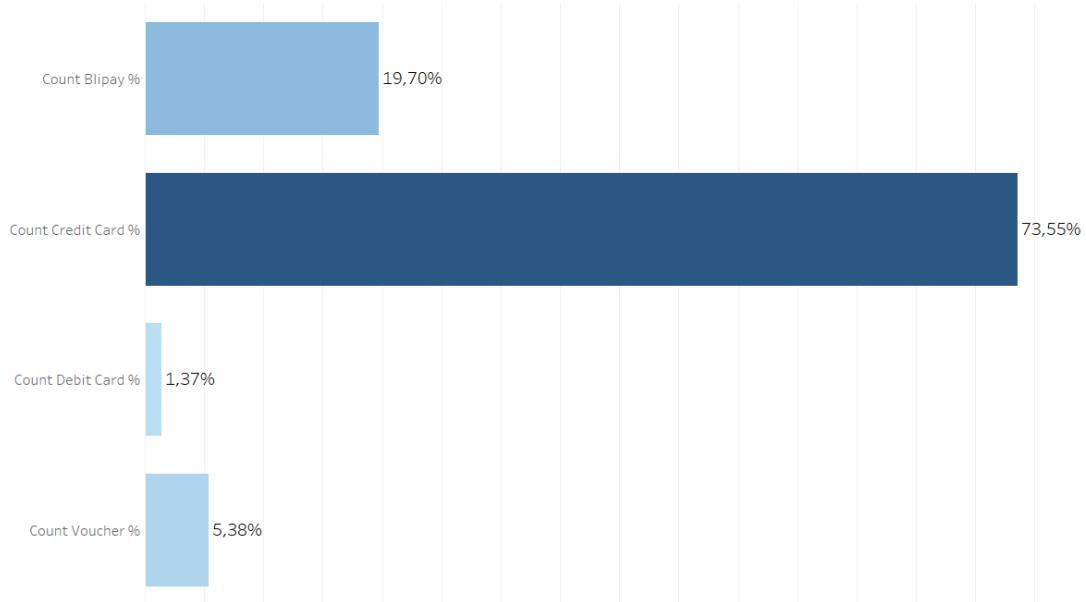


Figure 8: Payment Methods Used 29 of 34 Provinces in 2016-2018

Conclusion:

From **all provinces, 6 regions, and 29 of 34 provinces**, it was found that the most frequently used payment method was **credit cards**.

Next step:

It will be explored more deeply why this phenomenon can occur in **business questions no 2**.

Hypothesis 2: Consumption needs are the most selling product categories in every region

What is visualized is the overall data and to test the hypothesis, I took the data as a whole, 6 provinces from various islands (Banten, North Sumatra, East Kalimantan, South Sulawesi, West Nusa Tenggara, and Papua), and 29 of 34 provinces in Indonesia.

1. Product categories that are **frequently purchased** and have the **highest overall sales** include **bed bath tables**, **health beauty**, **computers accessories**, and **sports leisure**.
Excludes orders that have order status unavailable and canceled.

Product Sales by Location

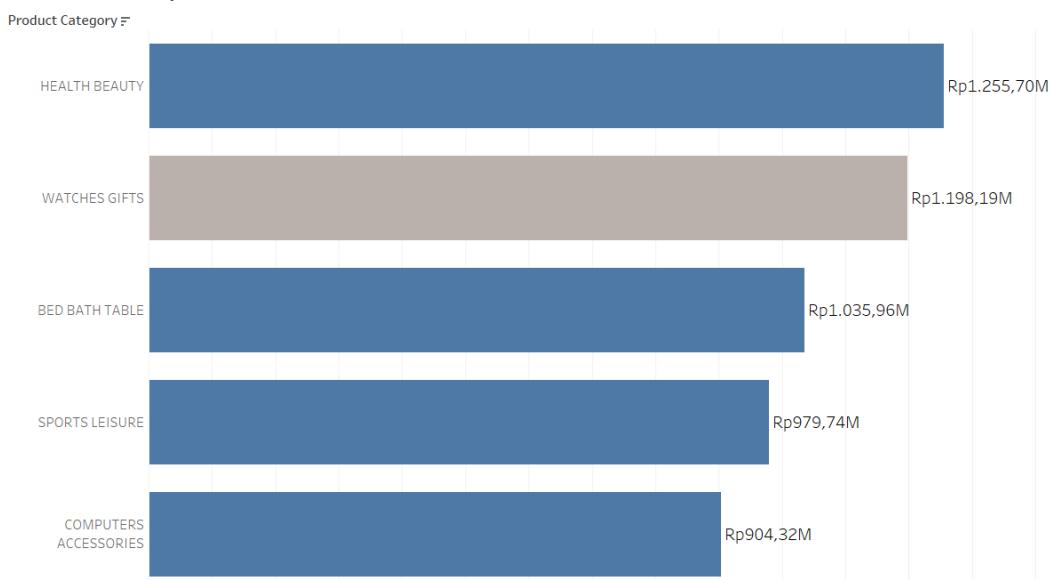


Figure 9: 5 Product Categories with the Highest Total Sales Overall

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Product Quantity by Location

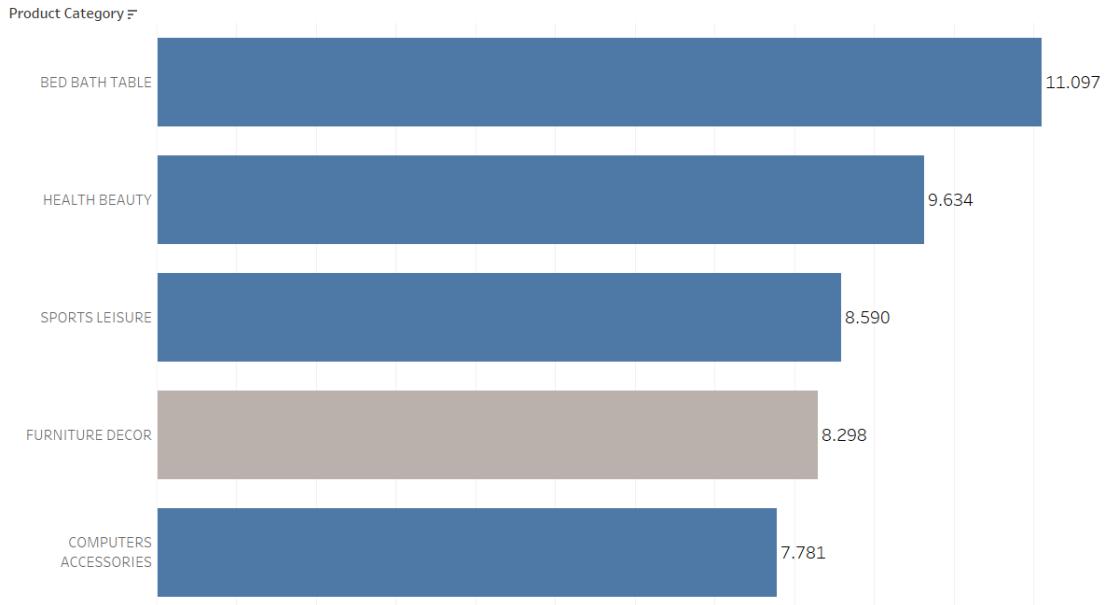


Figure 10: The 5 Most-Purchased Product Categories Overall

2. Product categories that are **frequently purchased** and have the **highest sales** in **Banten Province** include **bed bath tables**, **health beauty**, and **sports leisure**.

Excludes orders that have order status unavailable and canceled.

Product Sales by Location

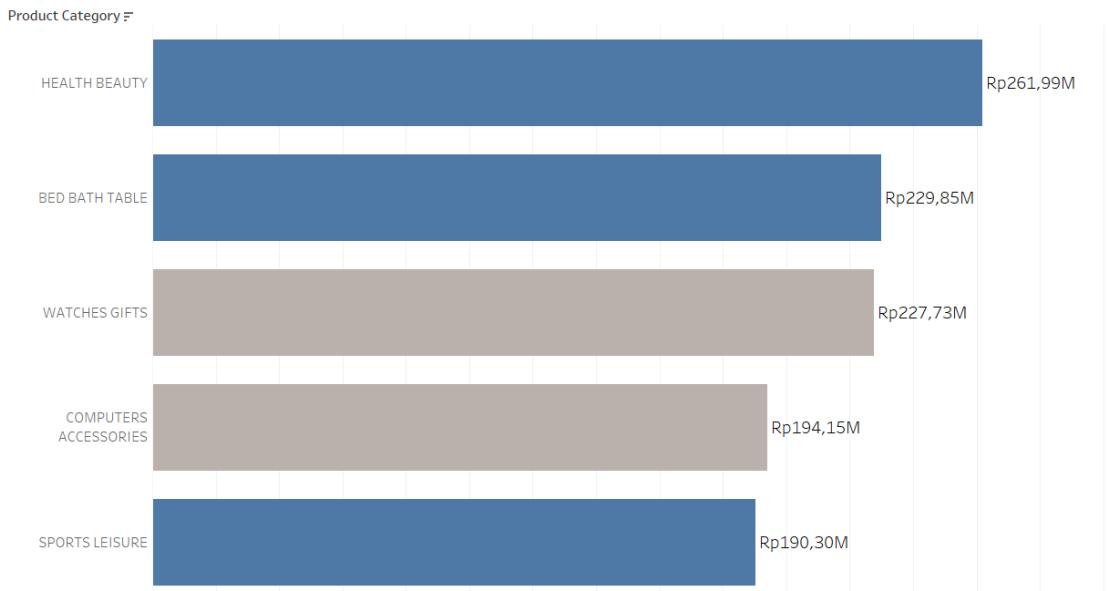


Figure 11: 5 Product Categories with the Highest Sales in Banten Province in 2016-2018

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Product Quantity by Location

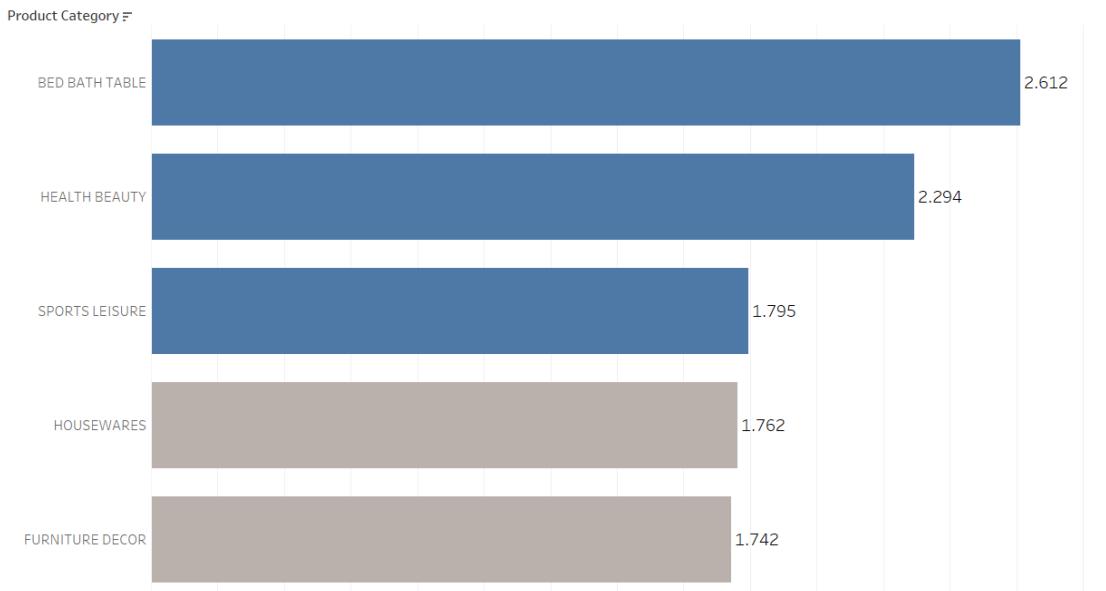


Figure 12: 5 Most Purchased Product Categories in Banten Province in 2016-2018

3. Product categories that are **frequently purchased** and have the **highest sales** in **North Sumatera Province** include **bed bath tables, health beauty, housewares, and sports leisure**.

Excludes orders that have order status unavailable and canceled.

Product Sales by Location

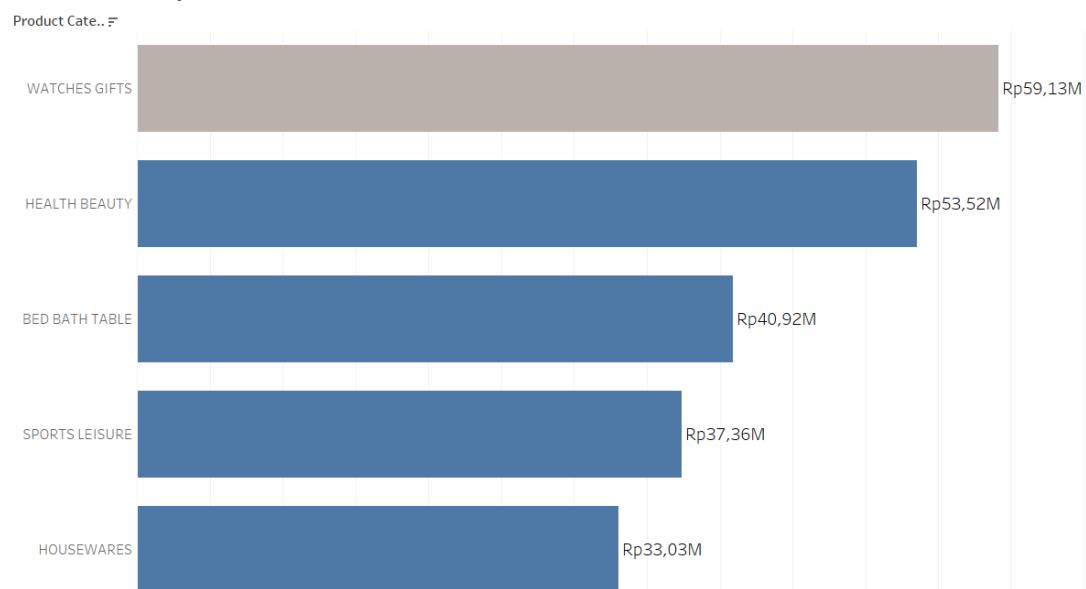


Figure 13: 5 Product Categories with the Highest Sales in North Sumatera Province in 2016-2018

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Product Quantity by Location

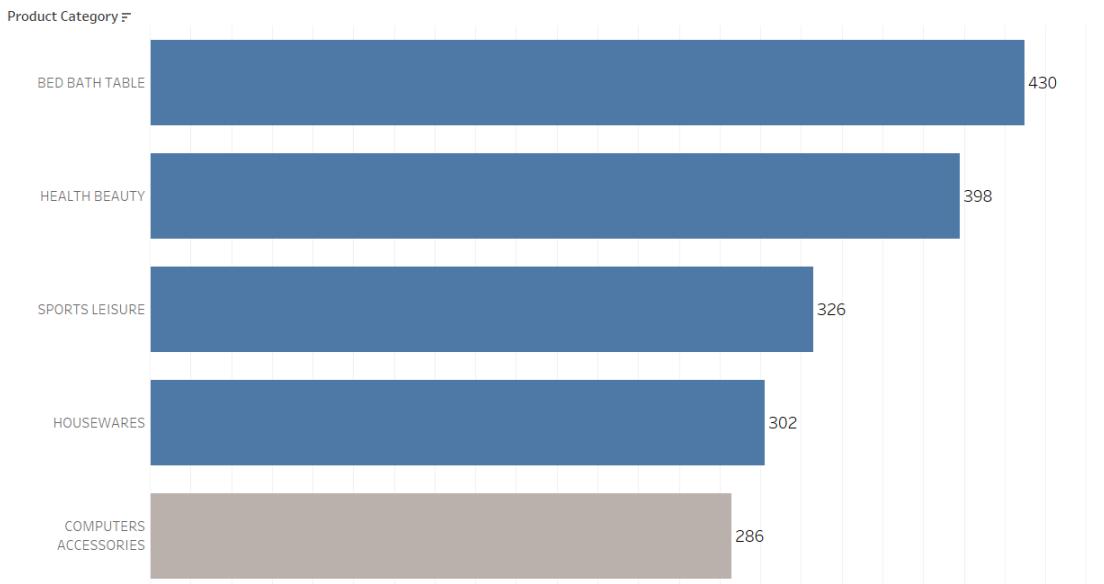


Figure 14: 5 Most Purchased Product Categories in North Sumatera Province in 2016-2018

4. Product categories that are **frequently purchased** and have the **highest sales** in **East Kalimantan Province** include **bed bath tables, health beauty, furniture decor, and sports leisure**.

Excludes orders that have order status unavailable and canceled.

Product Sales by Location

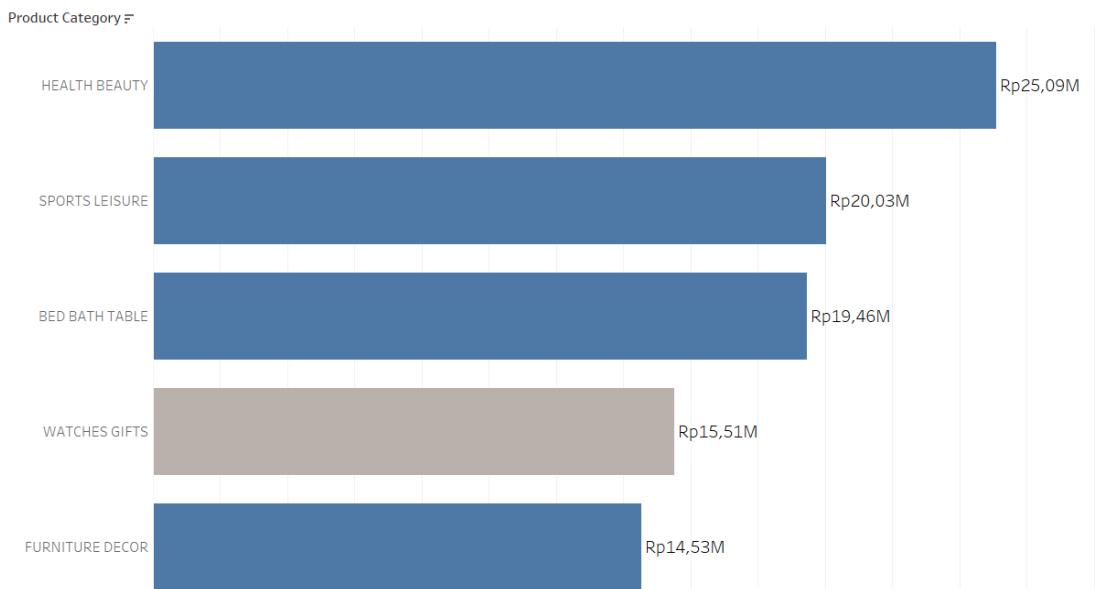


Figure 15: 5 Product Categories with the Highest Sales in East Kalimantan Province in 2016-2018

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Product Quantity by Location

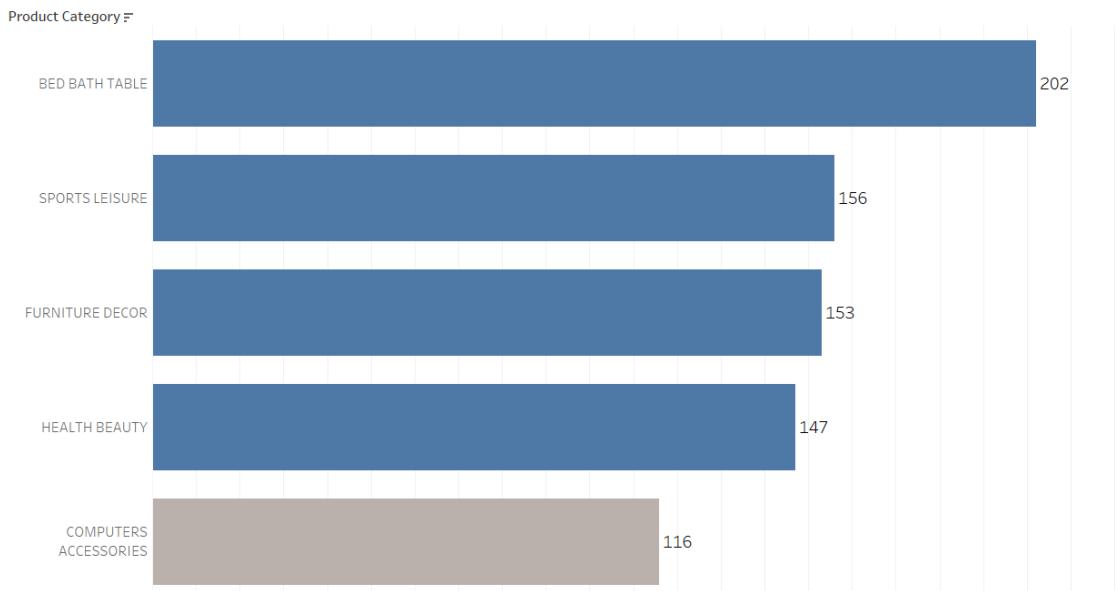


Figure 16: 5 Most Purchased Product Categories in East Kalimantan Province in 2016-2018

5. Product categories that are **frequently purchased** and have the **highest sales** in **South Sulawesi Province** include **bed bath tables, health beauty, computer accessories, and sports leisure**.

Excludes orders that have order status unavailable and canceled.

Product Sales by Location

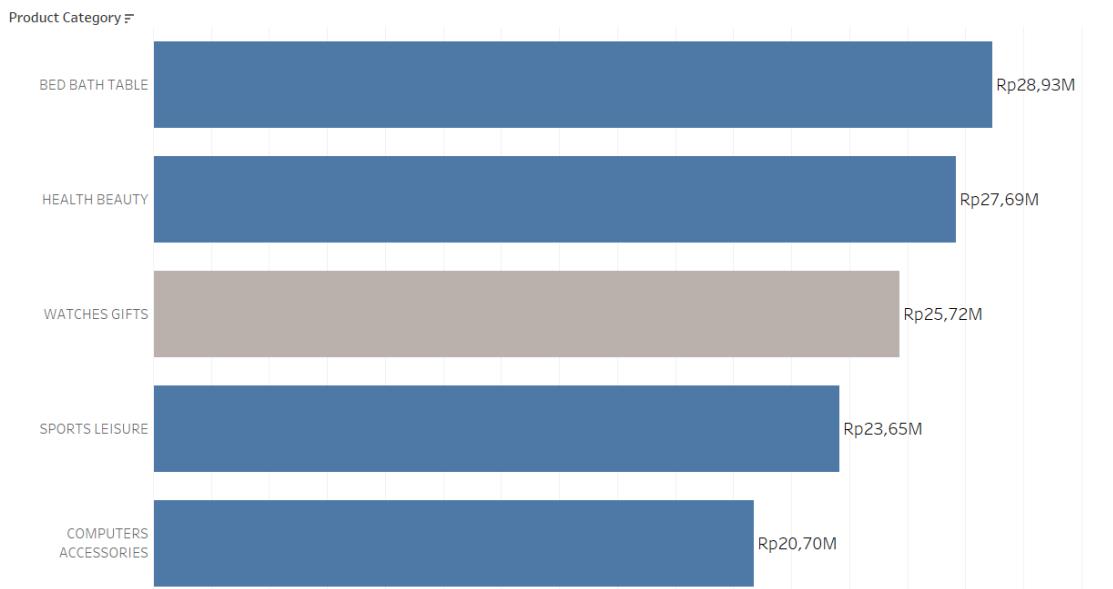


Figure 17: 5 Product Categories with the Highest Sales in South Sulawesi Province in 2016-2018

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Product Quantity by Location

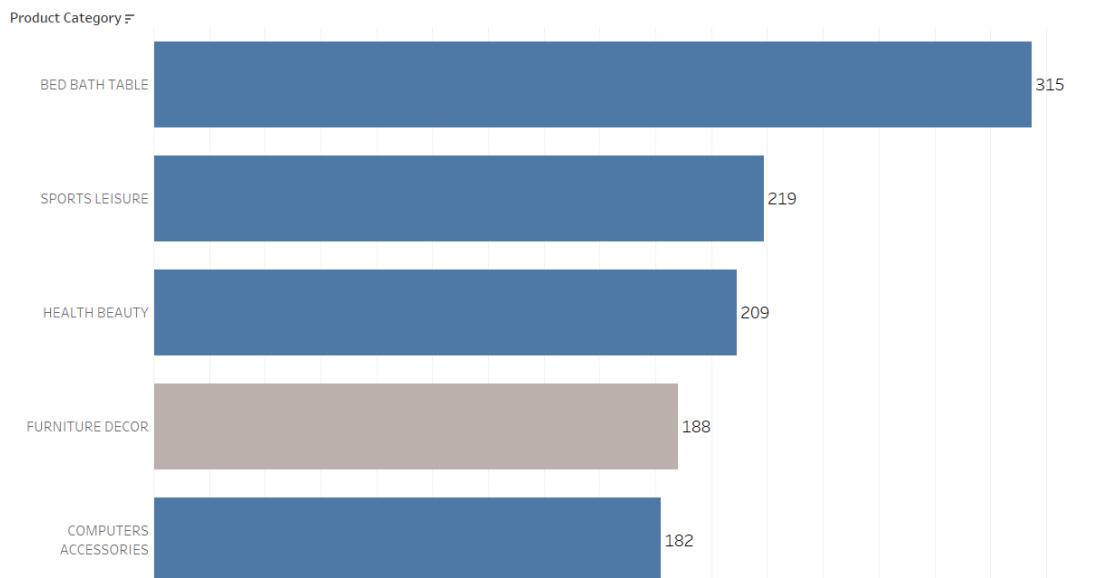


Figure 18: 5 Most Purchased Product Categories in South Sulawesi Province in 2016-2018

6. Product categories that are **frequently purchased** and have the **highest sales** in **West Nusa Tenggara Province** include **bed bath tables** and **health beauty**.

Excludes orders that have order status unavailable and canceled.

Product Sales by Location

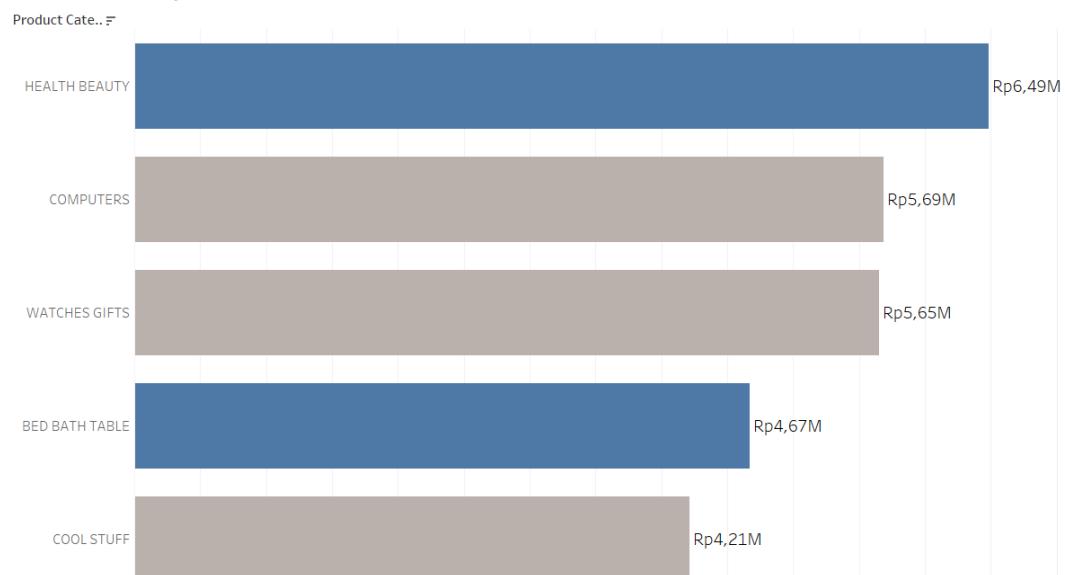


Figure 19: 5 Product Categories with the Highest Sales in West Nusa Tenggara Province in 2016-2018

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Product Quantity by Location

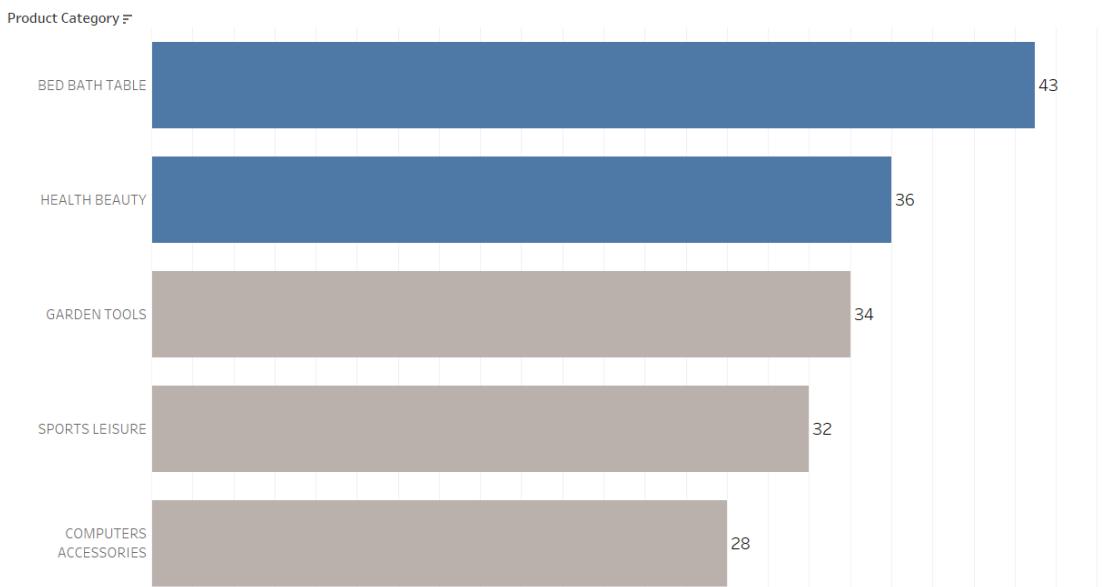


Figure 20: 5 Most Purchased Product Categories in West Nusa Tenggara Province in 2016-2018

7. Product categories that are **frequently purchased** and have the **highest sales** in **Papua Province** include **bed bath tables, health beauty, computer accessories, and sports leisure**.

Excludes orders that have order status unavailable and canceled.

Product Sales by Location

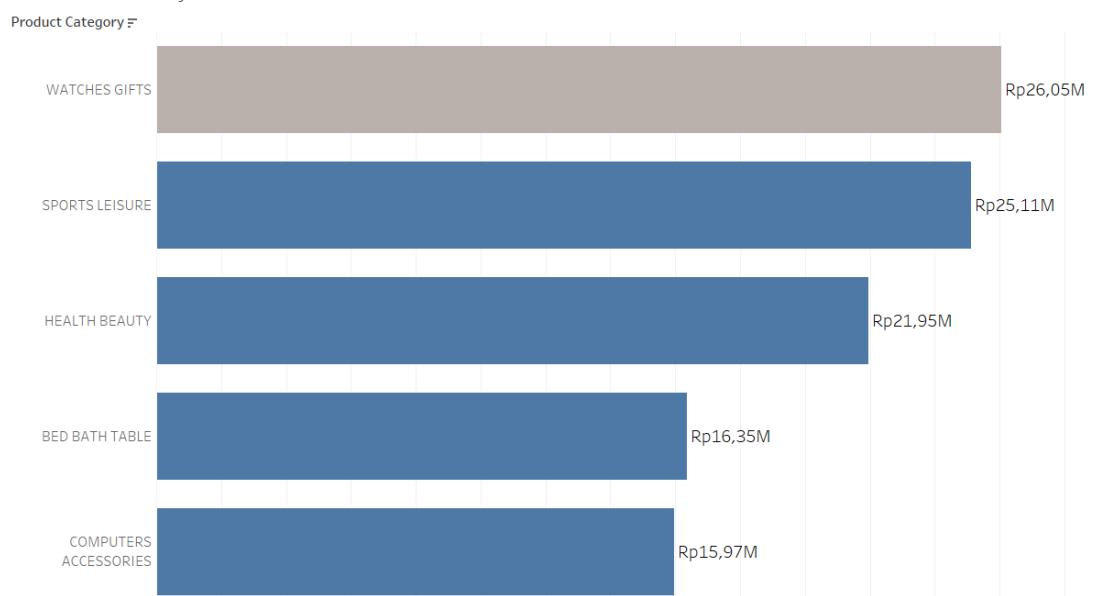


Figure 21: 5 Product Categories with the Highest Sales in Papua Province in 2016-2018

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Product Quantity by Location

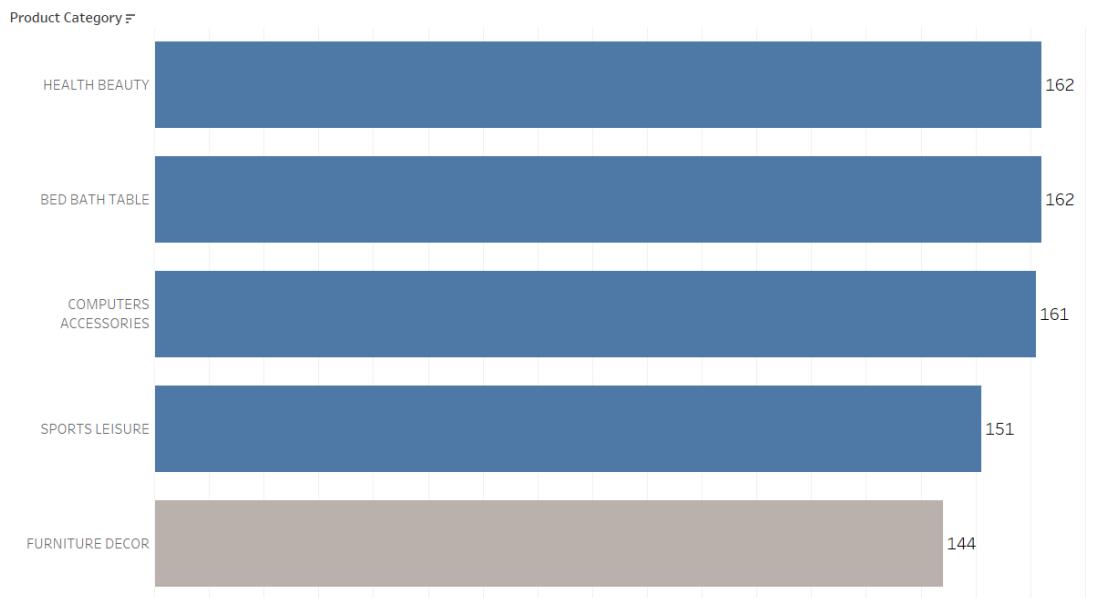


Figure 22: 5 Most Purchased Product Categories in Papua Province in 2016-2018

8. In **29 out of 34 provinces**, it was found that the product categories that were **frequently purchased** and have the **highest sales** were **bed bath tables, health beauty, sports leisure, and computers accessories**.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

29 out of 34 Province Product Category

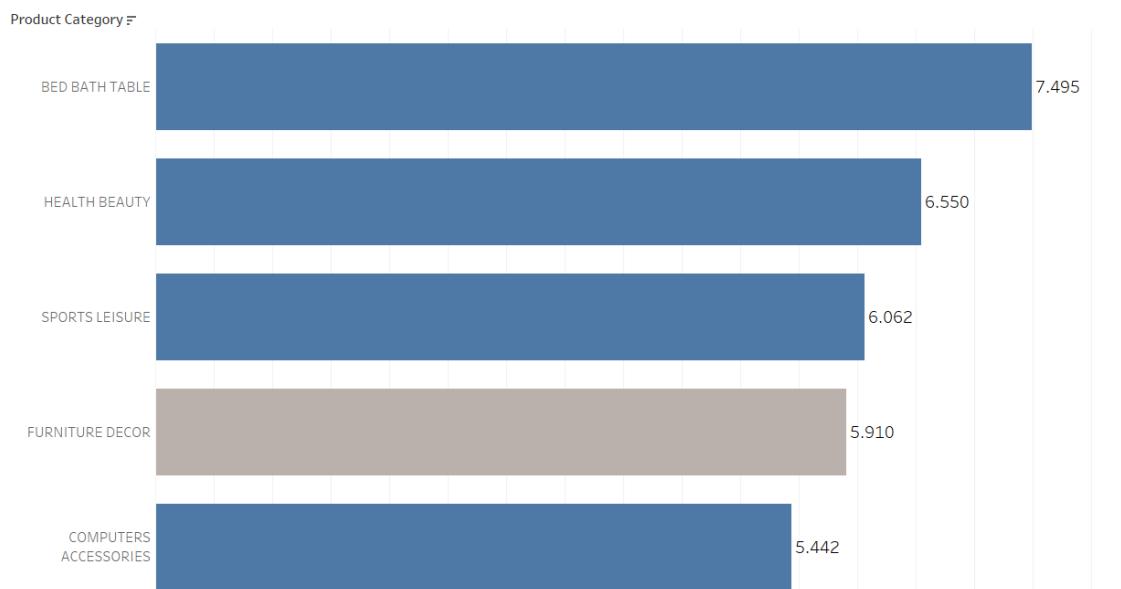


Figure 23: 5 Most Purchased Product Categories in 29 of 34 Provinces in 2016-2018

Excludes orders that have order status unavailable and canceled.

29 out of 34 Province Sales Product Category

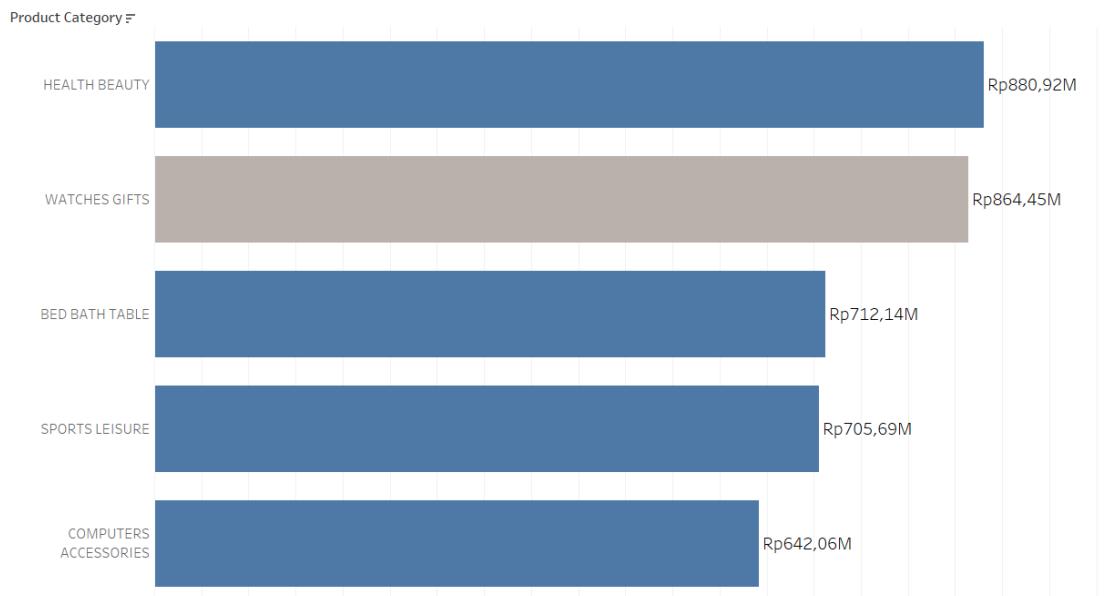


Figure 24: 5 Product Categories with the Highest Sales in 29 of 34 Provinces in 2016-2018

Conclusion:

The product categories with the **highest sales** and **most purchased** are **bed bath tables** and **health beauty**. So there are categories of goods that are often purchased apart from consumables such as **sports leisure** and **computer accessories**.

Next step:

It will be explored more deeply why this phenomenon can occur in **business question no 3**.

Hypothesis 3: Java Island is the region with the most buying of goods online

Overall, almost all provinces on the island of Java have a fairly **high tendency to purchase goods** and have **high sales** compared to other islands in Indonesia (the darker the color of the province, the higher the sales/purchase of goods in that province).

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Order by Location

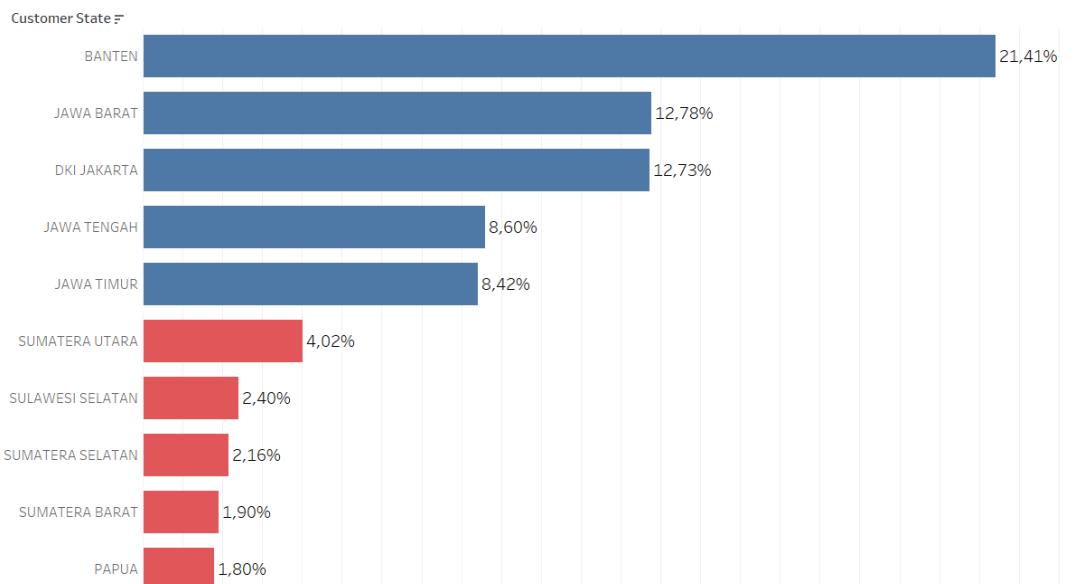


Figure 25: Province Ranking with the Most Purchased Percentage of Goods

Excludes orders that have seller state unknown, order status unavailable, and canceled.



Figure 26: Percentage of Total Product Categories Purchased in Each Province in 2016-2018

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Sales by Location

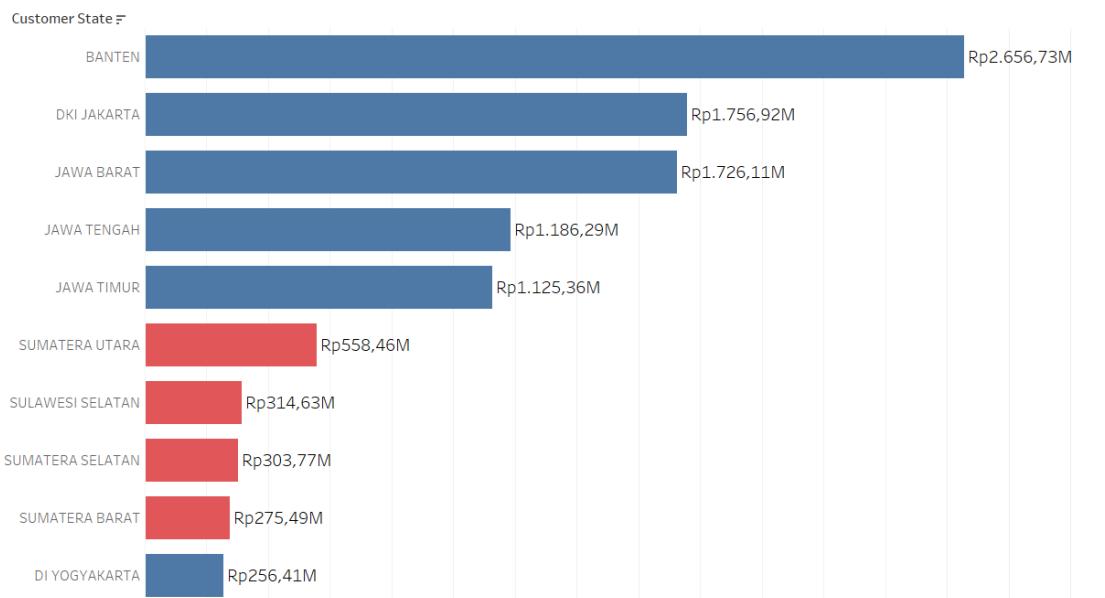


Figure 27: Ranking of Provinces with the Most Sales

Excludes orders that have order status unavailable and canceled.



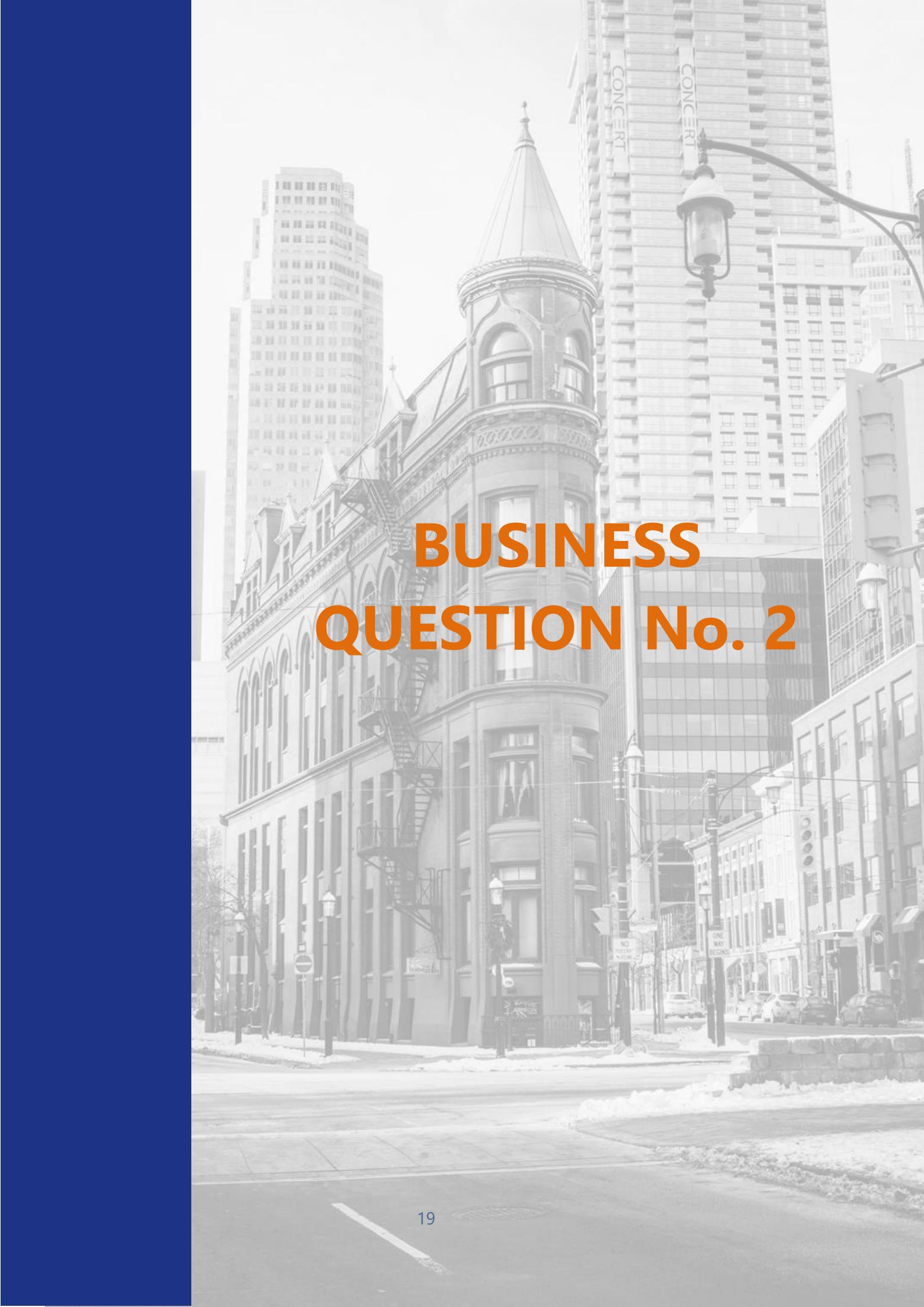
Figure 28: Sales in Indonesia in 2016-2018

Conclusion:

5 of the 6 provinces on the **Java Island** are included in the top 10 provinces that **have lot of total purchases of goods** and all provinces on the Java Island are included in the top 10 provinces with the **highest sales** in Indonesia.

Next step:

I will find out more about why this phenomenon can occur in **business question 2**.



BUSINESS QUESTION No. 2

Background

In the first business questions, it was found that the most **common payment method** was using a **credit card**.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

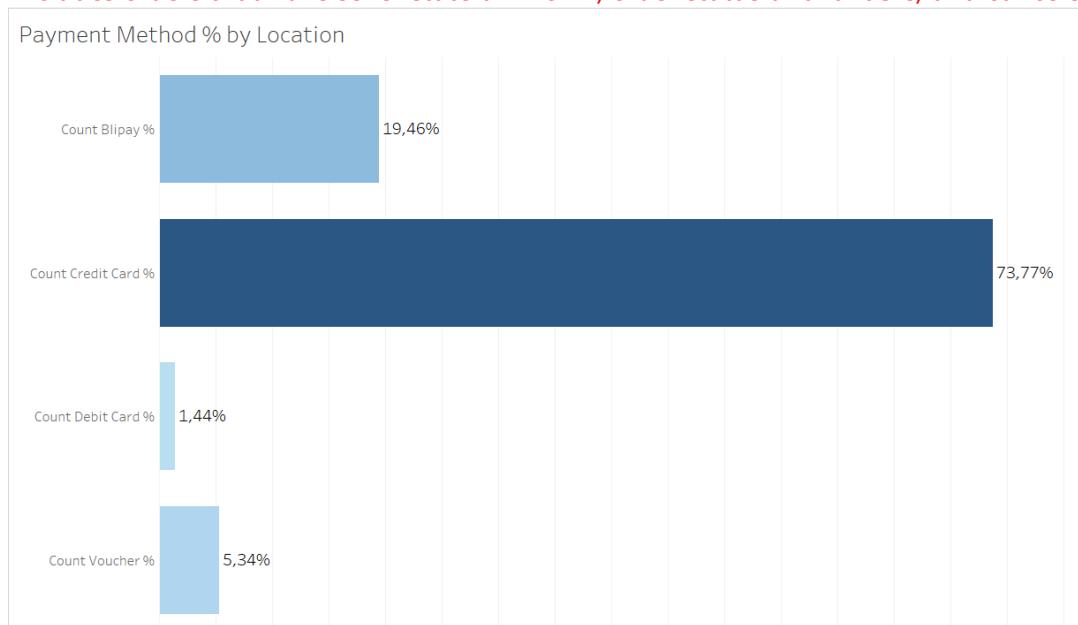


Figure 29: The Most Used Payment Method Overall

In addition, the first business question shows that the **Java Island** dominates online shopping transactions compared to other islands.

Excludes orders that have seller state unknown, order status unavailable, and canceled.



Figure 30: Percentage of Total Product Categories Purchased in Each Province in 2016-2018

Excludes orders that have order status unavailable and canceled.



Figure 31: Sales in Indonesia in 2016-2018

I want to explore the phenomena that occur in business question 1 (**Most sales** are only on **Java Island** and the use of **credit cards** is **very high** compared to the other payment methods).

Purpose

Knowing the distribution of payment methods in each region whether it is evenly distributed or not.

Hypothesis

Payment methods are very different in every region

Is the distribution of payment methods evenly distributed between Java and other islands?

In the previous visualization, it was found that Java dominates in purchasing goods. Here I want to see how the payment methods are quite diverse in trend in each region.

Excludes orders that have seller state unknown, order status unavailable, and canceled.



Figure 32: Total Orders in Each Region in 2016-2018

From the visualization obtained, the facts obtained include:

1. The area with the most transactions using **Blipay** is the **Banten Province** with a total of **19.07%** of the total Blipay transactions in Indonesia. The area with the blue graph is Java Island and the red graph is outside Java Island. Here it can be seen that the **Java Island dominates** in terms of transactions using Blipay.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

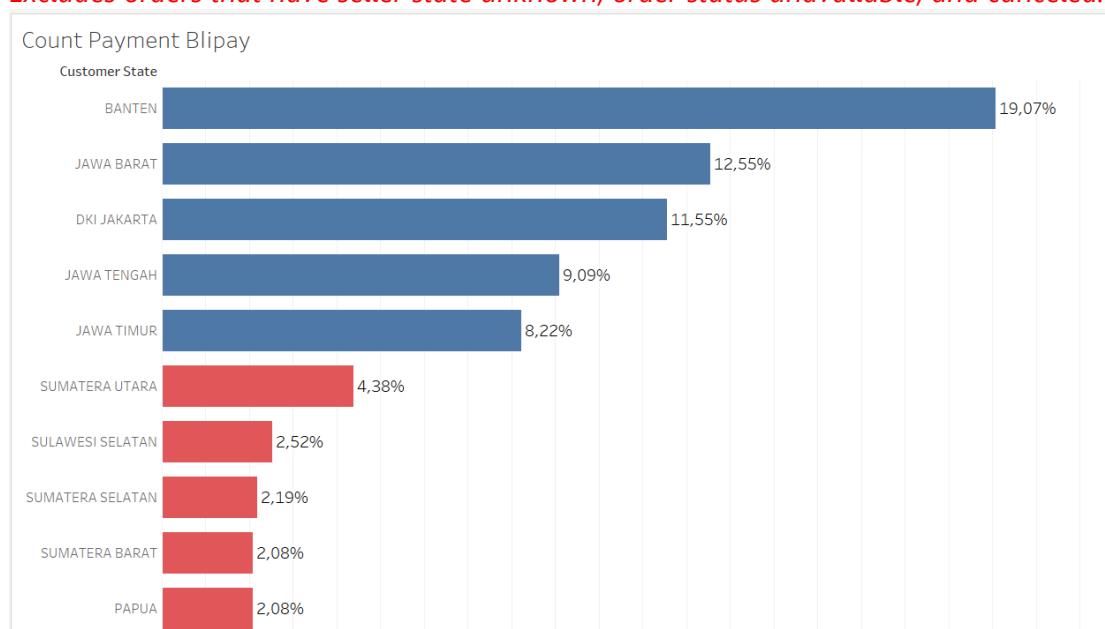


Figure 33: 10 Provinces with the Most Transactions Using Blipay

2. The area with the most transactions using **credit cards** is the **Banten Province** with a total of **21.67%** of the total credit card transactions in Indonesia. The area with the blue graph is Java Island and the red graph is outside Java Island. Here it can be seen that **Java** is quite dominating (in fact **all provinces in Java** are in the **top 10**) in terms of transactions using credit cards.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

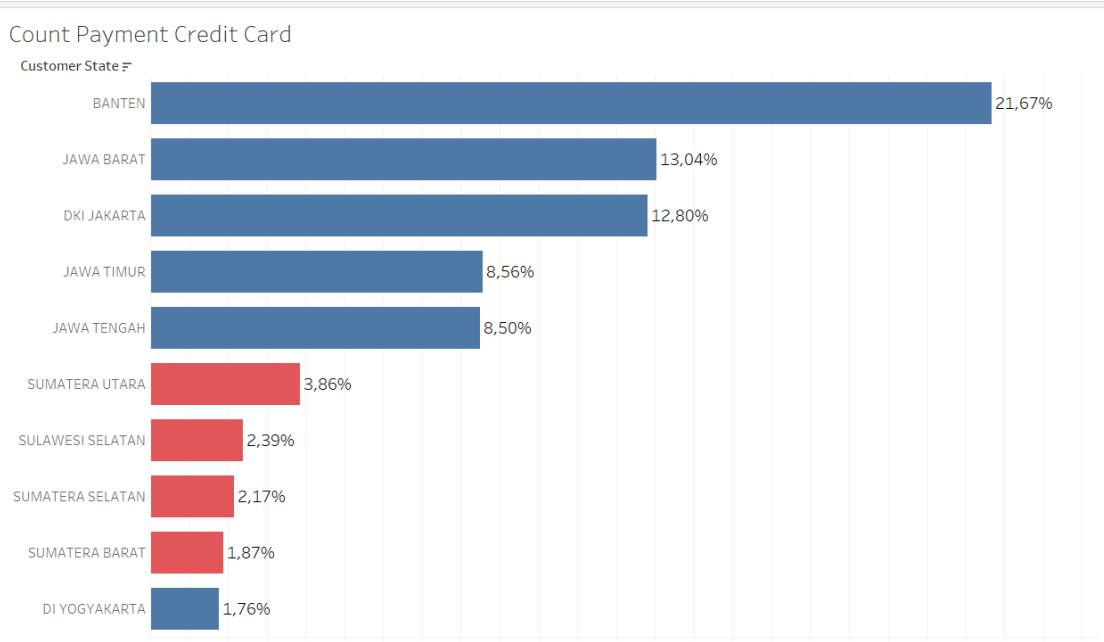


Figure 34: 10 Provinces with the Most Transactions Using Credit Card

- The area with the most transactions using **debit cards** is the **Banten Province** with a total of **25.40%** of the total debit card transactions in Indonesia. The area with the blue graph is Java Island and the red graph is outside Java Island. Here it can be seen that **Java Island dominates** in terms of transactions using debit cards.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

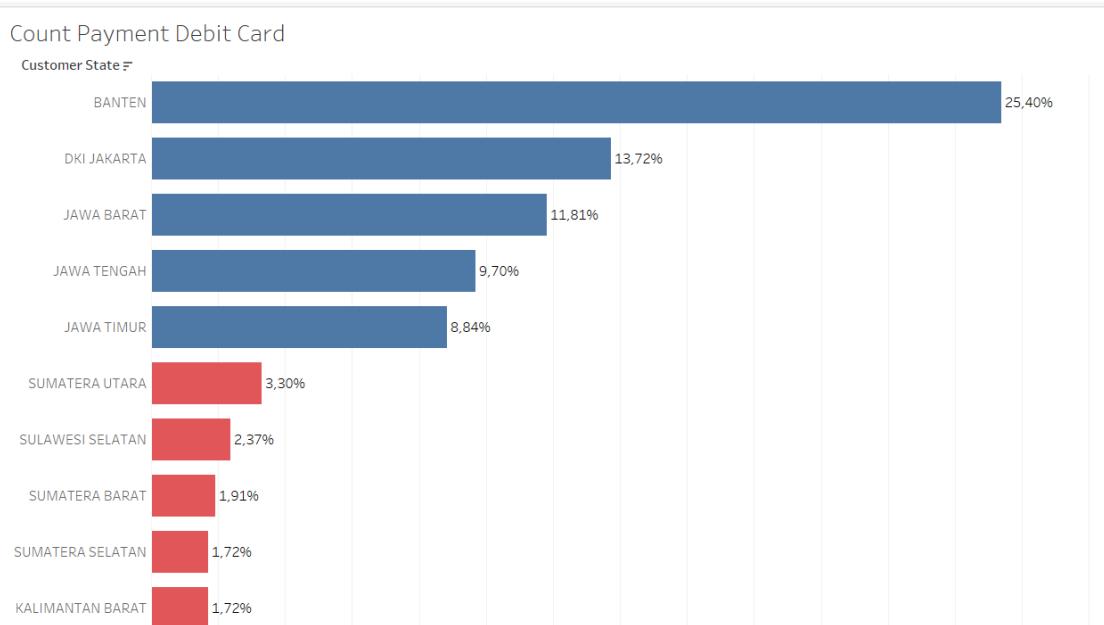


Figure 35: 10 Provinces with the Most Transactions Using Debit Card

- The area with the most transactions using **vouchers** is the **Banten Province** with a total of **20.72%** of the total voucher transactions in Indonesia. The area with the blue graph is Java Island and the red graph is outside Java Island. Here it can be seen that **Java** is quite dominating (in fact **all provinces in Java** are in the **top 10**) in terms of transactions using vouchers.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

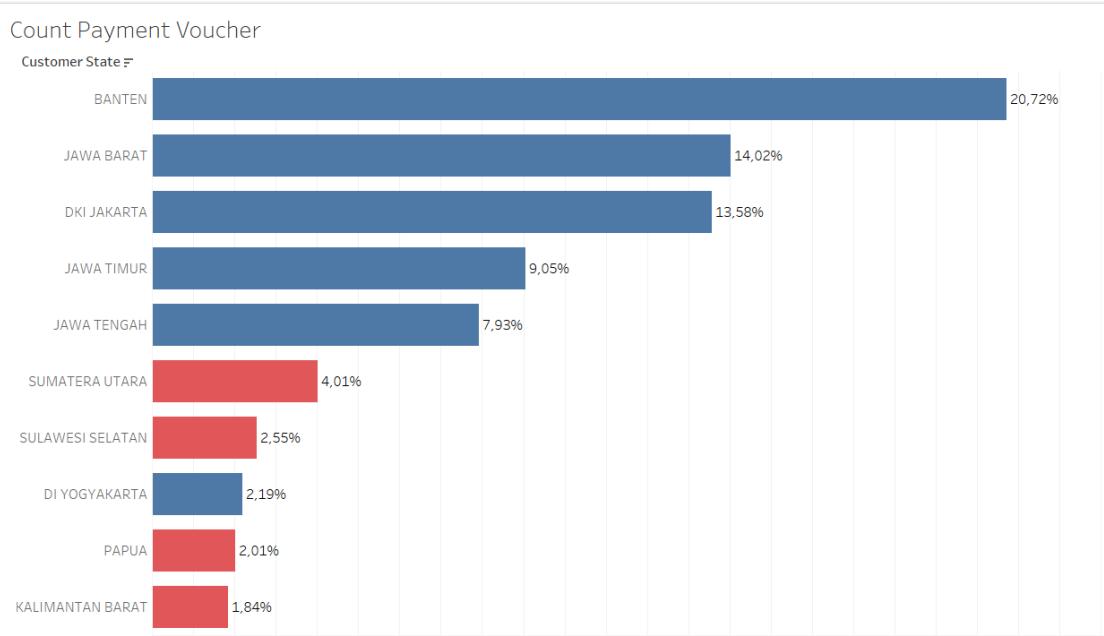


Figure 36: 10 Provinces with the Most Transactions Using Voucher

In the visualization in business question 1, it is known that the island of Java dominates in terms of total sales. From here I want to see how the transactions in each region. Do areas that frequently make transactions also have high total transactions?

Excludes orders that have seller state unknown, order status unavailable, and canceled.



Figure 37: Total Sales in Each Region in 2016-2018

In the visualization of transactions for each payment method, several things are obtained, such as the following:

1. The area with the largest total nominal transaction using **Blipay** is **Banten province** with a total of **Rp 507,09M** transactions, the area with the blue graph is Java Island and the red graph is outside Java. Here it can be seen that **Java Island dominates** in terms of total transactions using Blipay.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Total Payment Value Blipay

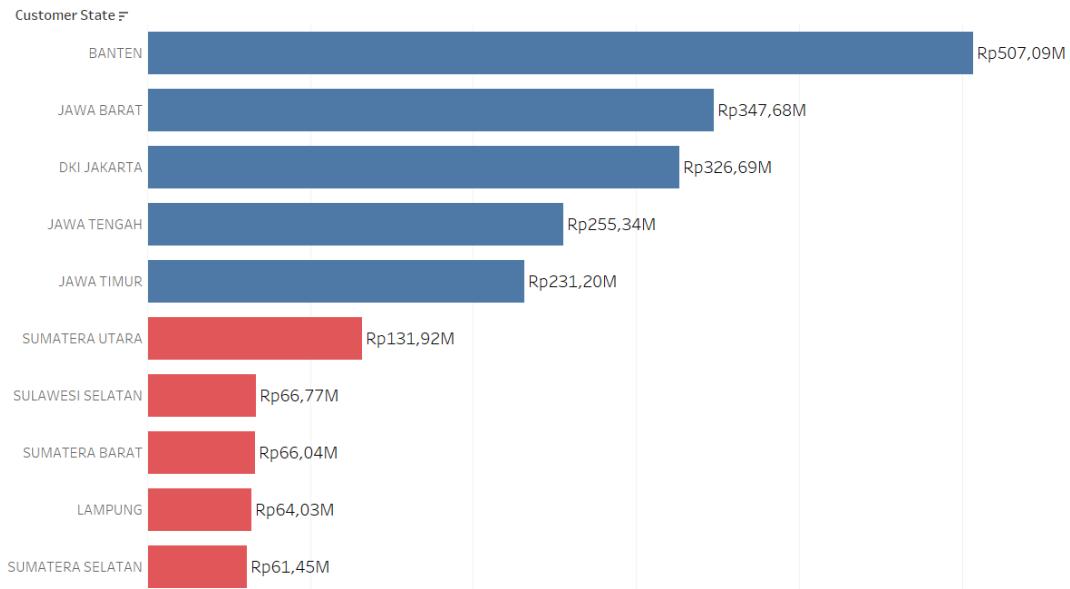


Figure 38: 10 Provinces with the Most Total Transactions Using Blipay

- The area with the largest total nominal transaction using a **credit card** is the **Banten Province** with a total of **Rp 2.419,46M** transactions, the area with the blue graph is Java Island and the red graph is outside Java. Here it can be seen that **Java** is quite dominating (in fact **all provinces in Java** are in the **top 10**) in terms of total transactions using credit cards.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Total Payment Value Credit Card

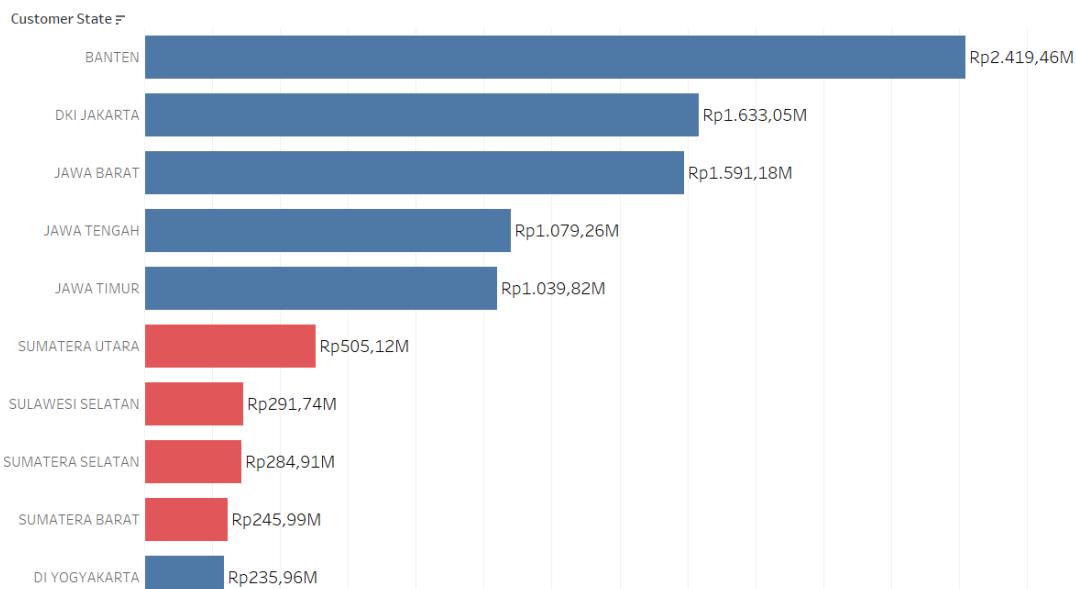


Figure 39: 10 Provinces with the Most Total Transactions Using Credit Card

- The area that has the largest total nominal transaction using a **debit card** is the **Banten Province** with a total of **Rp 41,56M** transactions. The area with the blue graph is Java Island and the red graph is outside Java Island. Here it can be seen that **Java Island dominates** in terms of total transactions using debit cards.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Total Payment Value Debit Card

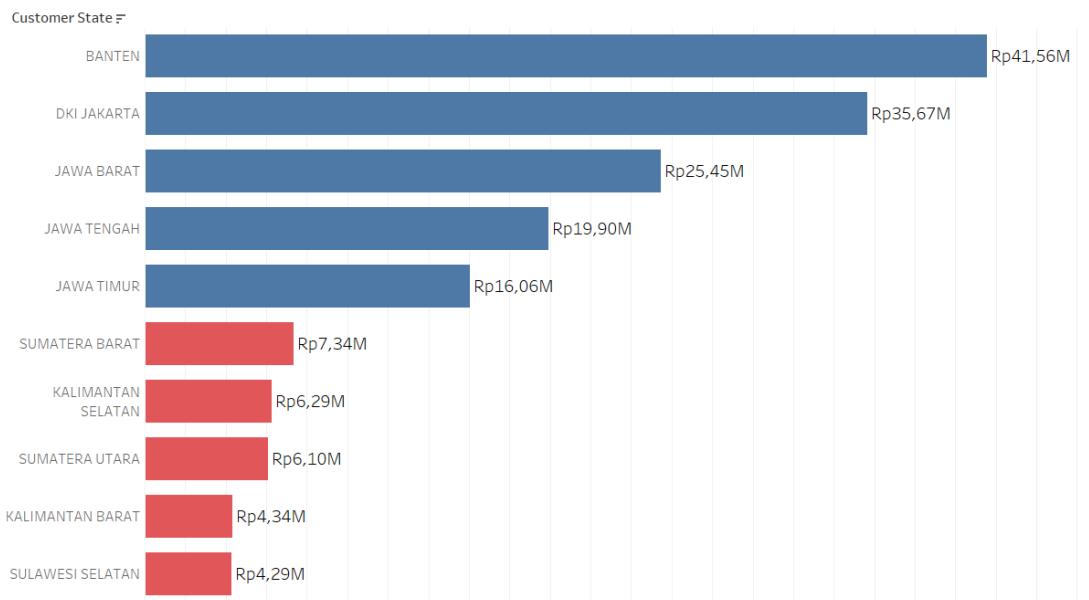


Figure 40: 10 Provinces with the Most Total Transactions Using Debit Card

- The region that has the largest total nominal transaction using **vouchers** is **Banten Province** with a total of **Rp 69,67M** transactions. The area with the blue graph is Java Island and the red graph is outside Java Island. Here it can be seen that **Java** is quite dominating (in fact **all provinces in Java** are in the **top 10**) in terms of total transactions using vouchers.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Total Payment Value Voucher

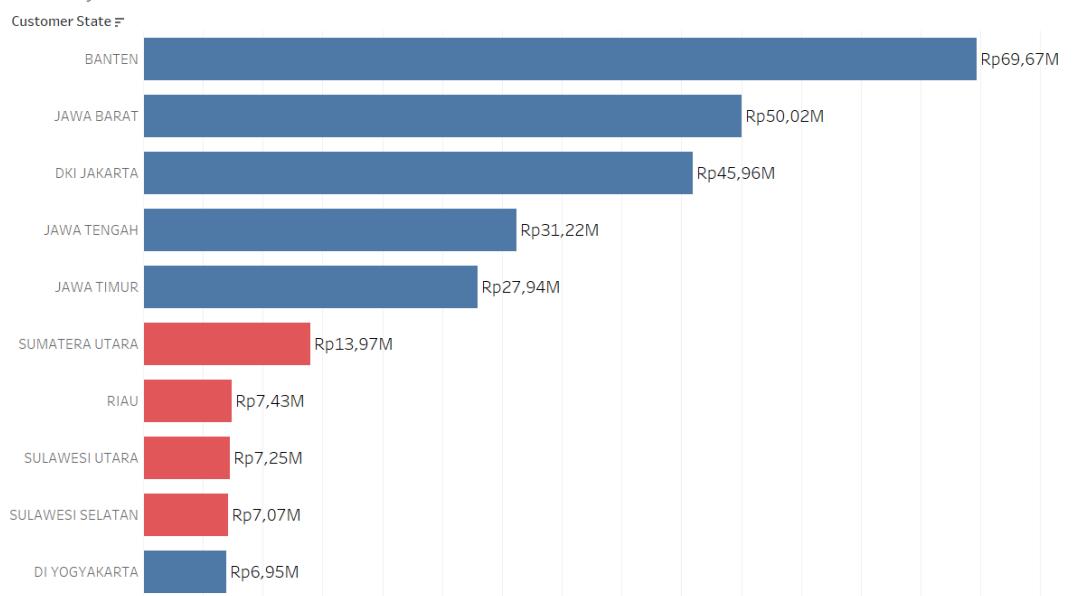


Figure 41: 10 Provinces with the Most Total Transactions Using Voucher

Here we will find out what payment methods are often used in addition to the payment methods already provided.

What are the most used payment method to buy online?

In a survey conducted by APJII, the top 6 **most frequently used** online payment methods to purchase online was **COD** as much as **27.5%**.

(Asosiasi Penyelenggara Jasa Internet Indonesia, 2019-2020).

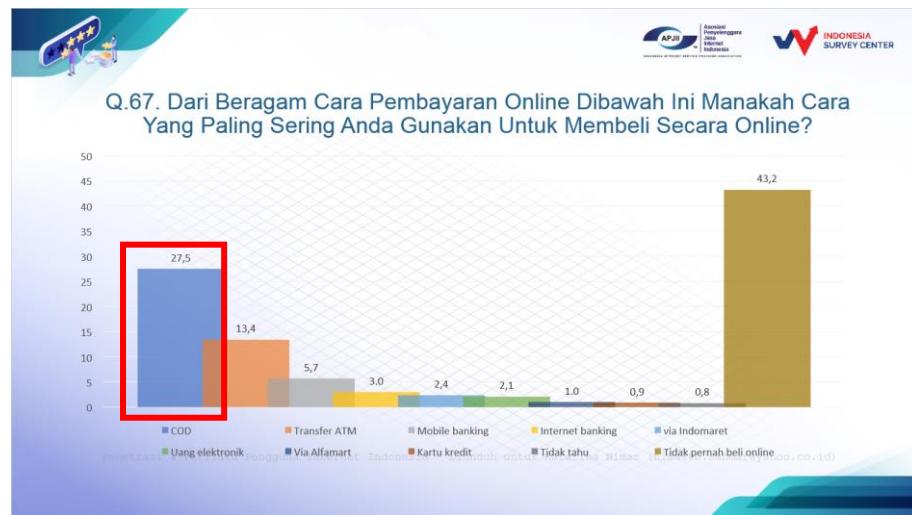


Figure 42: The Most Frequently Used Online Payment Methods for Buying Online (Asosiasi Penyelenggara Jasa Internet Indonesia, 2019-2020)

What are the most frequently used payment methods in each region in Indonesia?

In a survey from **lokadata**, **73.04%** of e-commerce payments were made by buyers via **COD**. The area that did the most COD are from **outside of Java Island**, one of them was Gorontalo at 93.48% (Lita, 2020).



Figure 43: Lokadata Survey Regarding the Most Interested Payment Method (Lita, 2020)

Based on the 2 surveys, most people use payment methods such as COD. Also, the use of COD is concentrated in areas outside Java, even most of the people of Gorontalo prefer the COD system in making payments (Lita, 2020).

While in the data, there are only 4 payment methods, namely blipay, credit card, debit card, and voucher.

Average Order Value

Here are some interesting things that I found. One of them is the payment method using a credit card. Here I see that there are more transactions between West Java and DKI Jakarta in West Java. However, for total transactions, it turns out that DKI Jakarta is superior to West Java in the payment method using a credit card. Here I want to explore more about the average order value where the purpose of the Average Order Value method is to see the average number of rupiah spent every time a customer places an order in each area.

In the following visualization, it turns out that there are quite surprising facts where the regions that tend to have the most Average Order Value are areas outside Java where West Nusa Tenggara ranks first wherein one order they spend a budget of around Rp. 172,11K.

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Average Order Value

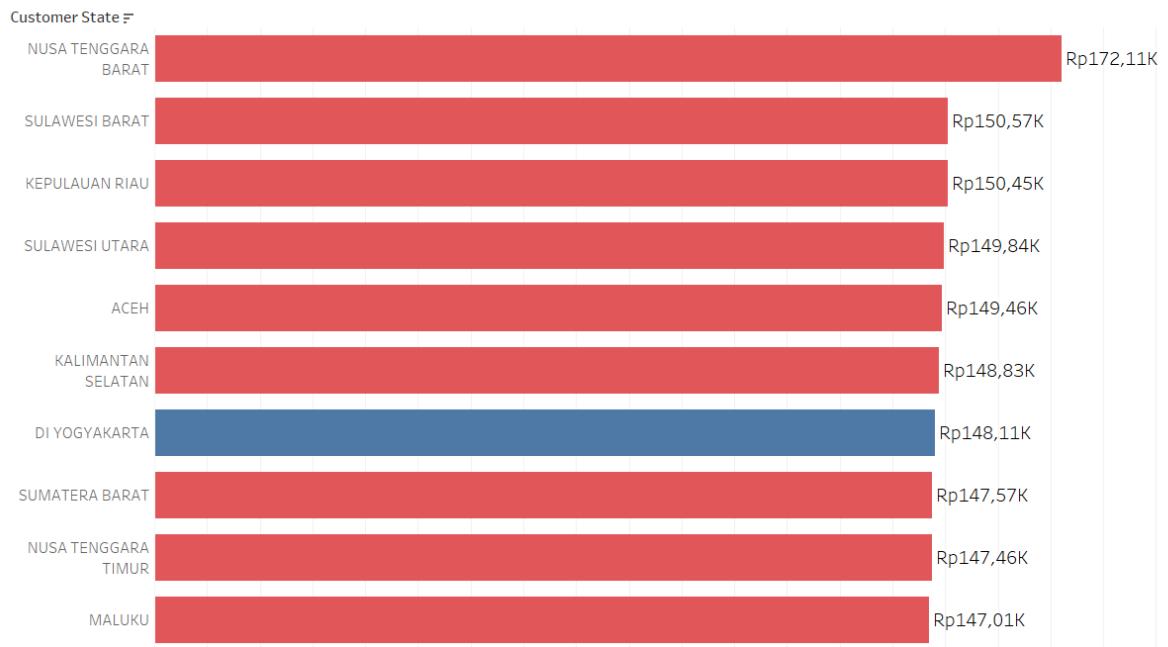


Figure 44: Average Order Value

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Count of Order

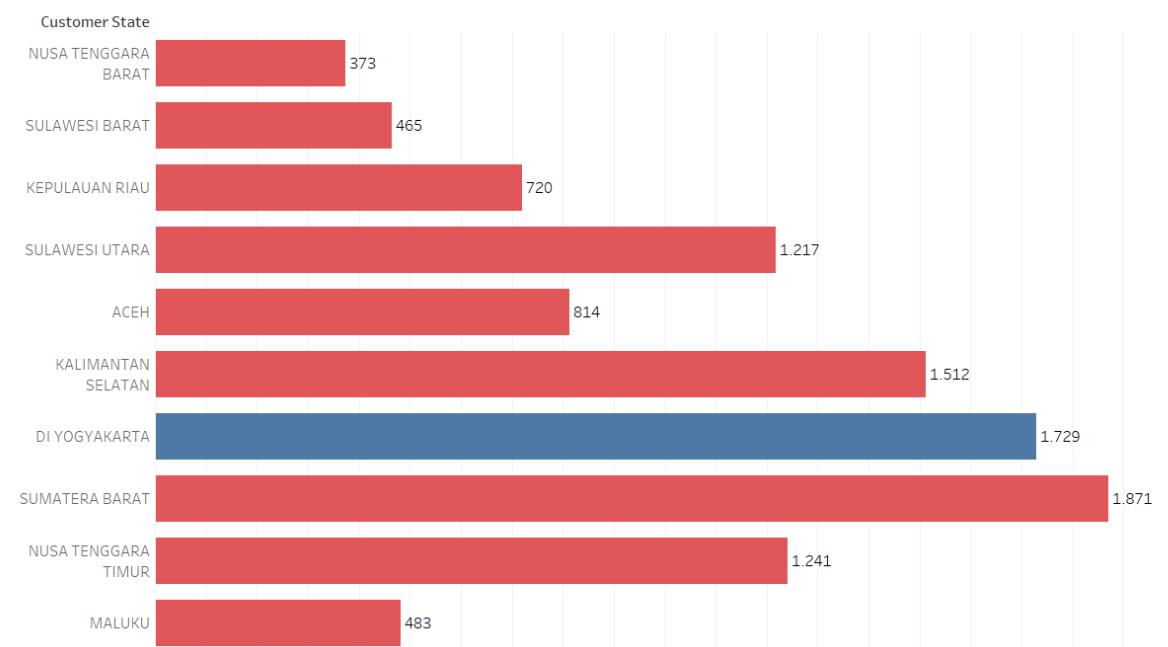


Figure 45: Count of Order

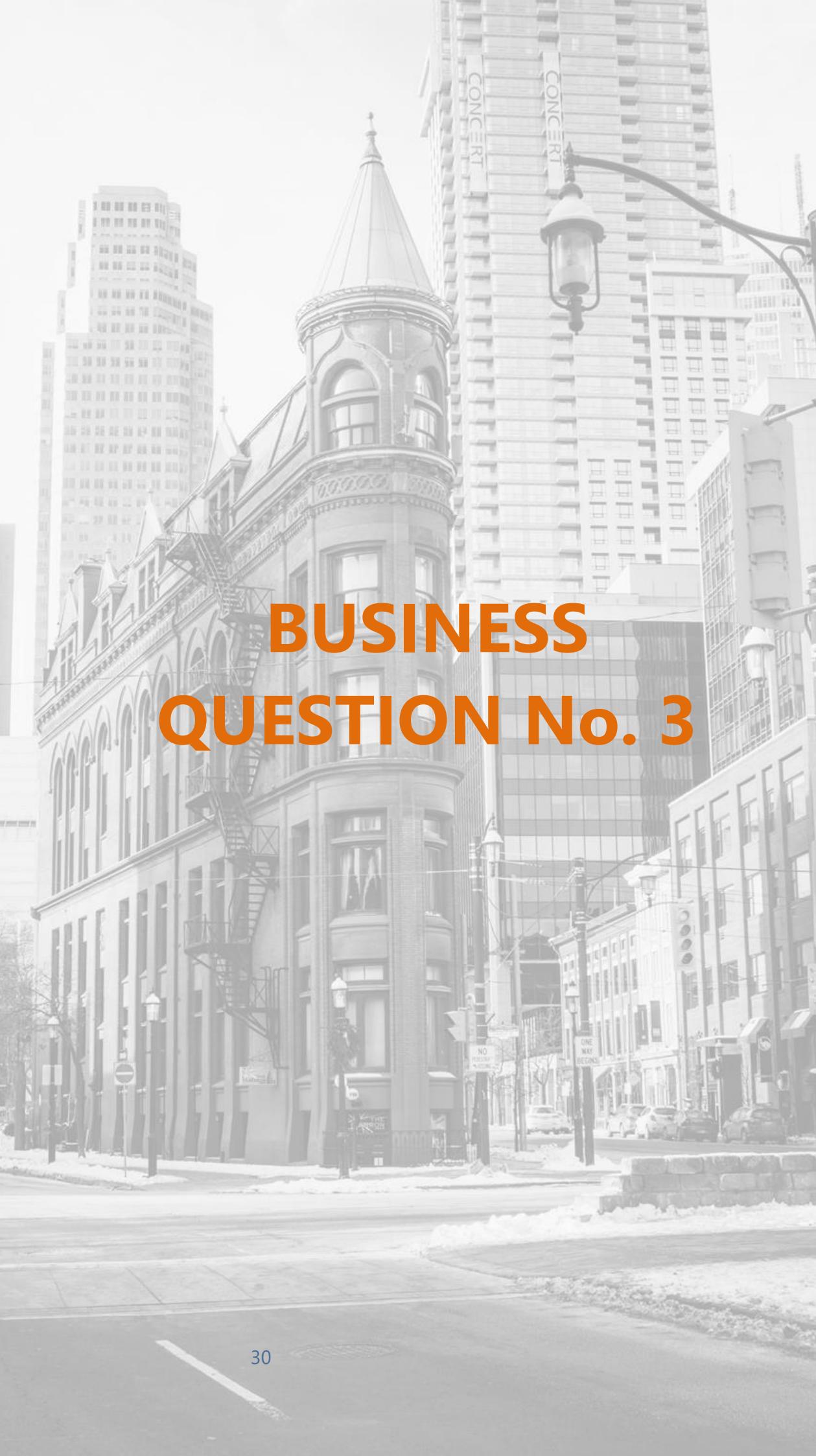
This means that even outside of Java, they spend quite a lot of money shopping online even though there are not many items ordered. The addition of payment methods is expected to reach markets outside Java to increase sales.

Conclusion:

1. Customers on the **Java Island dominate transactions** on each payment method provided.
2. **Banten Province always ranks first** in the most total transactions.
3. The most frequently used payment methods **outside Java** are **COD**.
4. Although areas outside Java tend to have fewer orders, in one order **they spend quite a lot of money**.

Suggestion:

1. Based on surveys from external sources, I recommend adding a payment method in the form of **COD**. Users are expected to have many choices of payment methods to increase user flexibility in making payments.
2. By implementing payment methods that are widely used outside Java, it is expected to be able to **embrace markets outside Java**.



BUSINESS QUESTION No. 3

Background

In business question 1, it is known that the product categories that are most frequently purchased and have the highest sales are bed bath tables, health beauty, sports leisure, and computers accessories. Here I want to find out how the trend of the existing product categories? Is the trend up or down?

Excludes orders that have seller state unknown, order status unavailable, and canceled.

Product Quantity by Location

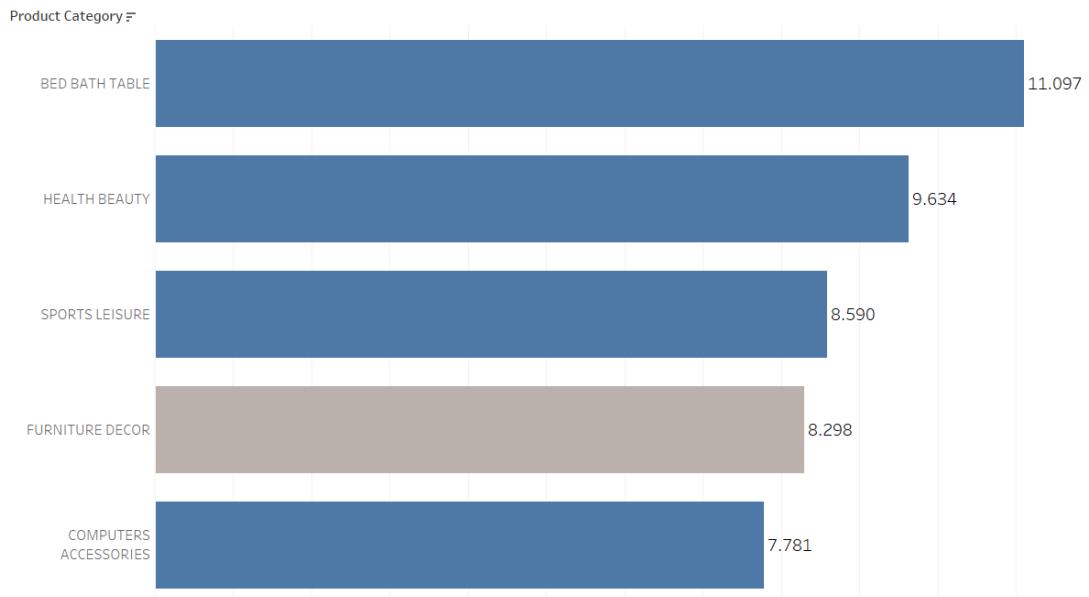


Figure 46: 5 Most Purchased Product Categories in 2016-2018

Excludes orders that have order status unavailable and canceled.

Product Sales by Location

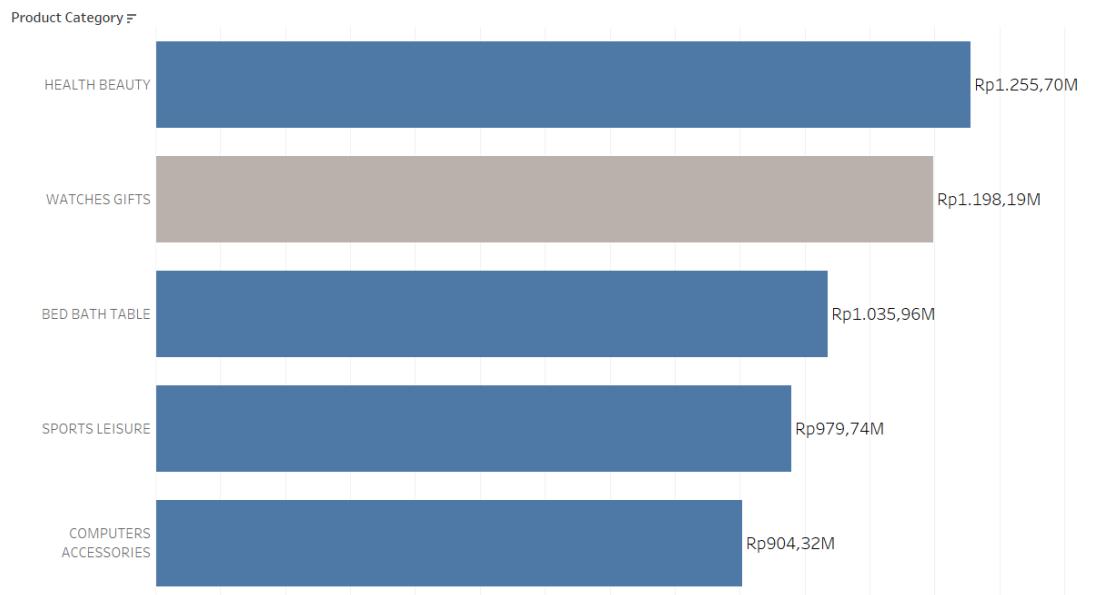


Figure 47: 5 Product Categories with the Highest Sales in 2016-2018

Purpose

Knowing what the trend of product categories in Blibli data is so that product categories that have an increasing trend can keep in stock.

What is the trend of the 5 best-

selling product categories in each year and how are the sales of these product categories?

Note: the data displayed is data from 2017 to 2018 in the second quarter because the assumption is that the data in 2016 and 2018 in the third quarter have not yet been entered.

1. The **5 most frequently purchased product categories** during the **2017Q1-2018Q2** were **bed bath tables, health beauty, sports leisure, furniture decor, and computers accessories**.

Excludes orders that have order status unavailable and canceled.

Count Product Category

Product Category

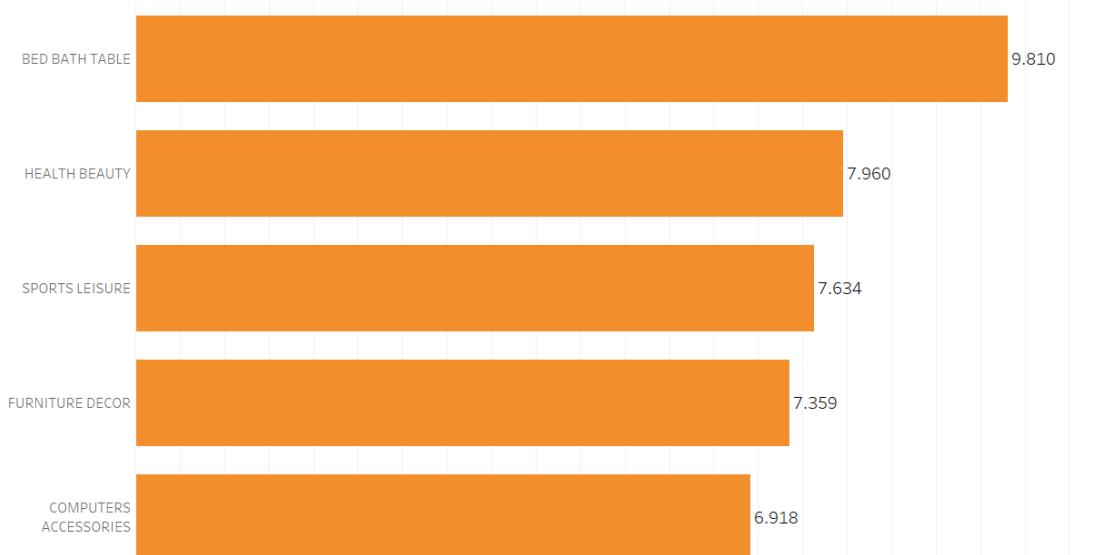


Figure 48: 5 Most Purchased Product Categories in 2017-2018 Second Quarter

2. The **5 product categories** with the highest sales during the **2017Q1-2018Q2** were **watches gifts, health beauty, bed bath tables, sports leisure, and computers accessories**.

Excludes orders that have order status unavailable and canceled.



Figure 49: 5 Product Categories with the Highest Sales in 2017-2018 Second Quarter

- Products in the **bed bath table** and **health beauty** categories experienced an **increase** in the number of products purchased, although sales of bed bath tables decreased slightly in the second quarter.

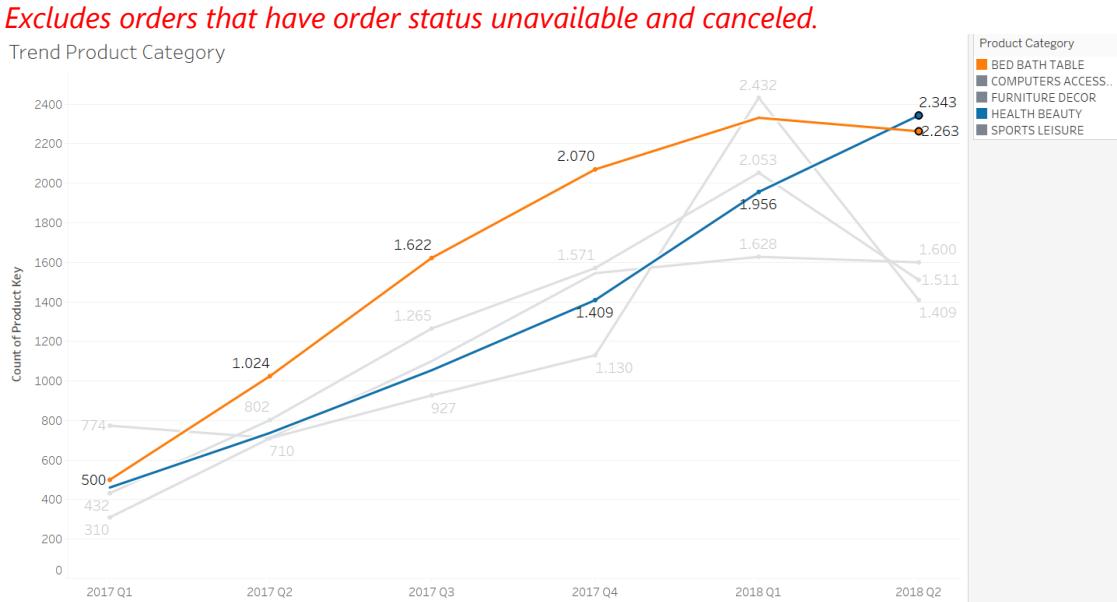


Figure 50: Product Category Trend in 2017-2018 Second Quarter

- Products in the watch gifts category have always experienced an **increase in sales** throughout **2017Q1 to 2018Q2**.

Excludes orders that have order status unavailable and canceled.

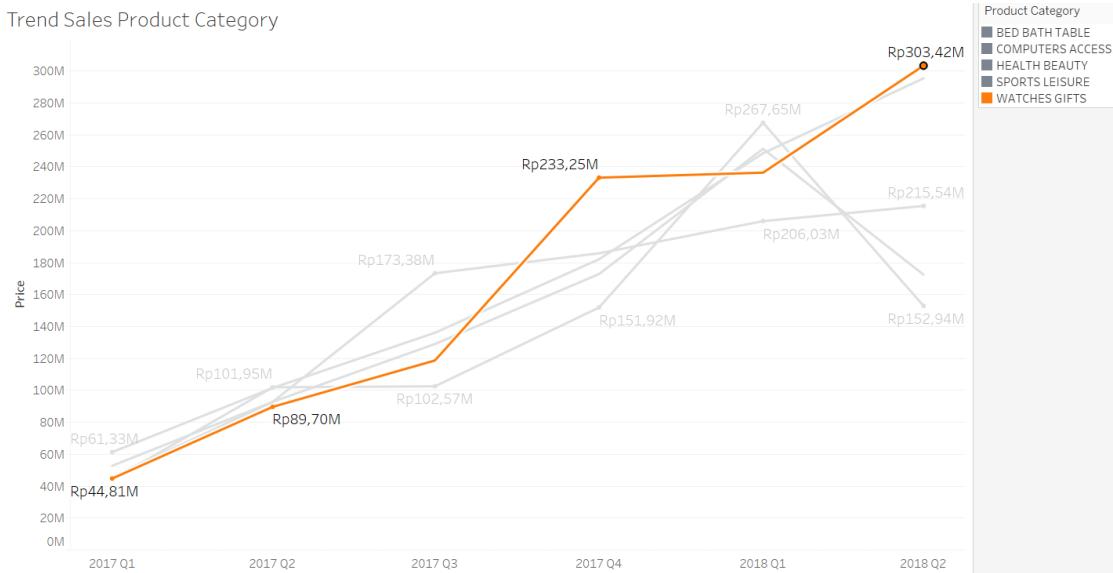


Figure 51: Highest Sales Trend in 2017-2018 Second Quarter

Suggestions:

- **Bed bath tables** and **health beauty** have quite high sales and are necessities that quickly run out. So doing a fairly massive sale like giving some promo can **increase sales**.
- **Watches gifts** are a category product whose sales are quite high, but because watch gifts are items that can last for a long time, it is necessary to review the trend in the future, whether it will continue to rise.
- The following data can be used to perform **predictive analysis** to predict how the trend will be in the following years.

Predictive Analysis

Furthermore, predictive analysis was performed using Tableau. Products in **the Bed bath Table** and **Health Beauty** categories are predicted to increase in sales until the end of 2018.



Figure 52: Prediction of Goods Selling in the Bed Bath Table and Health Beauty Product Categories

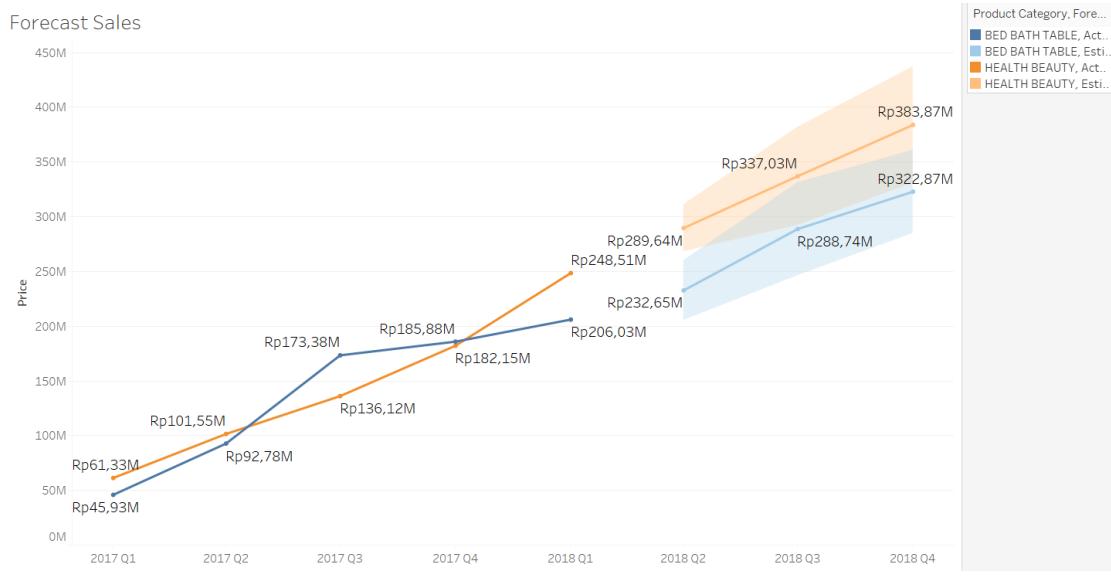


Figure 53: Sales Prediction in Bed Bath Table and Health Beauty Product Categories

Predictive analysis on Watches Gifts category products using Tableau is also predicted to increase sales until the end of 2018.

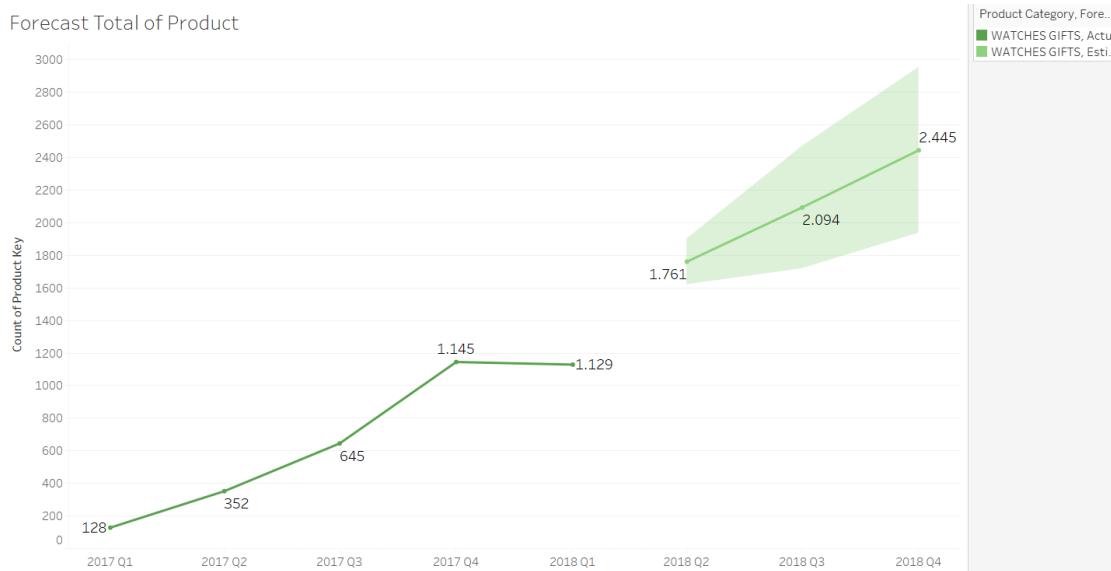


Figure 54: Prediction of Goods that Sell in the Watches Gifts Product Category

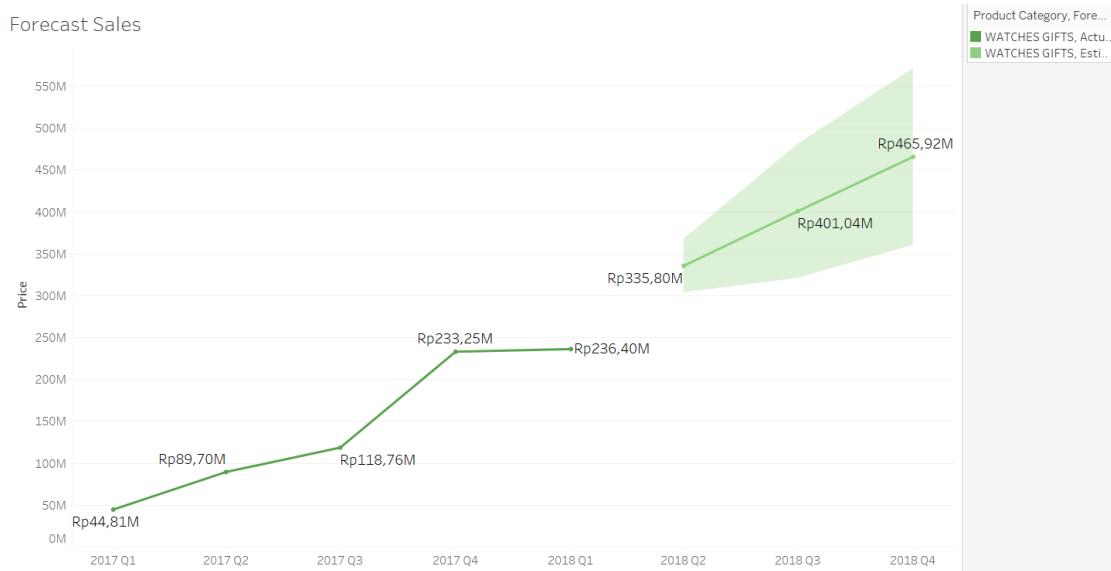


Figure 55: Sales Prediction in the Watches Gifts Product Category

Conclusion:

1. **Bed bath table** and **health beauty** are the most frequently purchased category products
2. **Watches gifts** are the products that have the highest sales
3. **Bed bath tables, health beauty, and watches gifts** have pretty **good trend** predictions so they need to be kept in stock



BUSINESS QUESTIONS No. 4

Background

Reported from the article Aulia, et al with respondents are students of the Faculty of Economics, Islamic University of Borneo Muhammad Arsyad Al-Banjari (UNISKA) Banjarmasin with a total of 100 respondents, in which the article contains a service quality factor as one of the determinants of someone buying goods in e-commerce or no. Based on the survey results, 68% of respondents agree with the services provided by the seller. Things that can be done to improve the quality of customer satisfaction are friendly and polite communication, fast response to consumers, and on-time delivery.

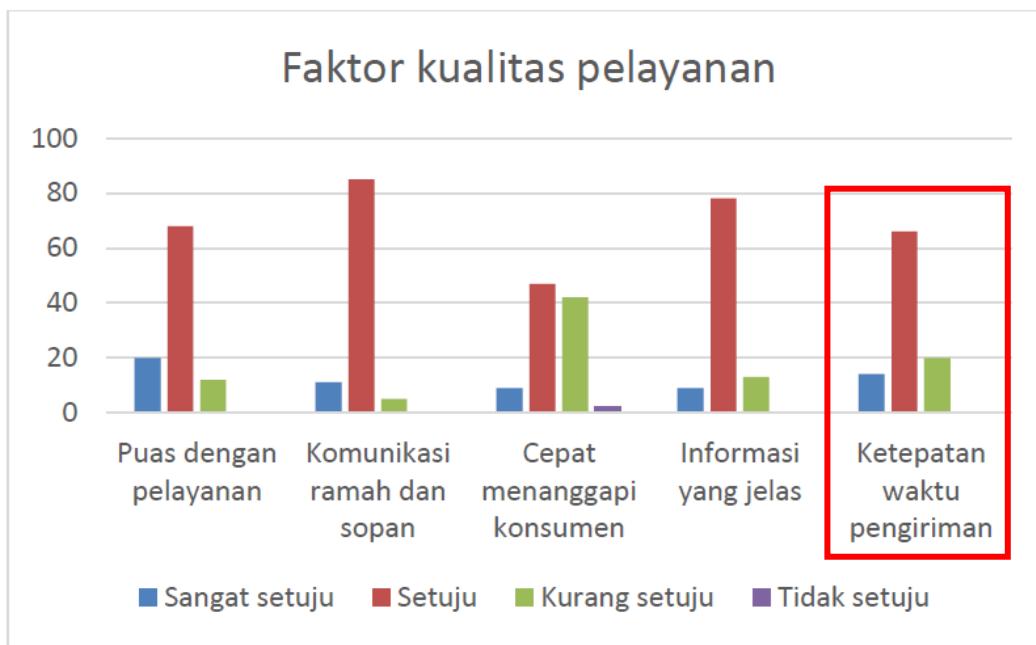


Figure 56: Service Quality Factor (Aulia, et al., n.d.)

One of the factors that we want to review is the timeliness of delivery. Based on the survey, as many as 66% of respondents agree with the services provided on time. Good seller service in sending goods and on time according to the specified delivery estimate can increase customer satisfaction in shopping (Aulia, et al., n.d.).

Purpose

Knowing whether the product sent to the customer has arrived on time and how the customer responds in the form of a rating.

Hypothesis

- 80% orders sent on time.
- Late delivery will affect customer satisfaction

Is the product delivered on time? If not, does late delivery affect customer satisfaction?

By using the calculation **assumption** whether an order arrives extremely early, early, on time (normal), late, extremely late, or has not arrived.

If an order **doesn't have a delivered date key** then the order **has not arrived**.

If the order is delivered **more than 2 weeks to 2 weeks than estimated**, the order is

classified as **extremely early**.

If the order is delivered **less than 2 weeks to 1 week earlier** than estimated, the order is classified as **early**.

If the order is delivered **less than 1 week earlier to the D day** of the estimate, the order is classified as **normal (on time)**.

If the order is delivered **1 day to 1 week late** from the estimate, the order is classified as **late**.

If the order is delivered **more than 1 week later** than estimated, the order is classified as **extremely late**.

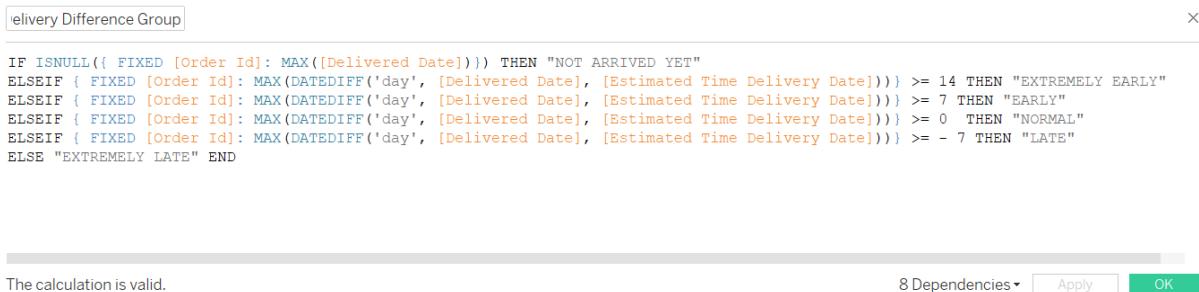


Figure 57: Determination of Delay Category

Then it is found that:

1. Most orders were shipped **very earlier** than the estimated, **42,070** orders. Only **13,98%** of orders that **arrived on time** (13796 out of 98666). This phenomenon is quite **strange** because it means the distance between the estimated delivery time and the actual delivery time is **still too far**.

Estimated Time Delivery Difference Group

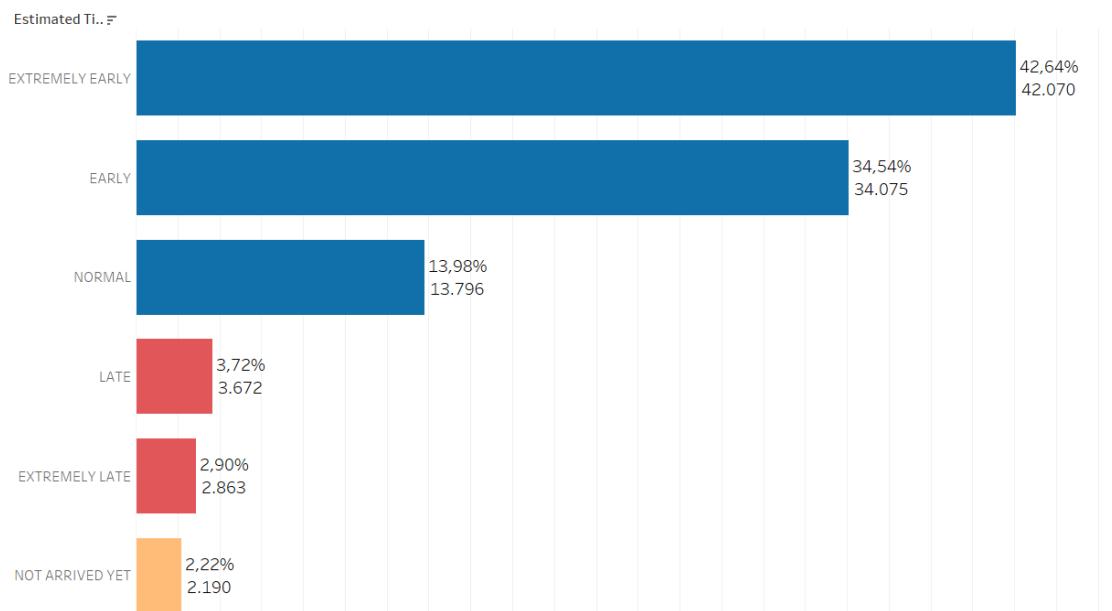


Figure 58: Estimated Delivery Time

2. Most orders get a **perfect rating** (5), which is **58.91%** of the total orders.
Only shows orders that have the order status Delivered and have arrived.

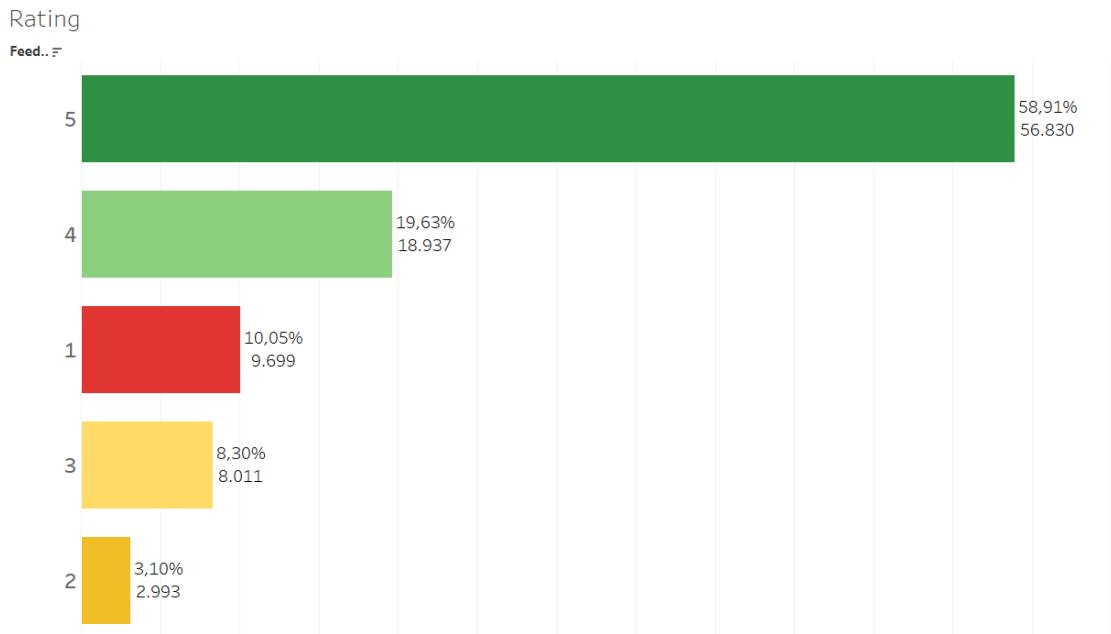


Figure 59: Rating Overall

3. Most of the orders were sent to customers, which was **97.78%** (96478) of the total orders.



Figure 60: Overall Delivery Status

From the visualization, there are 2 categories of orders that need to be explored more deeply, late and very late.

On late orders found the fact that:

1. total number of **late** orders was **3.72%** (3,672) orders from all total orders.

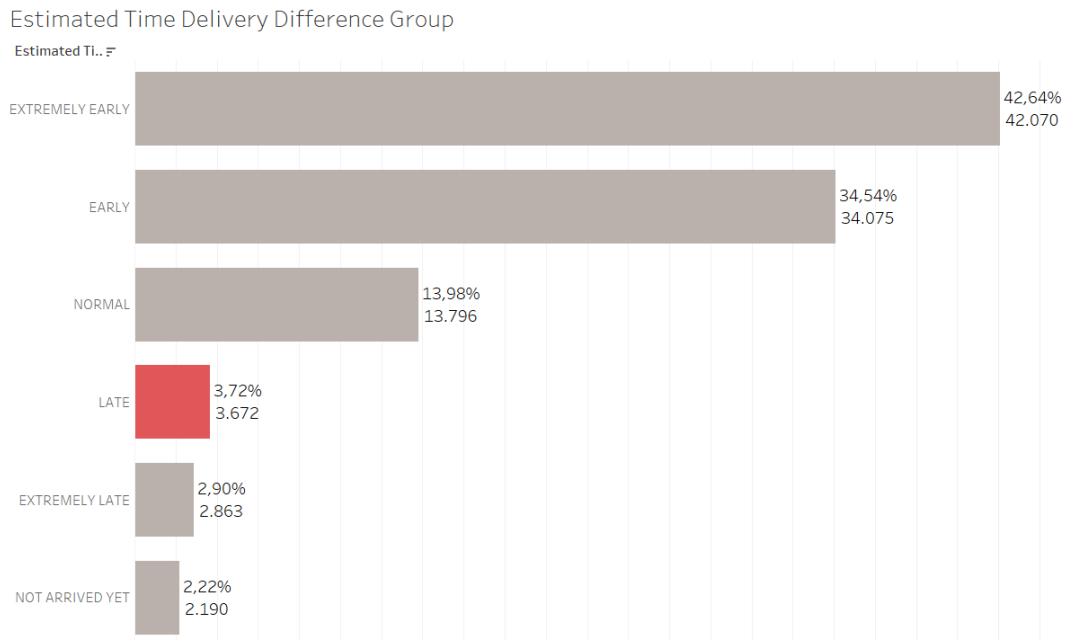


Figure 61: Total Late Orders

2. All late orders have been **delivered** to customers.



Figure 62: Delivery Status of Orders Sent Late

3. Late orders that get a rating of **1** are **41.91%** of the total late orders.
Only display orders that have the order status Delivered.

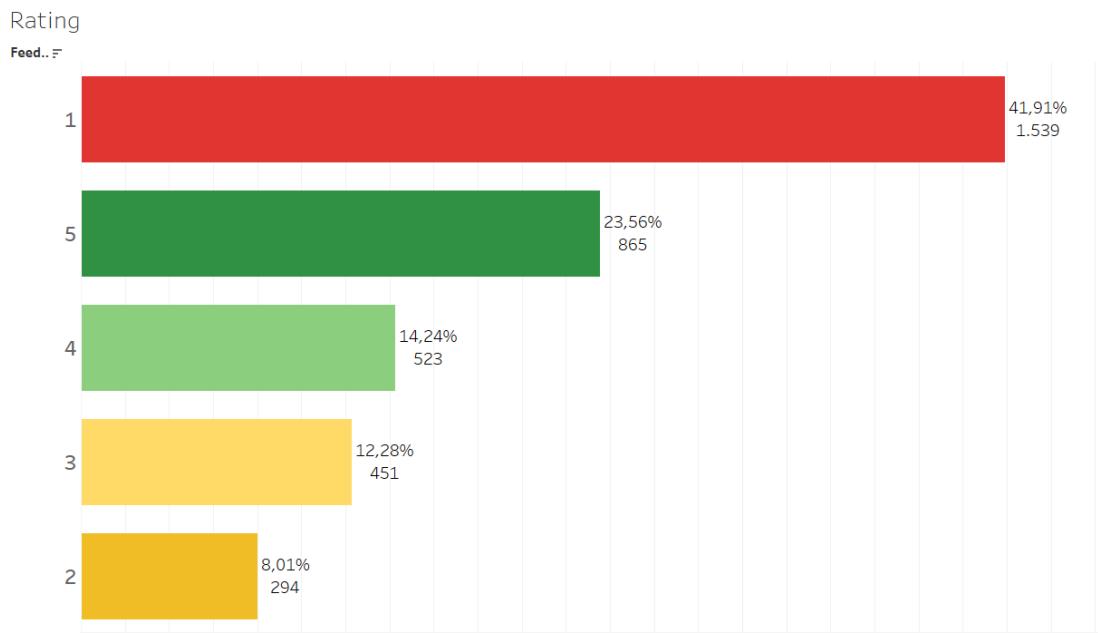


Figure 63: Rating of Orders Sent Late

4. The highest percentage of orders that are late orders from the **Kepulauan Bangka Belitung - North Maluku**. With a delay percentage of **50%** of the total orders sent.
Only display orders that have the order status Delivered.

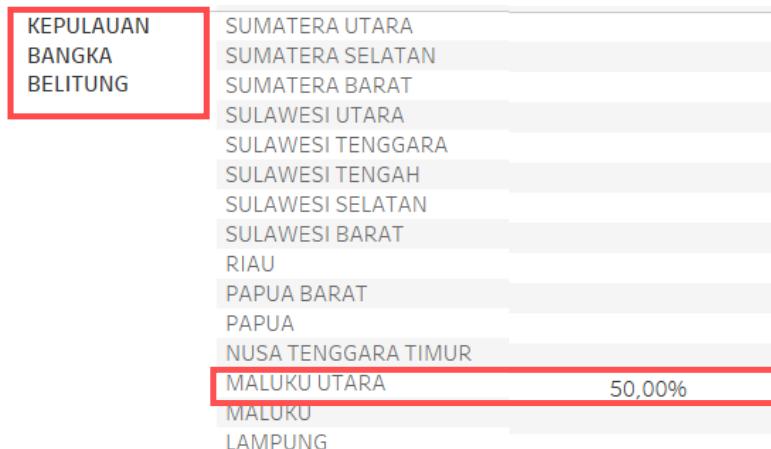


Figure 64: The province with the Most Percentage of Orders Delivered Late

On extremely late orders found the fact that:

1. Total orders that are extremely late are **2.90%** (2.683) orders of all total orders.

Estimated Time Delivery Difference Group

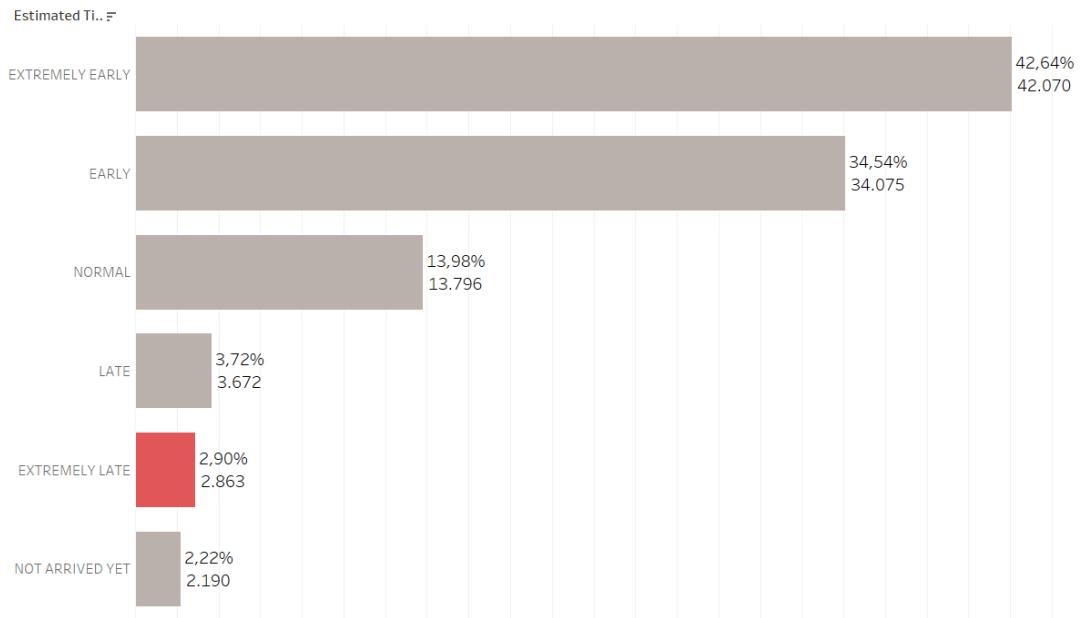


Figure 65: Total Orders Extremely Late

- On extremely late orders, **99.97%** (2.862) orders were delivered and 0.03% (1) order was canceled.

Order Status



Figure 66: Delivery Status of Orders Sent Extremely Late

- Extremely late orders that get a rating of **1** are **69.88%** of the total very late orders.
Only display orders that have the order status Delivered.

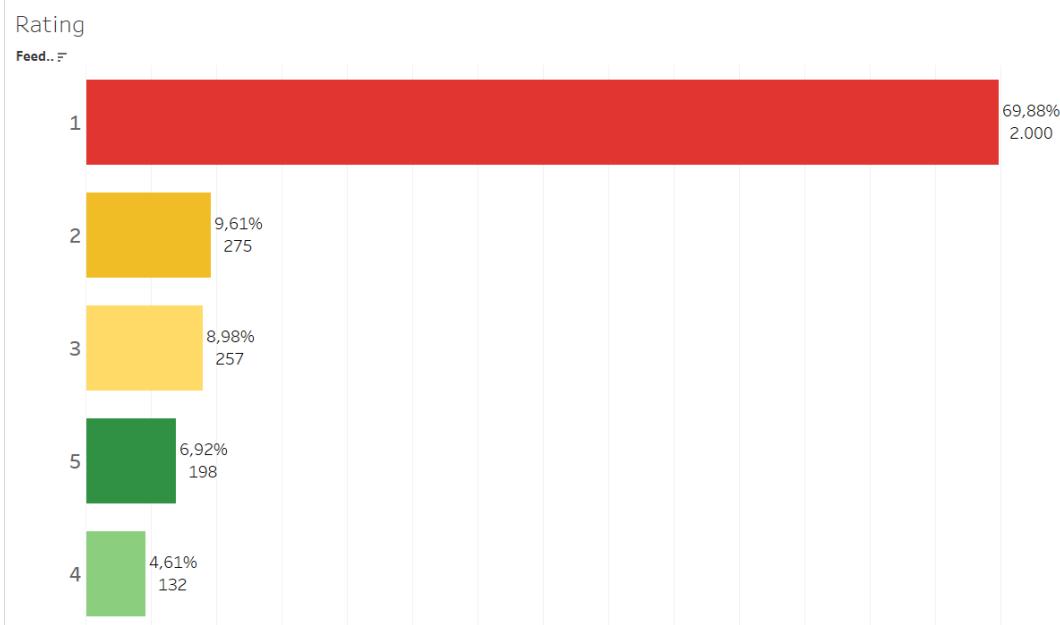


Figure 67: Rating of Orders Sent Extremely Late

4. The highest percentage of orders that are extremely late orders from **Aceh-Jambi, North Kalimantan-Bali, Kepulauan Bangka Belitung - Southeast Sulawesi, and West Papua-West Sulawesi** where all orders are delivered extremely late.
Only display orders that have the order status Delivered.

Seller State	Customer State	EXTREMELY LATE
ACEH	BALI	
	JAMBI	100,00%
	SULAWESI BARAT	
KALIMANTAN UTARA	SULAWESI TENGGARA	14,29%
	BALI	100,00%
	JAMBI	
KEPULAUAN BANGKA BELITUNG	SULAWESI BARAT	
	BALI	
	JAMBI	
PAPUA BARAT	SULAWESI BARAT	
	SULAWESI TENGGARA	100,00%
	BALI	25,00%
	JAMBI	
	SULAWESI BARAT	100,00%
	SULAWESI TENGGARA	

Figure 68: The Province with the Most Orders Sent Very Late

Conclusion:

1. A total of **42,64%** (42.070) orders arrived **extremely early**.
2. Only **13,98%** of orders arrived **on time** (13.796 out of 98.666 orders)
3. A total of **97,78%** (96.478) orders were successfully **delivered**.
4. Most orders get a **perfect rating (5)**, which is **58.91%** of the total orders.
5. For **late orders**, most of the **rating is 1** with a total of **41.91%**.
6. For orders that are **extremely late**, the **highest rating** obtained is **rating 1** with a total of **69.88%**, so orders that **arrive late and very late affect customer satisfaction**.
7. Orders that are **late** and **extremely late** happened in regions **outside Java**.

Suggestion:

- Adjust the estimated delivery time so that the distance is not too far from the original delivery date.
- Provide notification to customers that the ordered goods are expected to arrive late.



BUSINESS QUESTIONS No. 5

Background

Customer segmentation is the practice of dividing a customer base into groups of individuals that are similar in specific ways. One of the techniques of customer segmentation is RFM (recency, frequency, monetary). RFM segmentation allows marketers to target specific clusters of customers with communications that are much more relevant to their behavior.

Purpose

Create effective allocation of marketing resources and the maximization of cross and up-selling opportunities

How is the customer recency, frequency, and monetary?

Making RFM requires 3 aspects, namely recency, frequency, and monetary.

- **Recency** is the maximum time an order occurs overall – time_limit each customer + 1
- **Frequency** is the number of times a customer places an order
- **Monetary** is how much the total expenses per customer

Handling outliers using python, then outliers on recency and monetary are removed. This is because the outliers on the two attributes are few. Meanwhile, if we remove the outliers frequency, there will be only frequency 1. So I don't remove outliers in frequency.

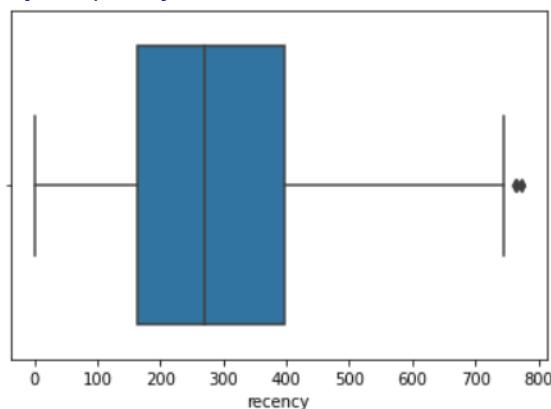


Figure 69: Recency

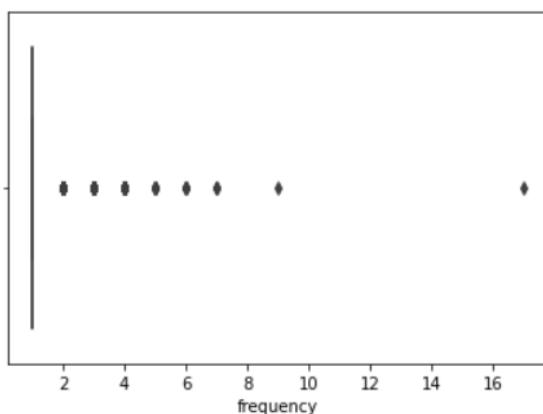


Figure 70: Frequency

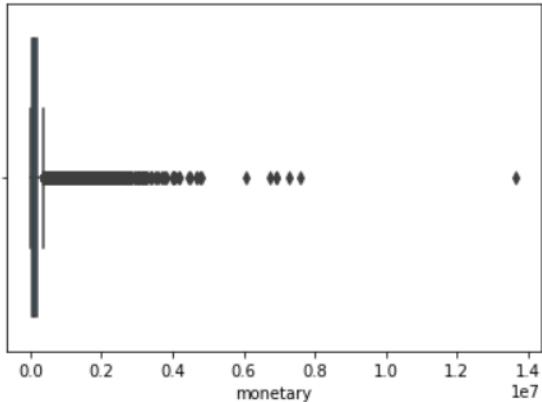


Figure 71: Monetary

After handling outliers, check the quantiles on all three attributes.

- The quantiles will be used as a divider for the **rfm segment**, except for the frequency
- RFM is divided into 4 segments where The segment with the lowest value is 1 and the highest is 4.
- For **monetary**, segment 1 is for customers that spend very little money, while segment 4 is for customers that spend so much money.
- The **recency** will be reversed. So segment 4 is for customers who recently come to orders, meanwhile segment 1 is for customers who haven't orders for long periods.
- For **frequency**, segment 1 is for customers who shopped 1 time, segment 2 is for customers who shopped 2 times, segment 3 is customers who shopped 3 times, and customers who shopped more than or equal to 4 are segment 4.

Table 1: Limitation

	recency	frequency	monetary
Minimum limit	-184.5	1	-117426.25
Maximum limit	747.5	1	362083.75
Outliers percentage under the minimum limit	0.0%	0.0%	0.0 %
Outliers percentage under the maximum limit	0.004162504162504162 %	3.118886067518628 %	7.950713899179952 %

Form a RFM Segments:

RFM Segments build from quantile that can be seen using function describe in Pandas.

Table 2: Recency Segments

	recency	R
Q1	recency \leq 165	4
Q2	165 $<$ recency \leq 270	3

Q3	$270 < \text{recency} \leq 399$	2
Q4	$\text{recency} > 399$	1

Table 3: Frequency Segments

frequency	Count user_name	F
1	93099	1
2	2745	2
3	203	3
4	30	4
5	8	4
6	6	4
7	3	4
9	1	4
17	1	4

Table 4: Monetary Segments

	monetary	M
Q1	$\text{monetary} \leq 58980$	1
Q2	$58980 < \text{monetary} \leq 98840$	2
Q3	$98840 < \text{monetary} \leq 159252.5$	3
Q4	$\text{monetary} > 159252.5$	4

After forming 4 segments, these segments are grouped into RFM Group. Each rfm group has a different name and marketing strategy.

Table 5: RFM Segmentation

Customer	RFM Score
Best Customers	444
Loyal Customers	x4x
Potential Big Spender	4x4
Need Attention Big Spender	xx4
Recent Customer	4xx
Lost Cheap Customers	111
Lost Customers	1xx
Regular Customers	Others

The visualization of RFM Group overall is shown as the figure below. We can see that most of the customers are Regular Customers. We will deep down analysis on each RFM Group (except Lost Cheap Customers and Best Customers since they are assigned into specific RFM Segment).

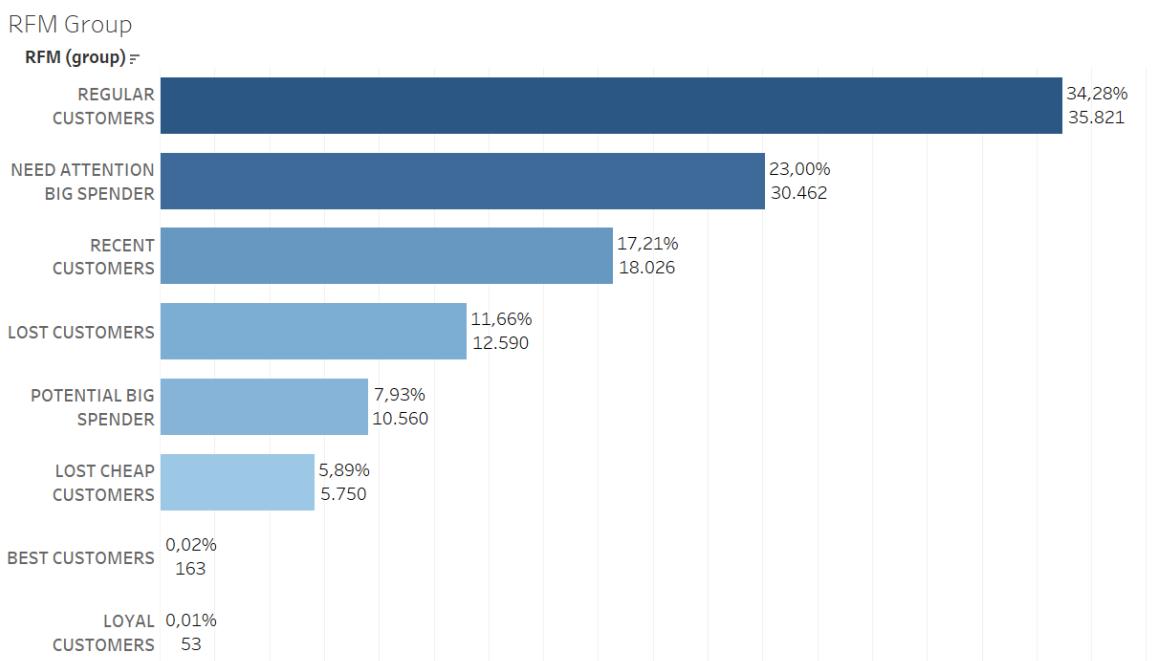


Figure 72: RFM Group

1. Regular Customers

Traits of most Regular Customers:

- Many customers (33.81%) spend a lot of money (monetary = 3) but have a very small frequency (frequency = 1).

F X M

F	M		
	1	2	3
1	31,07%	32,39%	33,81%
2	0,15%	0,68%	1,82%
3		0,01%	0,08%

Figure 73: Frequency X Monetary Regular Customers

- Most of them (49,31%) have a distant last shopping time (9 months - 1 year ago) (recency = 2).

R X F

F	R	
	2	3
1	49,31%	47,96%
2	1,39%	1,26%
3	0,03%	0,05%

Figure 74: Recency X Frequency Regular Customers

- Although many of the regular customers are in the monetary 3 category, their average spending is still **below the overall average** and **2 from the bottom**.

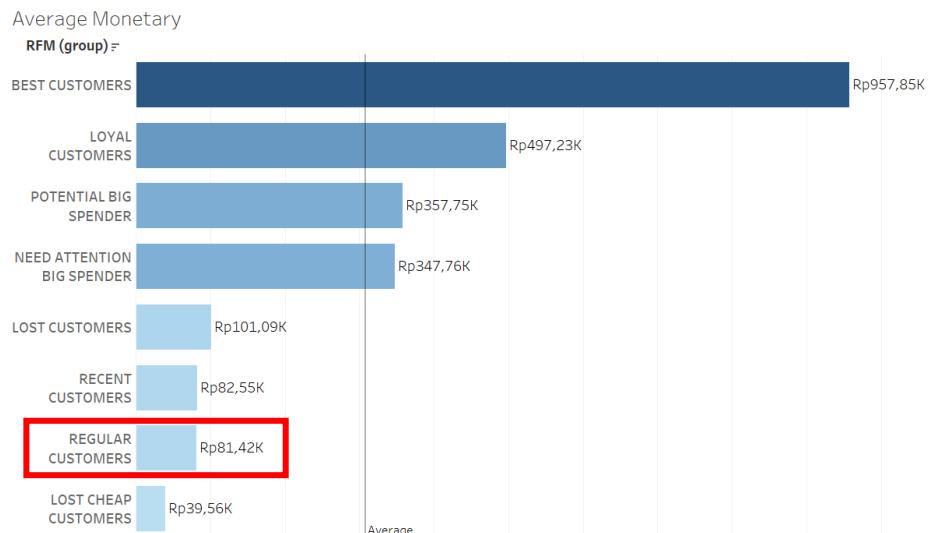


Figure 75: Average Monetary Regular Customers

- Suggestion:
Make limited-time offers, send personalised emails, offer personalized recommendations

2. Lost Customers

- Most customers (48,31%) spend quite a bit of money (monetary = 2) and very little shopping frequency (frequency = 1).

F X M

F	M		
	1	2	3
1		48,31%	48,11%
2	0,25%	0,98%	2,13%
3	0,05%	0,05%	0,12%

Figure 76: Frequency X Monetary Lost Customers

- Some customers (96,42%) have not shopped for more than 1 year (recency = 1) and only one time (frequency = 1).

R X F

F	R
1	96,42%
2	3,37%
3	0,21%

Figure 77: Recency X Frequency Lost Customers

- The average spending of "Lost Customers" is **below average**.

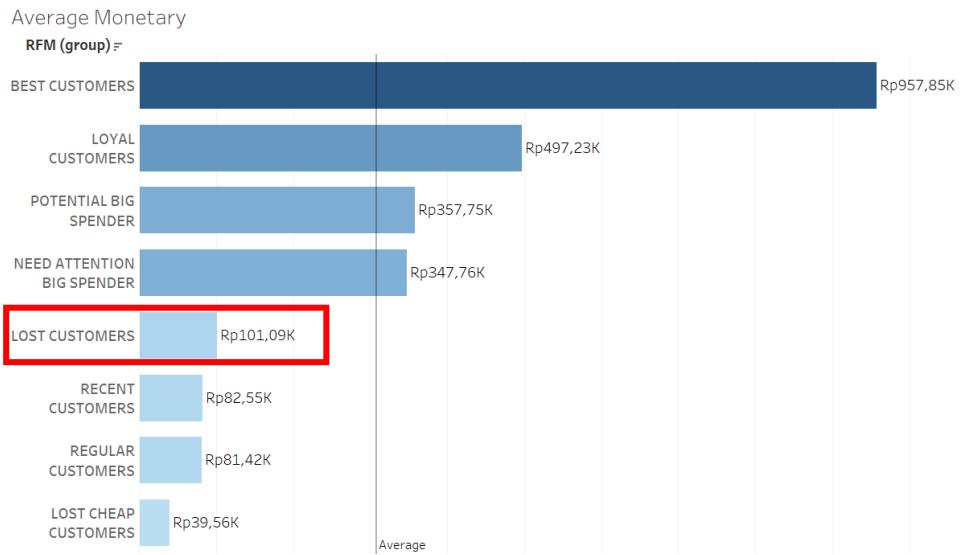


Figure 78: Average Monetary Low Customers

- Suggestion:

Send personalised emails, it is better to ignore it because attracting customers who have not shopped for more than 1 year will require more effort and cost a lot of money.

3. Recent Customers

- Many customers (34,27%) spend a lot of money (monetary = 3) but have a very small frequency (frequency = 1).

F X M

F	M	1	2	3
1	30,99%	31,71%	34,27%	
2	0,21%	0,73%	1,91%	
3	0,02%	0,07%	0,11%	

Figure 79: Frequency X Monetary Recent Customers

- Shopping these days (recency = 4) but most of them (96,97%) still have less frequency (frequency = 1).

R X F

F	R
1	96,97%
2	2,84%
3	0,19%

Figure 80: Recency X Frequency Recent Customers

- Although many of the recent customers are in the monetary 3 category, their average spending is still **below the overall average** and **3 from the bottom**.

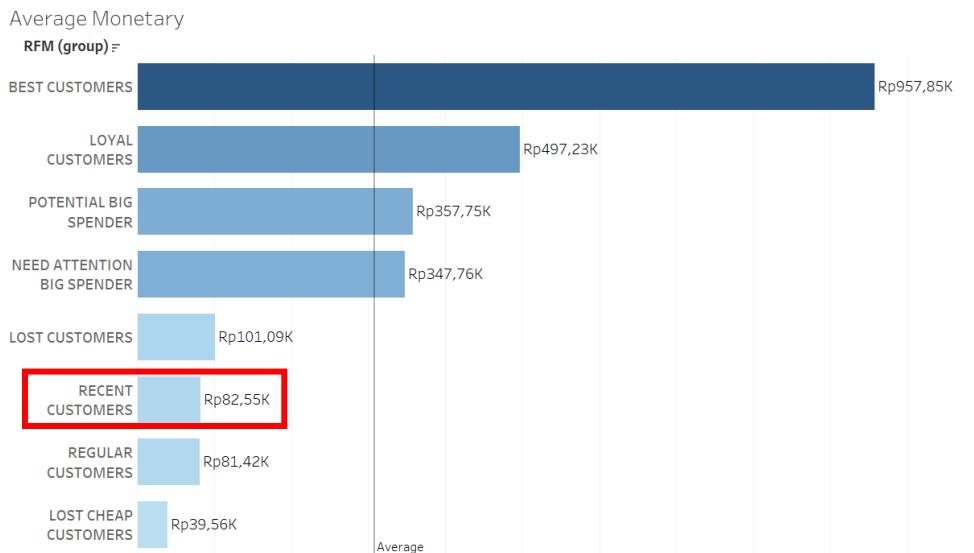


Figure 81: Average Monetary Recent Customers

- Suggestion:
Gift them discounts/promo.

4. Loyal Customers

- Many customers (73,58%) spend a quite a lot of money (monetary = 4).

F X M

M	2	3	4
F	7,55%	18,87%	73,58%
4			

Figure 82: Frequency X Monetary Loyal Customers

- Most of them (56,60%) have a distant last shopping time (9 months - 1 year ago) (recency = 2).

R X F

F	R
4	43,40% 56,60%

Figure 83: Recency X Frequency Loyal Customers

- Their monetary is very good and **above** average.

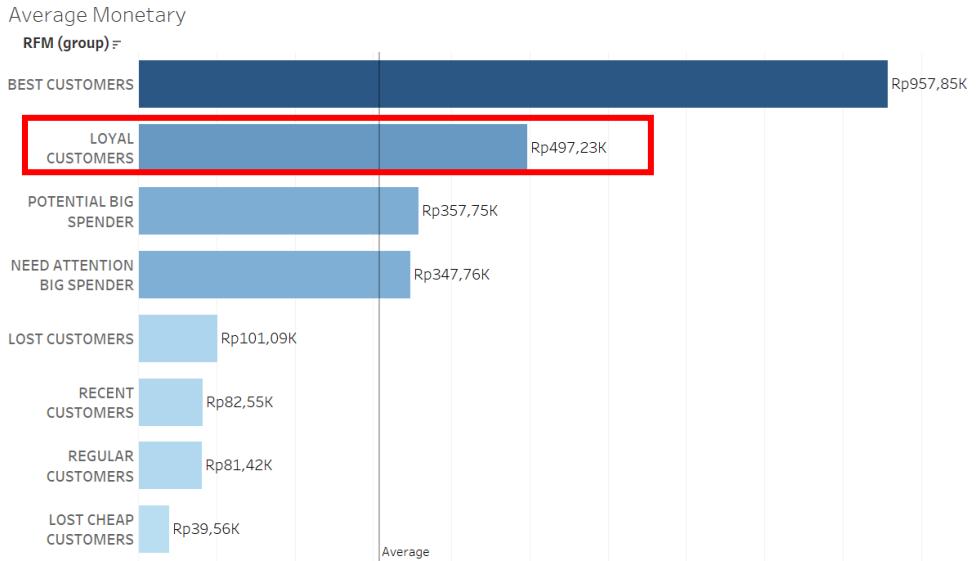


Figure 84: Average Monetary Loyal Customers

- Suggestion:
Offer personalized recommendations, upselling, look back at marketing strategy on 9 months - 1 year ago.

5. Customers That Need Attention

I crossed between frequency and monetary. 31.33% of customers spend quite a lot of money but only make one purchase. If examined further, most of them have stopped shopping since 5 - 9 months ago.

F X M

		M			
		1	2	3	4
F	1	19,81%	20,63%	21,46%	31,33%
	2	0,11%	0,44%	1,11%	4,14%
3	0,01%	0,02%	0,05%	0,61%	
4		0,00%	0,01%	0,27%	

Figure 85: Frequency X Monetary Customers That Need Attention

R X F

		R			
		1	2	3	4
F	1	23,555%	25,142%	26,012%	25,291%
	2				

Figure 86: Recency X Frequency Customers That Need Attention

These customer segments are potential big spenders and need attention big spenders. The difference is the recency segment of Need Attention Big Spender is 1–3, meanwhile, the recency segment Potential Big Spender is 4.



Figure 87: Average Monetary for Potential Big Spender & Need Attention Big Spender

Why potential big spender & need attention big spender?

- There are quite several them, it will be very profitable if they can level up to become best customers

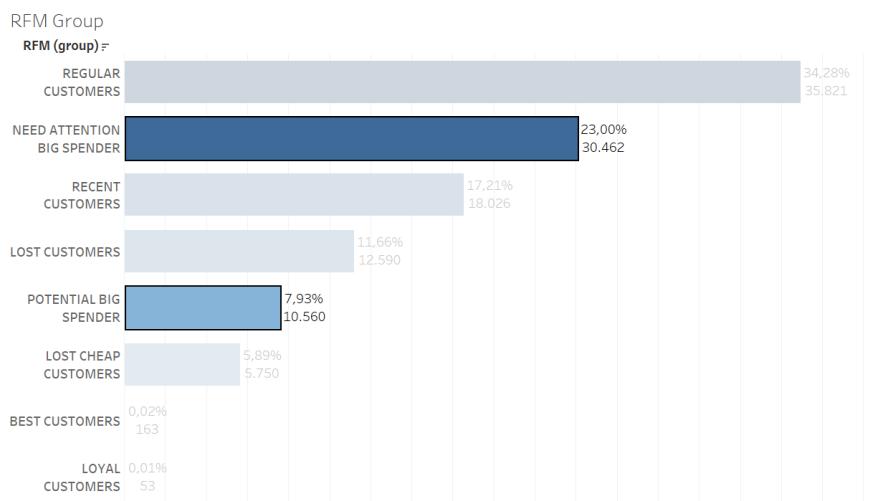


Figure 88: RFM Group Big Spender & Need Attention Big Spender

- Can shop with a large nominal

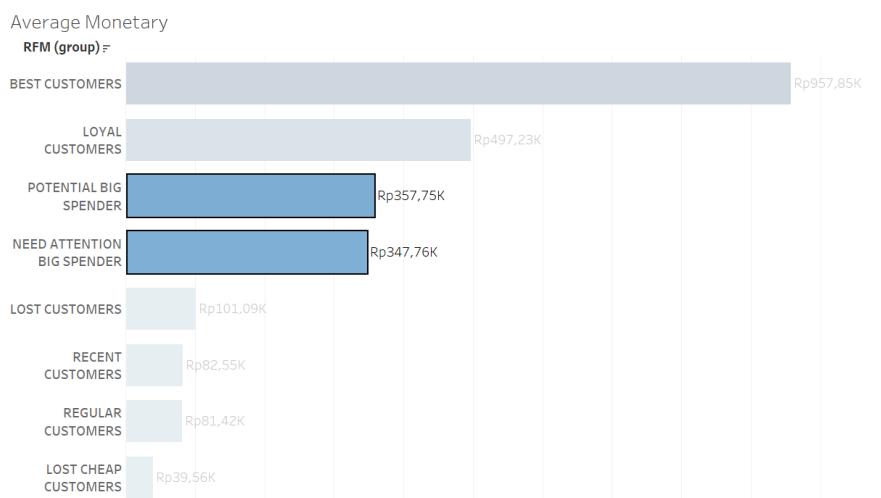


Figure 89: Average Monetary Big Spender & Need Attention Big Spender

- Suggestion:

Conduct in-depth analysis of events 5 – 9 months ago.

Potential big spender: offer personalized recommendations, encourage them to buy products more frequently so they can level up their member status with so much benefit.

Need attention big spender: reach them via email/notifications, make subject lines of emails very personalized, revive their interest by a specific discount on a specific product.

Summary:

This is the summary from the solution above.

Table 6: RFM Suggestion

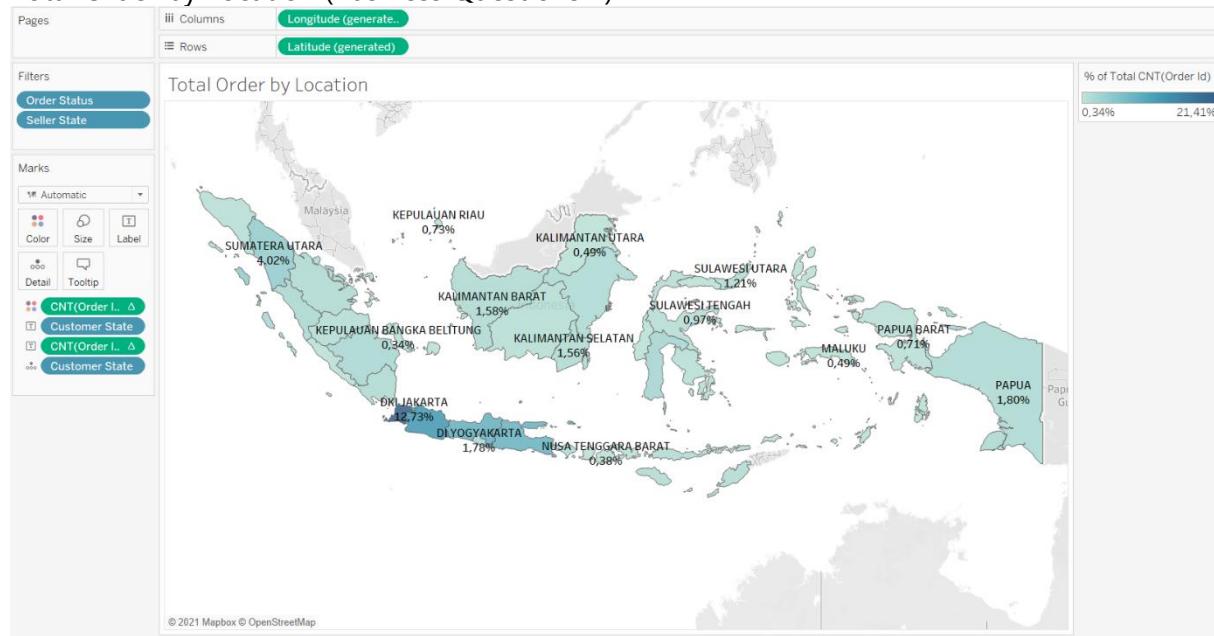
Customer	RFM Score	Marketing Tips
Best Customers	444	Give the big bonus points when they shop and special promos for the best customers.
Loyal Customers	x4x	Offer personalized recommendations, upselling
Potential Big Spender	4x4	Offer personalized recommendations, encourage them to buy products more frequently so they can level up their member status with so much benefit.
Need Attention Big Spender	xx4	Reach them via email/notifications, make subject lines of emails very personalized, revive their interest by a specific discount on a specific product.
Recent Customer	4xx	Gift them discounts/promo.
Lost Cheap Customers	111	Ignore.
Lost Customers	1xx	Send personalised emails, it is better to ignore it because attracting customers who have not shopped for more than 1 year will require more effort and cost a lot of money.
Regular Customers	Others	Make limited-time offers, send personalised emails, offer personalized recommendations

References

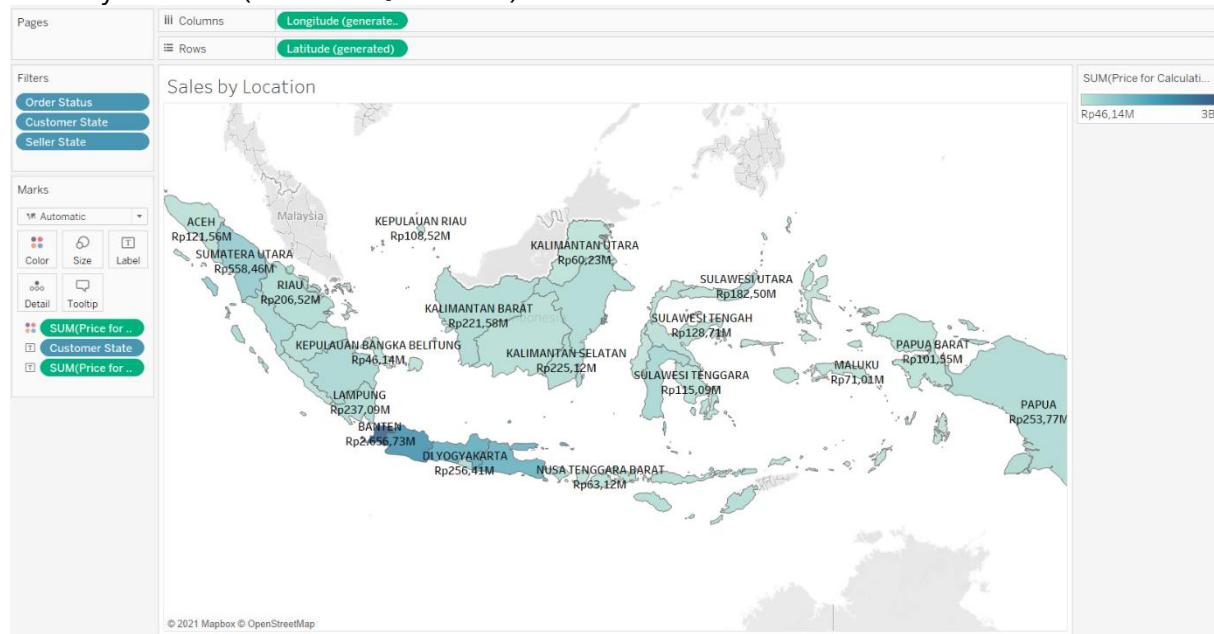
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Available at: <https://lokadata.id/artikel/orang-indonesia-pilih-cod-saat-belanja-online>
[Accessed 24 May 2021].

Visualization & Calculation

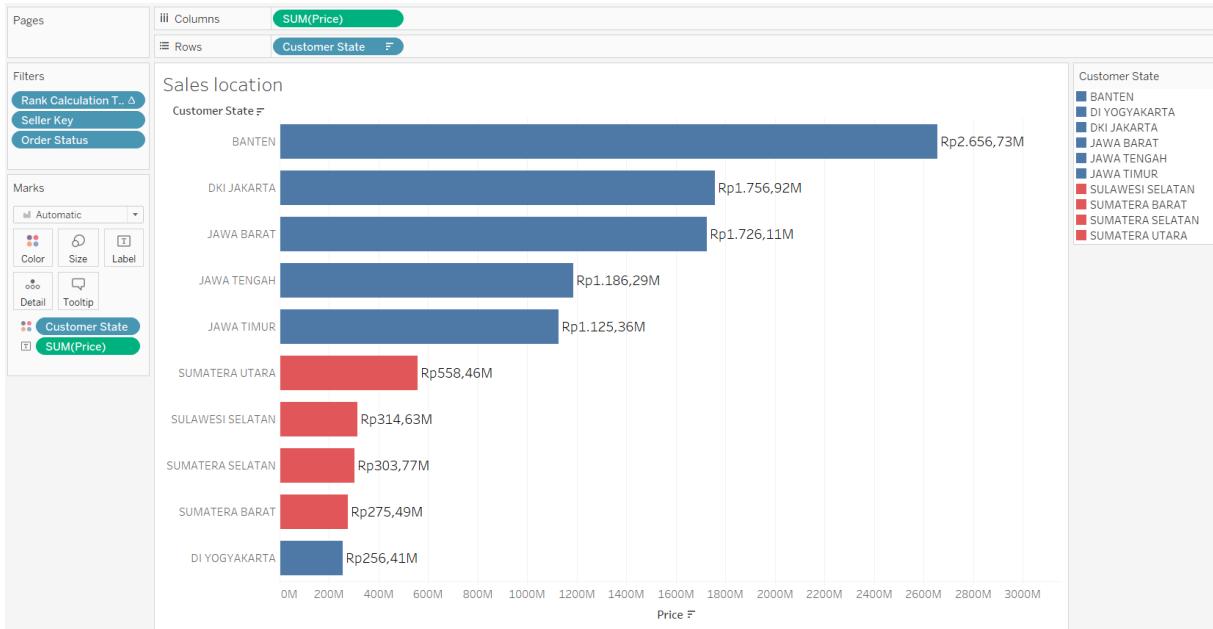
Total Order by Location (Business Questions 1)



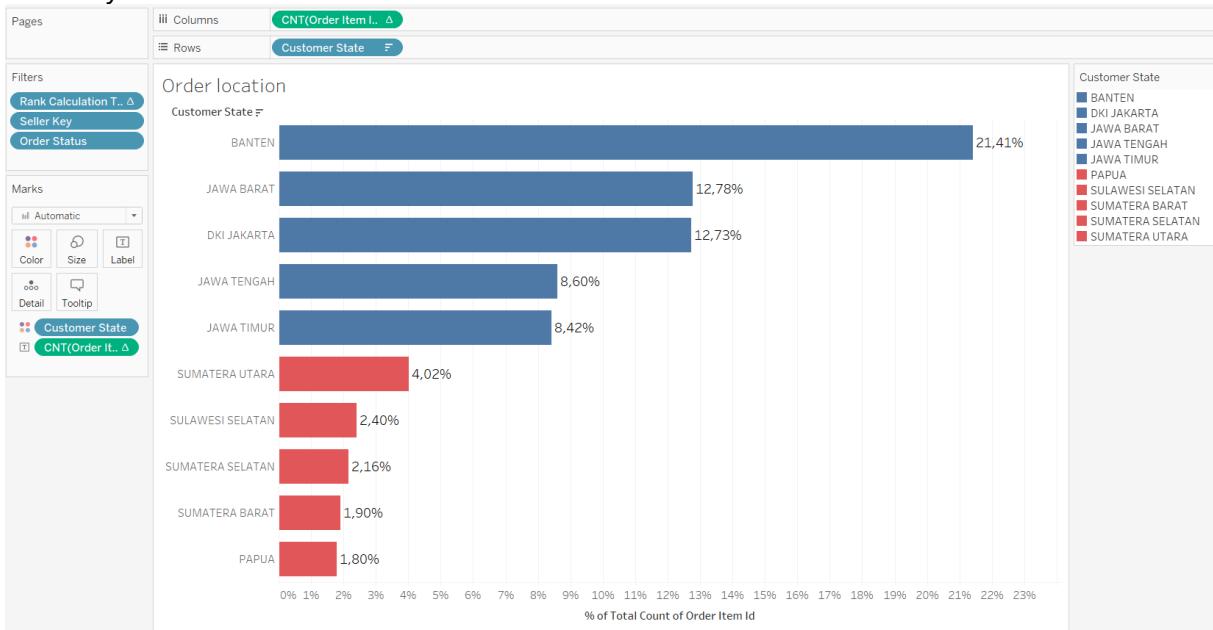
Sales by Location (Business Question 1)



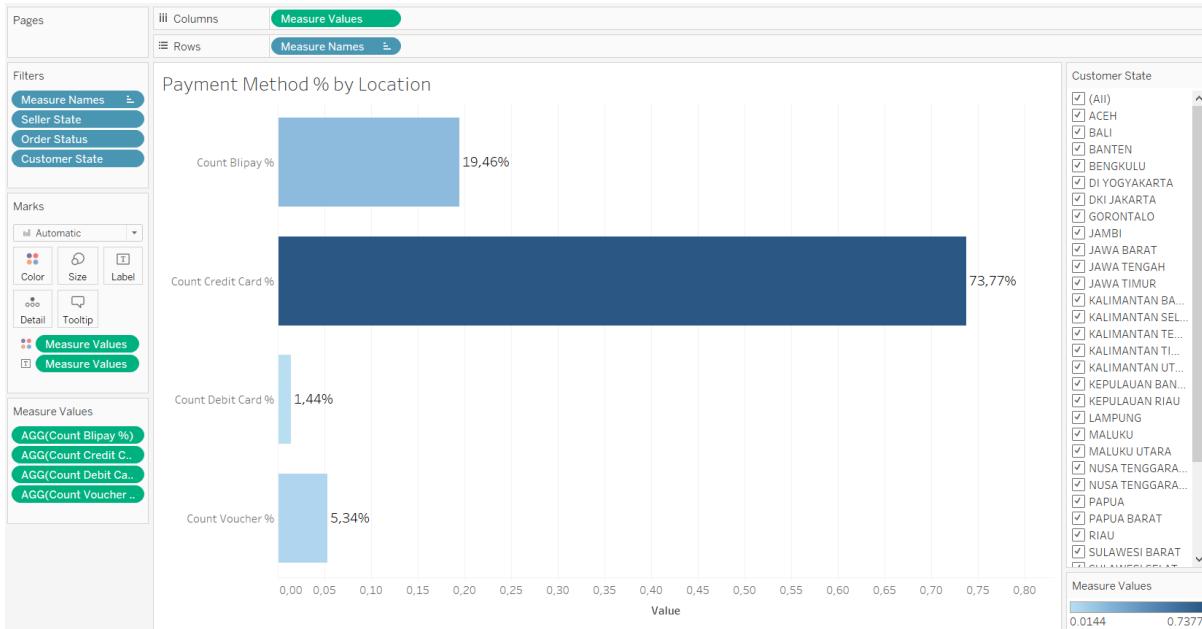
Sales by Location



Order by Location



Payment Method % by Location (Business Question 1)



Total Payment Method (Calculation for Count Blipay %, Count Credit Card %, Count Debit Card %, Count Voucher %)

Total Payment Method

```
SUM([Count Blipay]) + SUM([Count Credit Card]) +
SUM([Count Debit Card]) + SUM([Count Voucher])
```

The calculation is valid.

6 Dependencies

Apply

OK

Count Blipay %

Count Blipay %

X

SUM([Count Blipay]) / [Total Payment Method]

The calculation is valid.

2 Dependencies ▾

Apply

OK

Count Credit Card %

Count Credit Card %

X

SUM([Count Credit Card]) / [Total Payment Method]

The calculation is valid.

2 Dependencies ▾

Apply

OK

Count Debit Card %

Count Debit Card %

X

`SUM([Count Debit Card]) / [Total Payment Method]`

The calculation is valid.

2 Dependencies ▾

Apply

OK

Count Voucher %

Count Voucher %

X

`SUM([Count Voucher]) / [Total Payment Method]`

2 Dependencies ▾

Apply

OK

Count Blipay Calculation (sheet Payment Method by Location, Count Payment Blipay)

Count Blipay Calculation

X

`{ FIXED [Order Id]: MAX([Count Blipay]) }`

The calculation is valid.

4 Dependencies ▾

Apply

OK

Count Credit Card Calculation (sheet Payment Method by Location, Count Payment Credit

Card)

t Credit Card Calculation

X

```
{ FIXED [Order Id]:MAX([Count Credit Card]) }
```

▶

The calculation is valid.

4 Dependencies ▾

Apply

OK

Count Debit Card Calculation (sheet Payment Method by Location, Count Payment Debit Card)

t Debit Card Calculation

X

```
{ FIXED [Order Id]:MAX([Count Debit Card]) }
```

▶

4 Dependencies ▾

Apply

OK

Count Voucher Calculated (sheet Payment Method by Location, Count Payment Voucher Card)

ount Voucher Calculated

X

```
{ FIXED [Order Id]:MAX([Count Voucher]) }
```

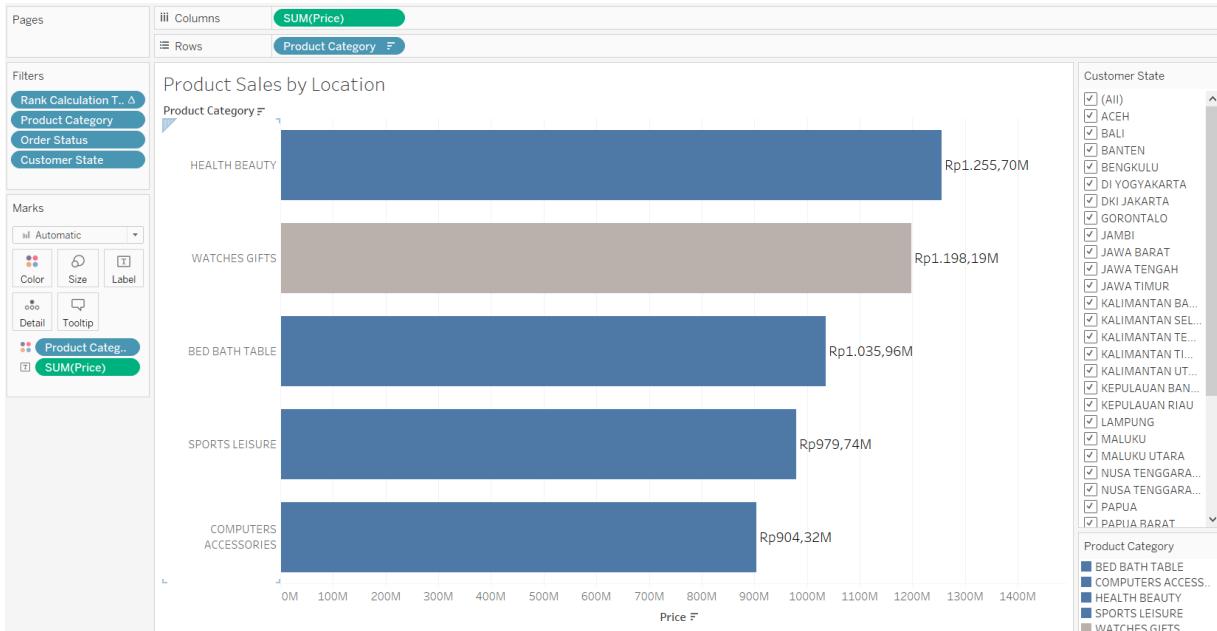
▶

4 Dependencies ▾

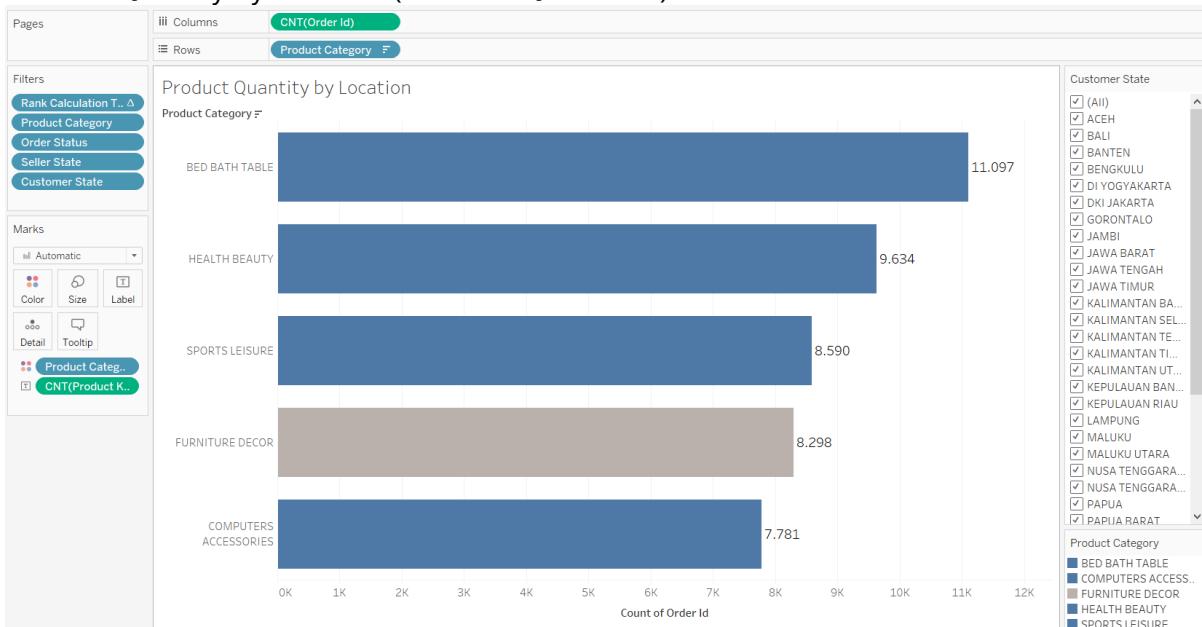
Apply

OK

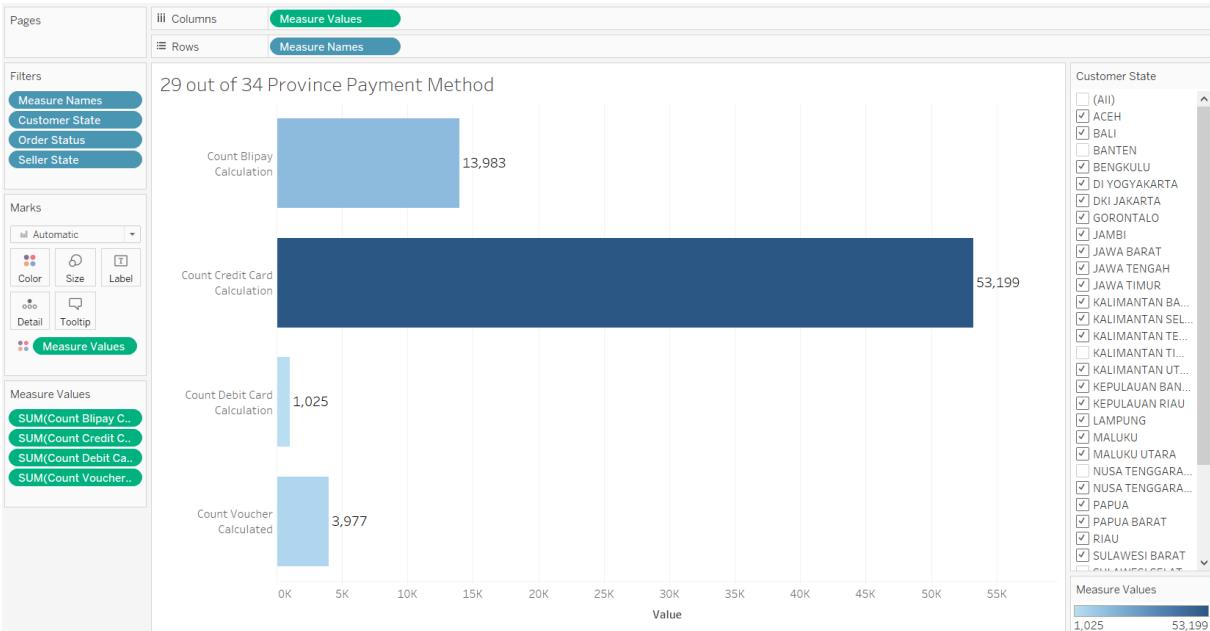
Product Sales by Location (Business Question 1)



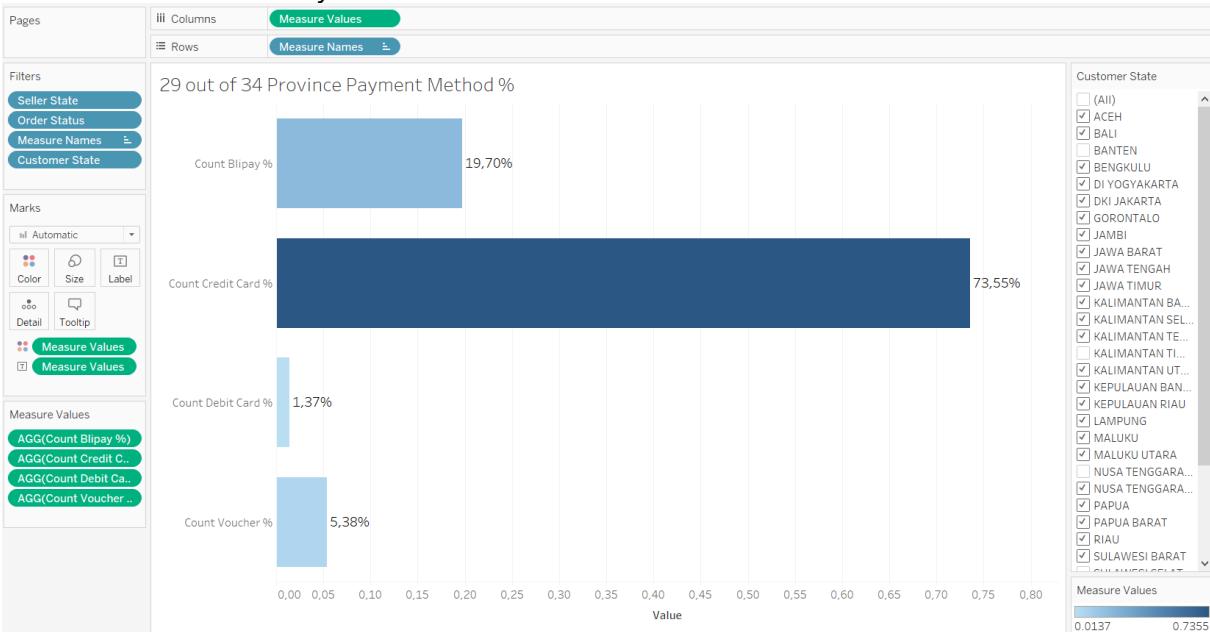
Product Quantity by Location (Business Question 1)



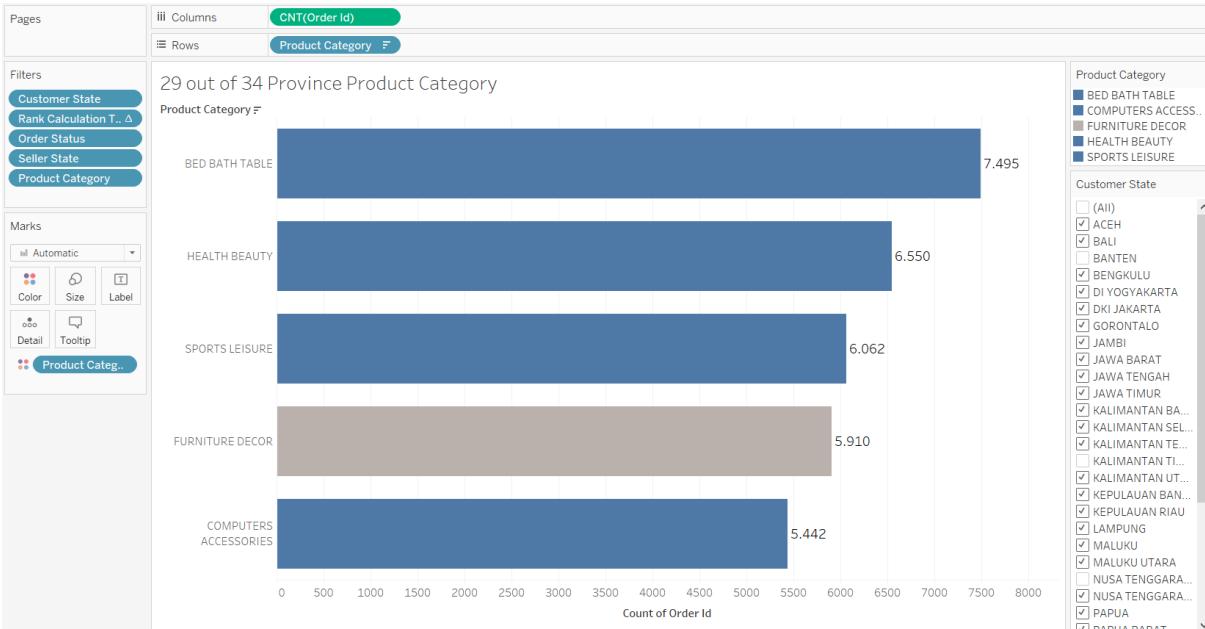
29 out of 34 Province Payment Method



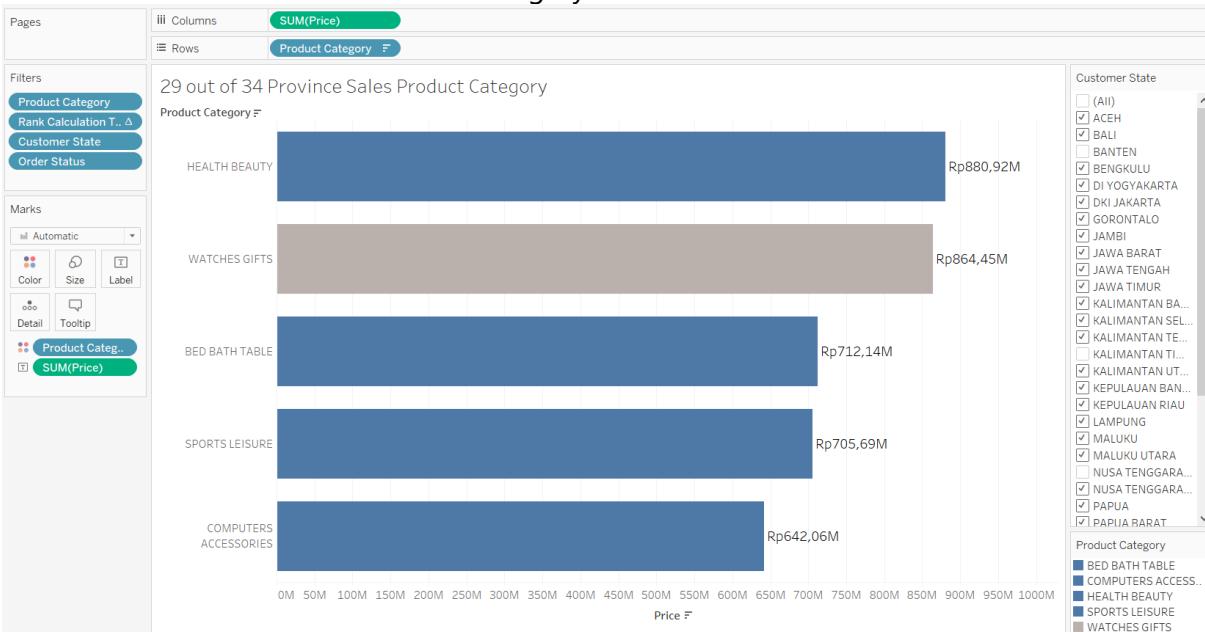
29 out of 34 Province Payment Method %



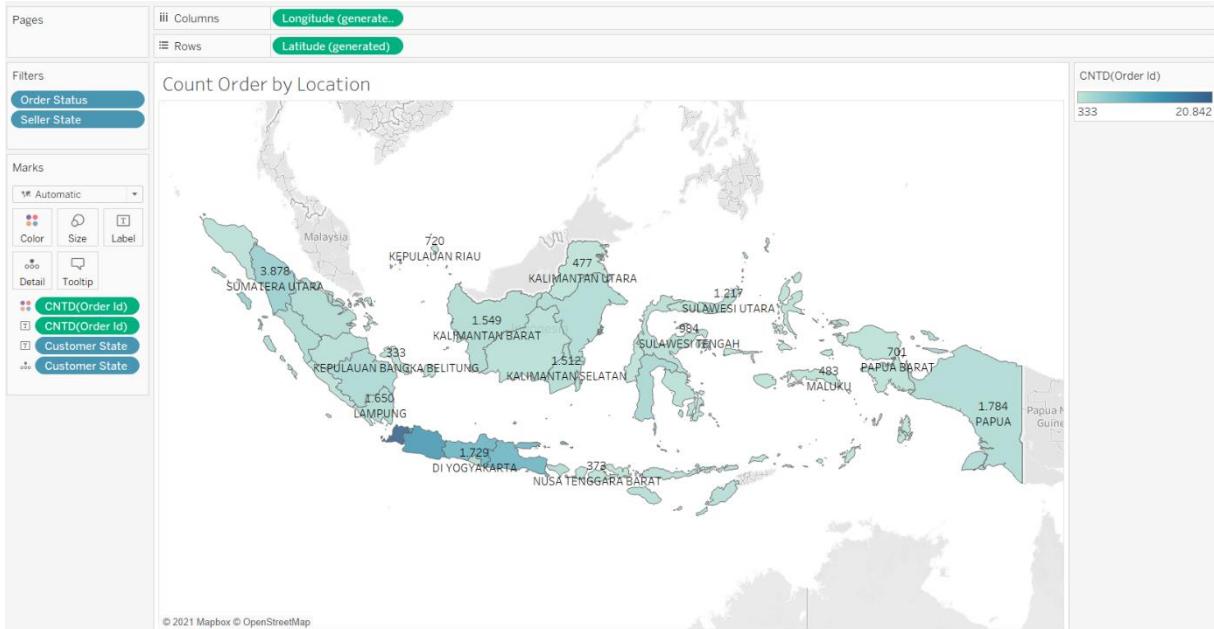
29 out of 34 Province Product Category



29 out of 34 Province Sales Product Category



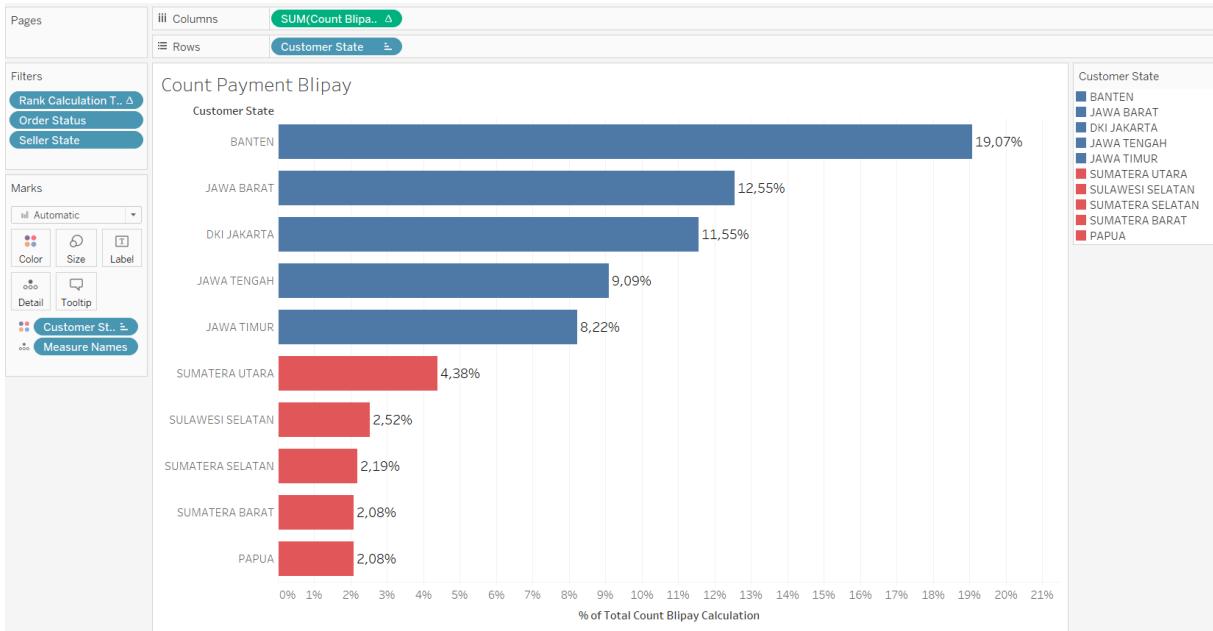
Count Order by Location



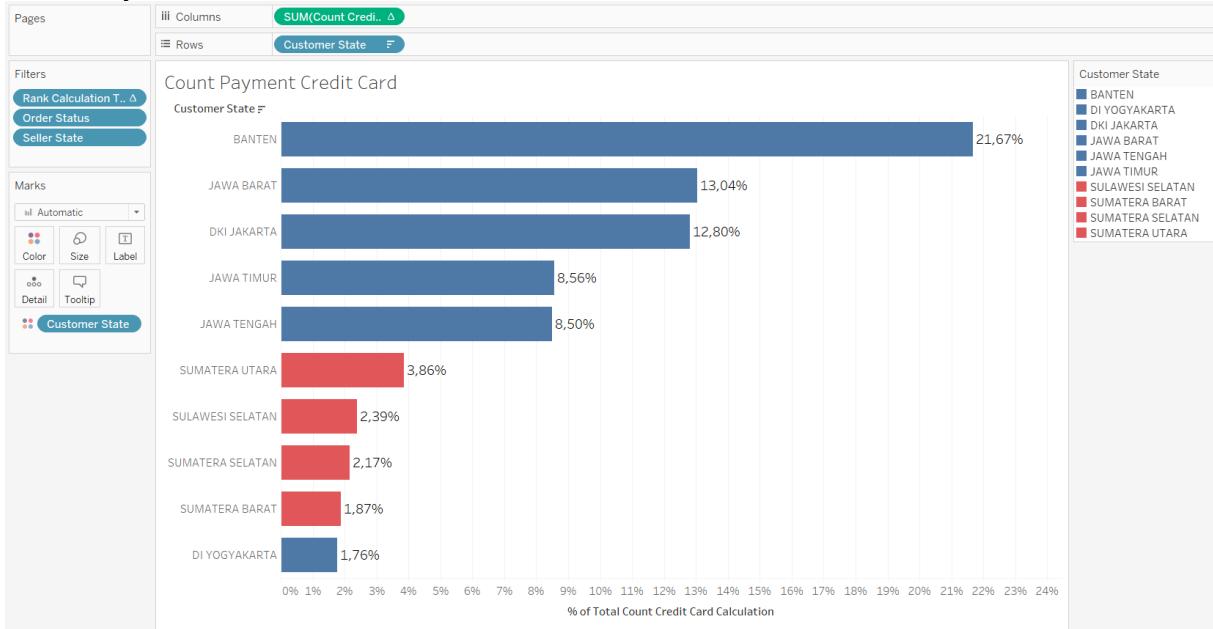
Total Payment by Location



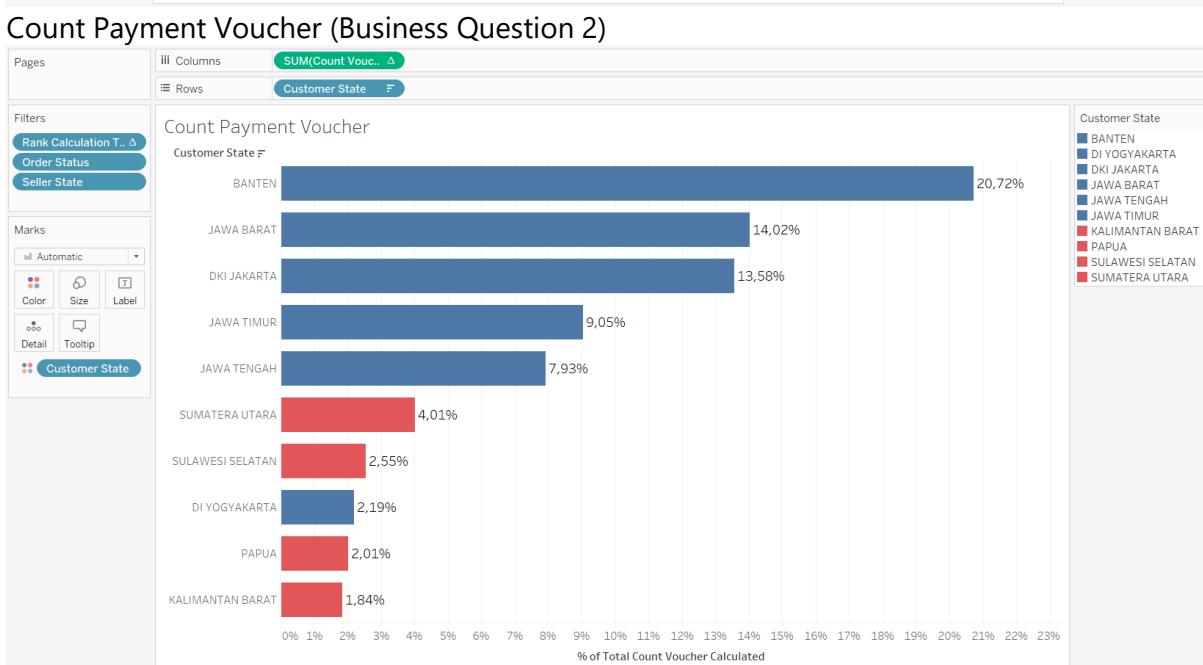
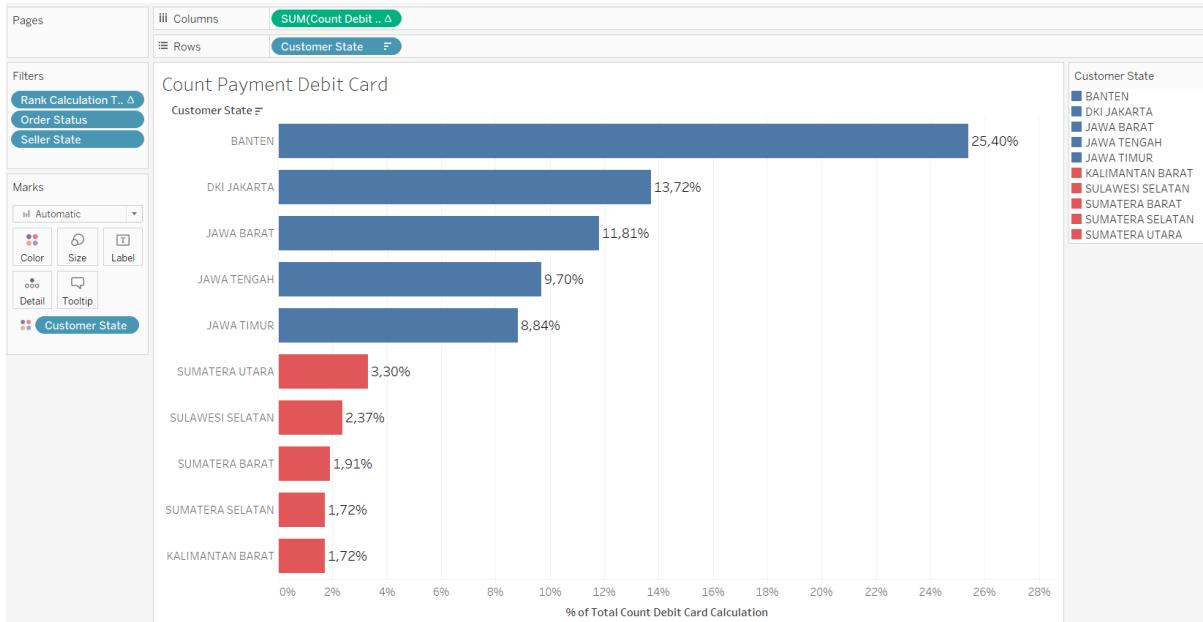
Count Payment Blipay (Business Question 2)



Count Payment Credit Card (Business Question 2)



Count Payment Debit Card (Business Question 2)



Calculation for Rank 5 Top

Rank Calculation Top 5

Results are computed along Table (across).

INDEX () <= 5

Default Table Calculation

Calculation for Rank 10 Top

Rank Calculation Top 10

X

Results are computed along Table (across).
INDEX() <= 10



Default Table Calculation

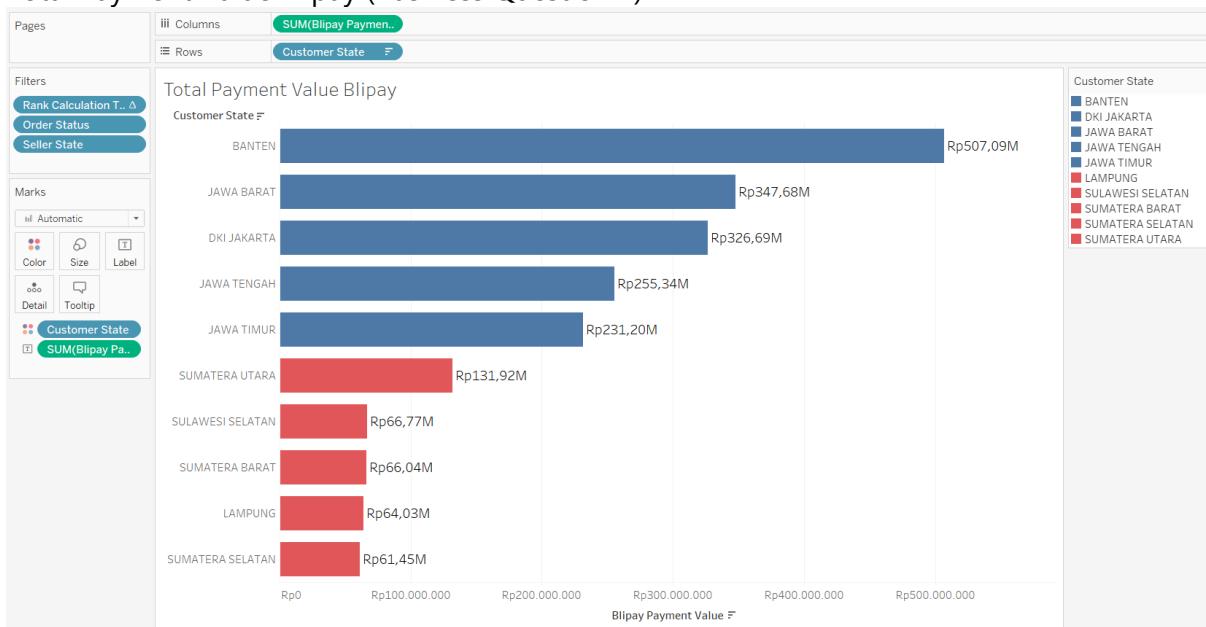
The calculation is valid.

12 Dependencies ▾

[Apply](#)

[OK](#)

Total Payment Value Blipay (Business Question 2)



Blipay Payment Value (sheet Payment Method by Location, Total Payment Value Blipay)

Blipay Payment Value

X

```
IF { FIXED [Order Id]:MAX([Total Blipay]) } = 0 THEN NULL
ELSE
{ FIXED [Order Id]:MAX([Total Blipay]) }
END
```



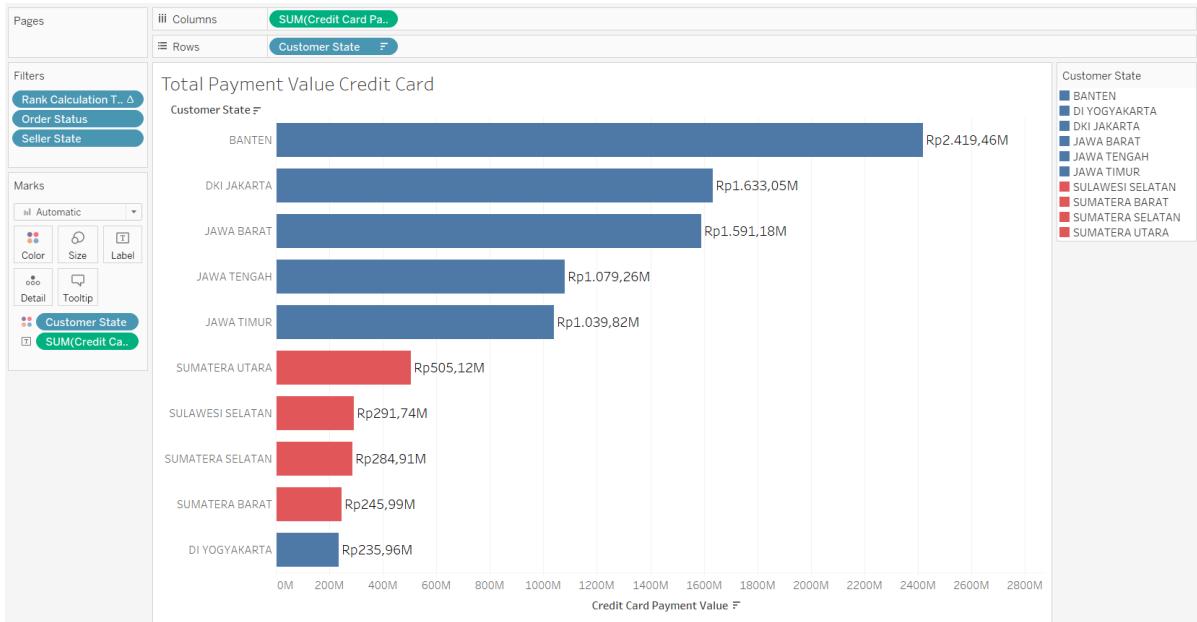
The calculation is valid.

2 Dependencies ▾

[Apply](#)

[OK](#)

Total Payment Value Credit Card (Dashboard Business Question 2)



Credit Card Payment Value (sheet Payment Method by Location, Total Payment Value Credit Card)

[edit Card Payment Value](#)

X

```
IF { FIXED [Order Id]:MAX([Total Credit Card]) } = 0 THEN NULL
ELSE
{ FIXED [Order Id]:MAX([Total Credit Card]) }
END
```

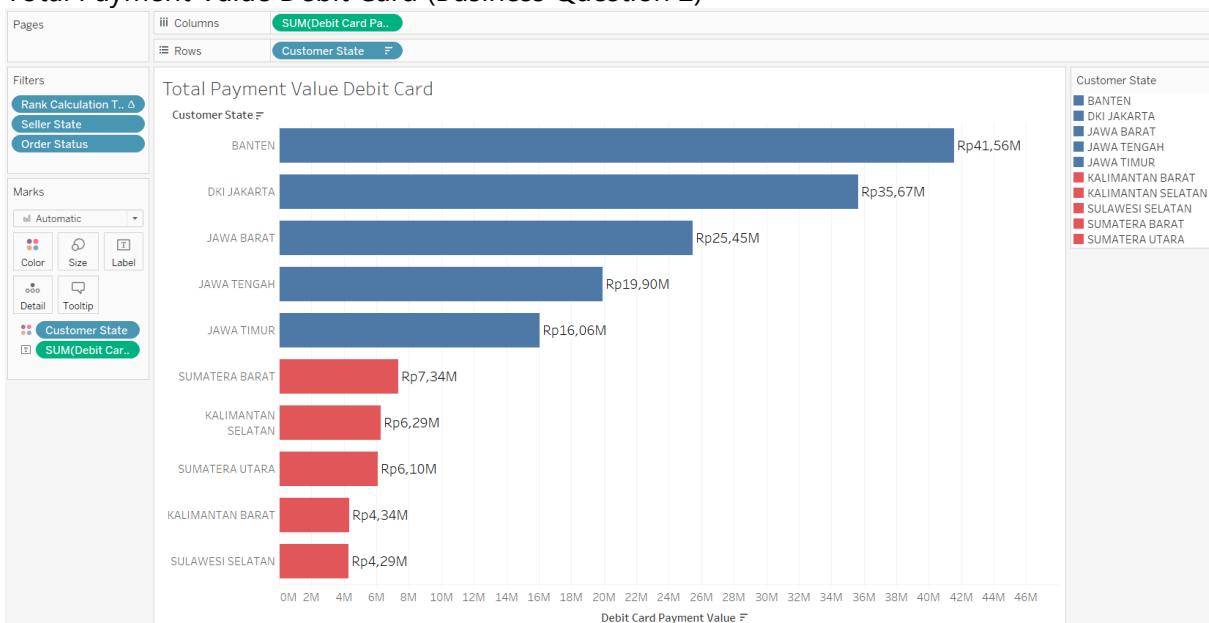
▶

2 Dependencies ▾

Apply

OK

Total Payment Value Debit Card (Business Question 2)



Debit Card Payment Value (sheet Payment Method by Location, Total Payment Value Debit Card)

debit Card Payment Value

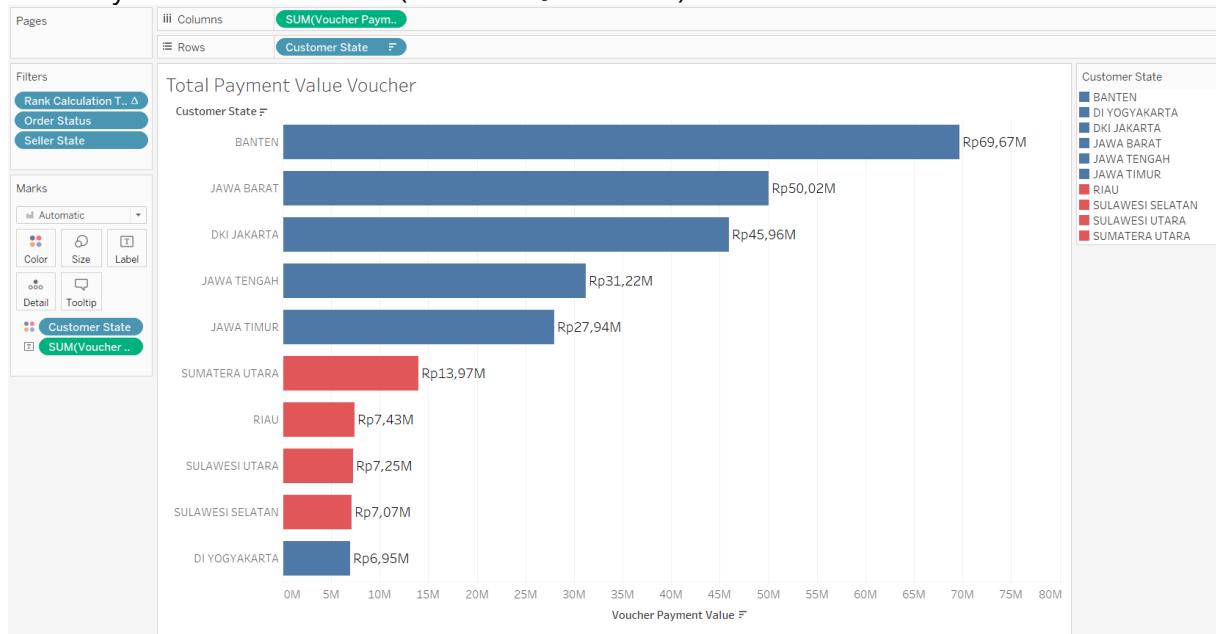
```

IF { FIXED [Order Id]:MAX([Total Debit Card]) } = 0 THEN NULL
ELSE
{ FIXED [Order Id]:MAX([Total Debit Card]) }
END

```

2 Dependencies ▾

Total Payment Value Voucher (Business Questions 2)



Voucher Payment Value (sheet Payment Method by Location, Total Payment Value Voucher)

Voucher Payment Value

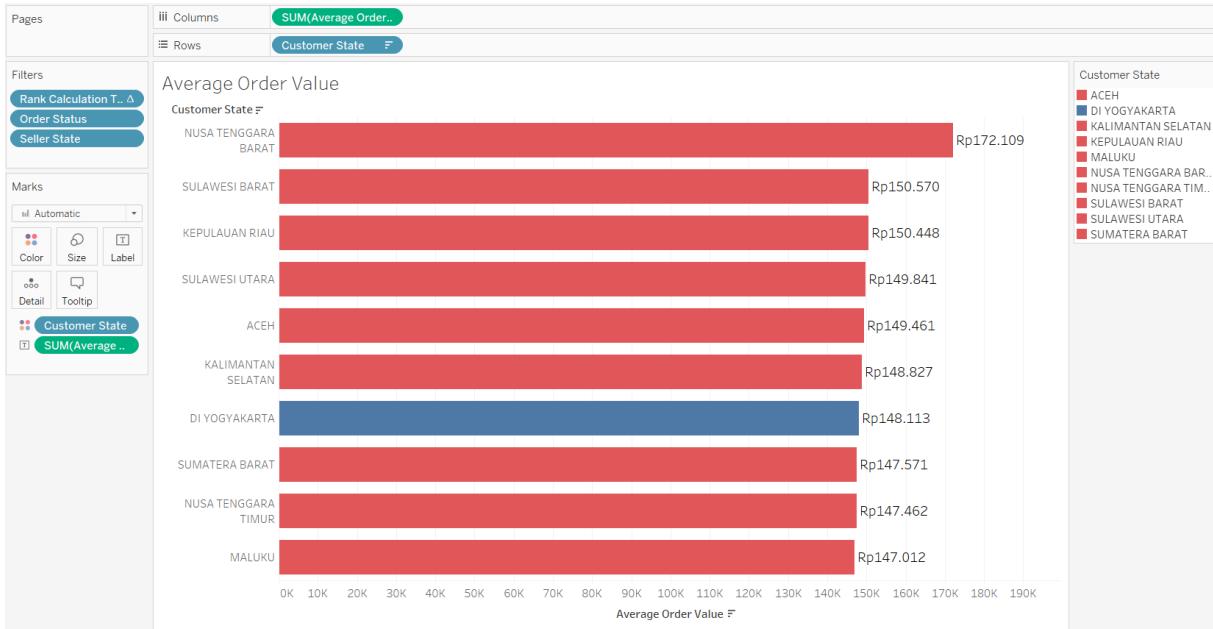
```

IF { FIXED [Order Id]:MAX([Total Voucher]) } = 0 THEN NULL
ELSE
{ FIXED [Order Id]:MAX([Total Voucher]) }
END

```

The calculation is valid. 2 Dependencies ▾

Average Order Value (Business Questions 2)



Average Order Value Calculation (sheet Average Order Value)

Average Order Value

X

```
{ FIXED [Customer State]: AVG({ FIXED [Order Id]:SUM([Price for Calculation]) }) }
```

▶

The calculation is valid.

1 Dependency

Apply

OK

Price for Calculation (sheet Average Order Value, Sales by Location)

Price for Calculation

X

```
IF [Price] = 0 THEN NULL
ELSE
[Price]
END
```

▶

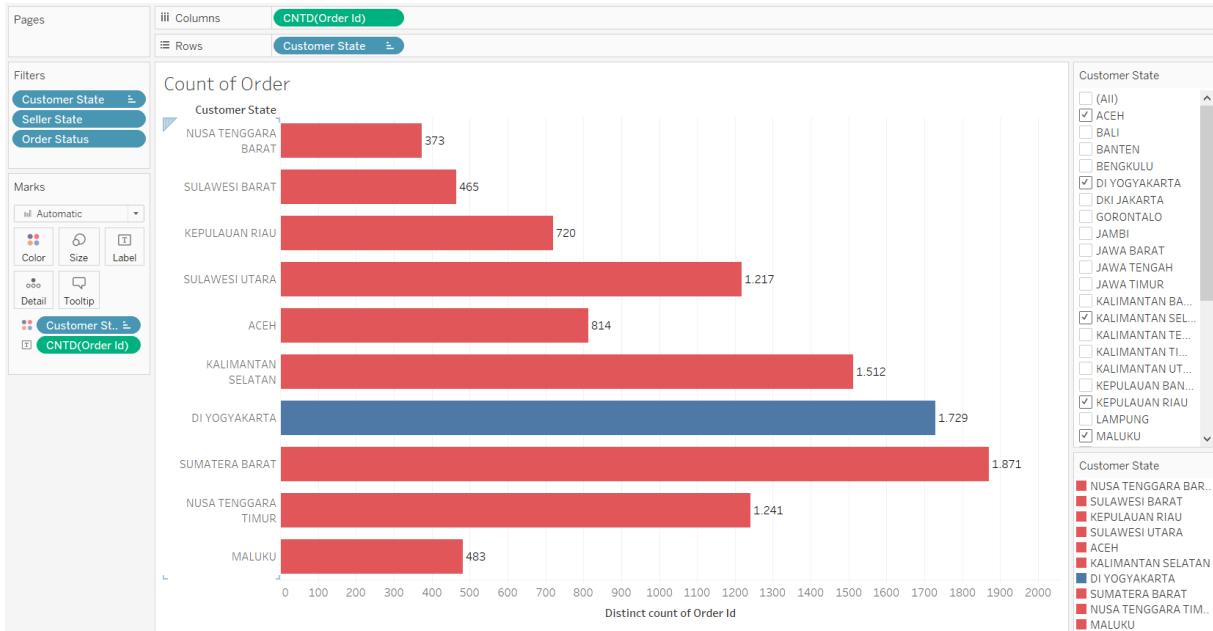
The calculation is valid.

4 Dependencies

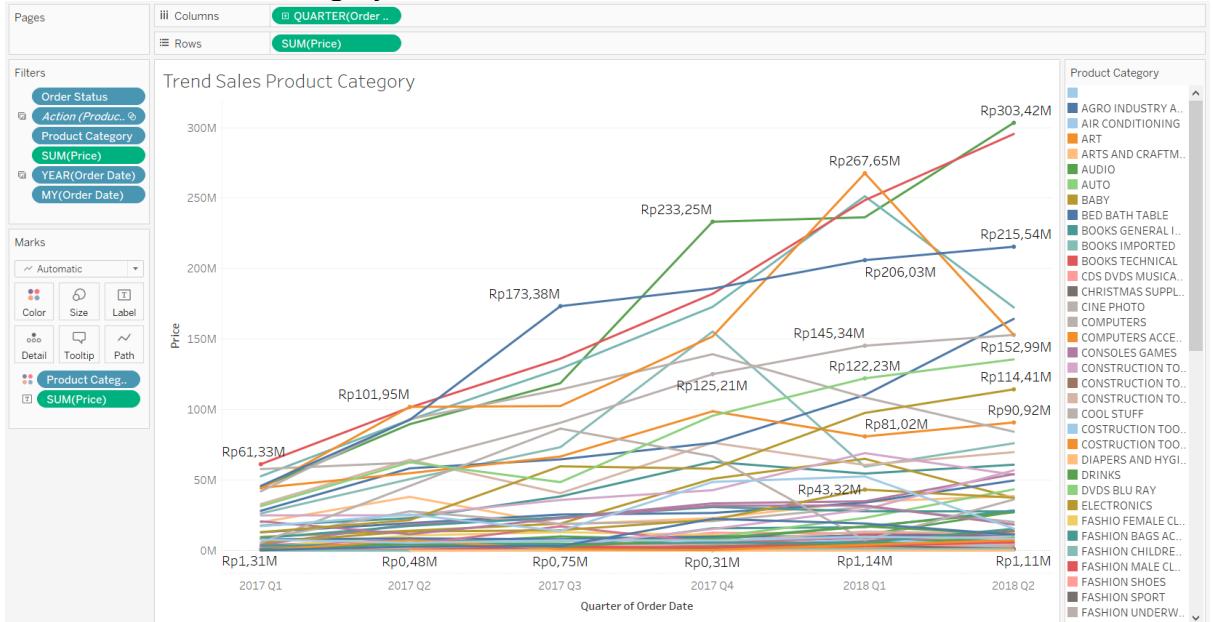
Apply

OK

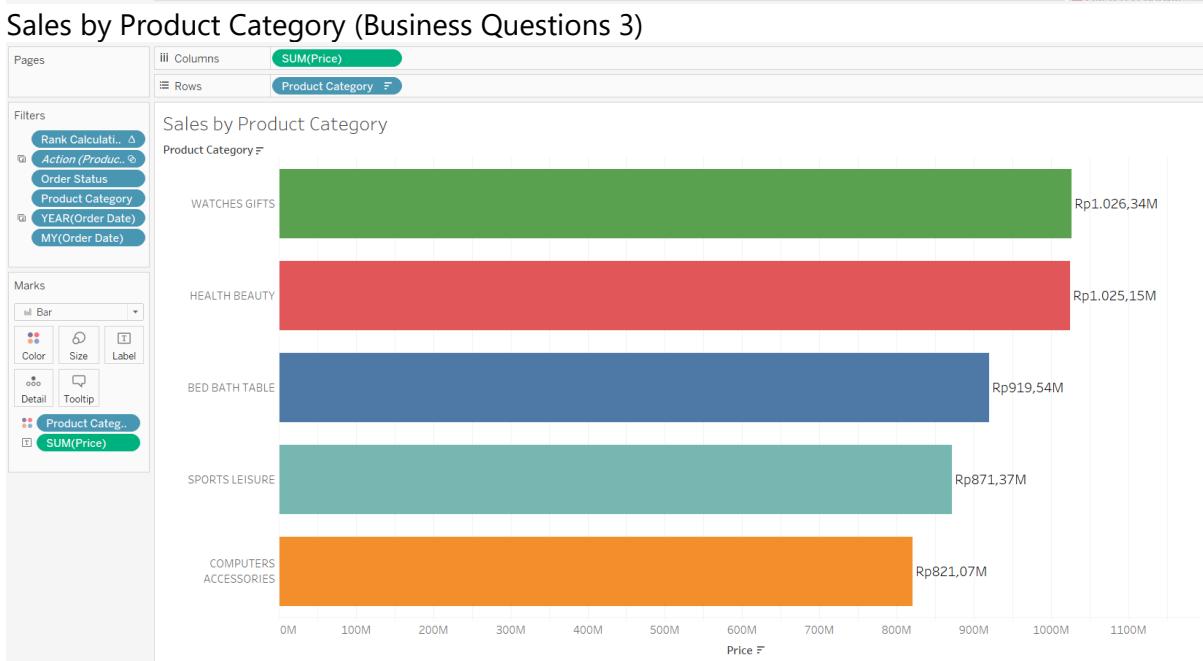
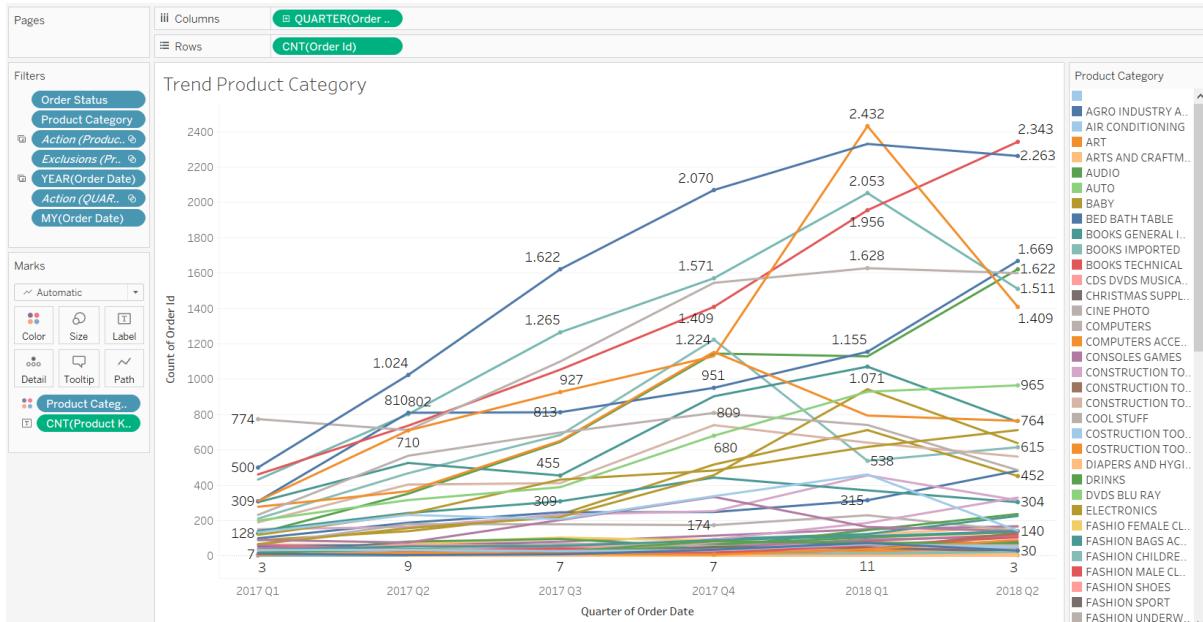
Count of Order (Business Questions 2)



Trend Sales Product Category (Business Questions 3)



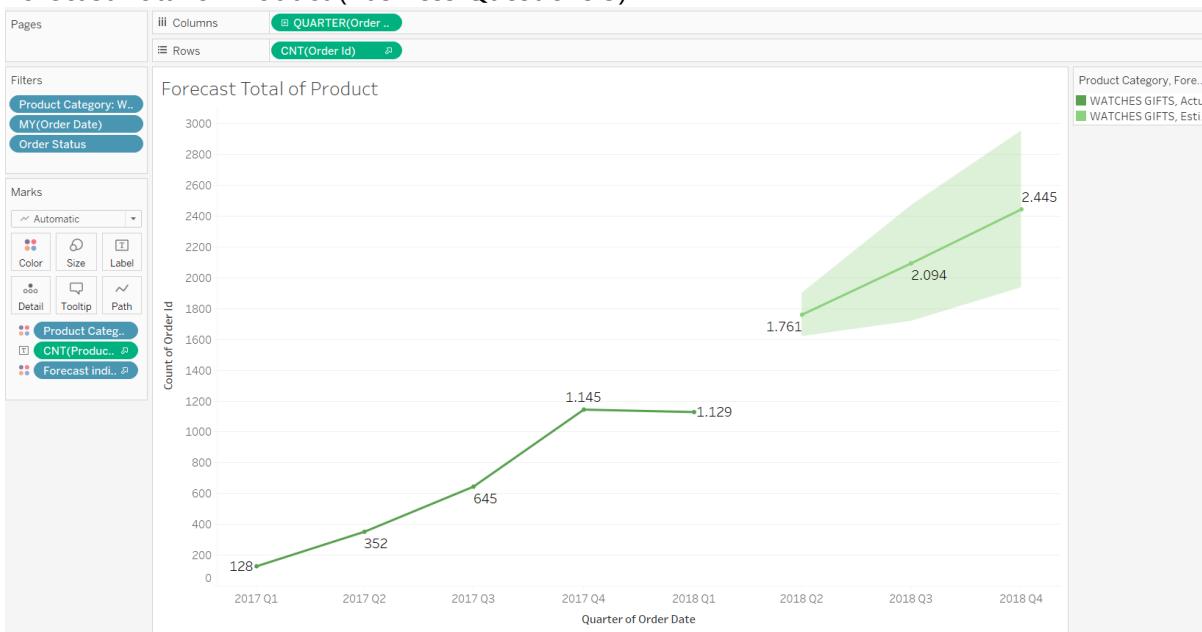
Trend Product Category (Business Questions 3)



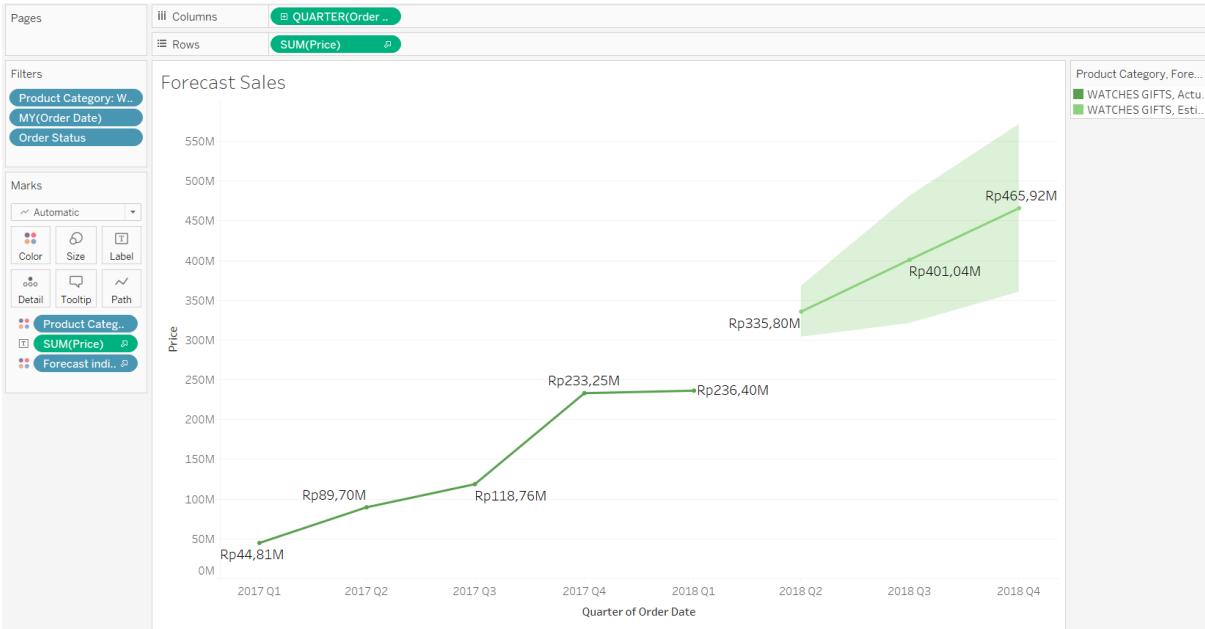
Count Product Category (Business Questions 3)



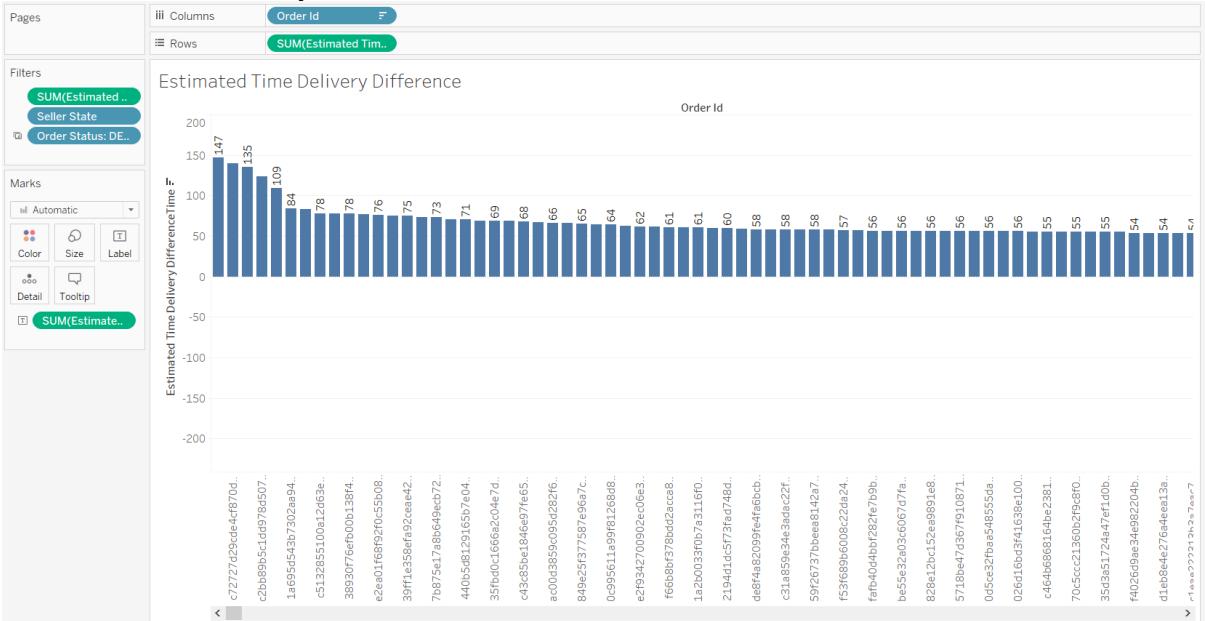
Forecast Total of Product (Business Questions 3)



Forecast Sales (Business Questions 3)



Estimated Time Delivery Difference (Business Questions 4)



Estimated Time Delivery Difference Time (sheet Estimated Time Delivery Difference)

Delivery DifferenceTime

```
{ FIXED [Order Id]: max(DATEDIFF('day', [Delivered Date], [Estimated Time Delivery Date]))) }
```

The calculation is valid.

2 Dependencies X Apply OK

Shipment Date Difference (Business Questions 4)

Pages Estimated Time Deliv..

Filters Seller State

Order Status: DELIV.

Customer State

Marks Automatic

Color Size Text

Detail Tooltip

CNT(Count..)

Rows Seller State

Estimated Time Delivery Difference Group

Seller State	Customer State	EARLY	EXTREMELY EARLY	EXTREMELY LATE	LATE	NORMAL	NOT ARRIVED YET
ACEH	ACEH	66,67%	33,33%				
	BALI	10,00%	70,00%		10,00%	10,00%	
	BANTEN	33,33%	46,21%	2,27%	3,79%	14,39%	
	BENGKULU		75,00%			25,00%	
	DI YOGYAKARTA	37,50%	50,00%			12,50%	
	DKI JAKARTA	25,81%	59,68%	1,61%	3,23%	9,68%	
	GORONTALO		100,00%				
	JAMBI			100,00%			
	JAWA BARAT	37,33%	34,67%	8,00%	2,67%	17,33%	
	JAWA TENGAH	39,06%	32,81%	9,38%	4,69%	14,06%	
	JAWA TIMUR	30,30%	48,48%		3,03%	18,18%	
	KALIMANTAN BARAT	37,50%	50,00%	12,50%			
	KALIMANTAN SELATAN	50,00%	50,00%				
	KALIMANTAN TENGAH	33,33%	33,33%	16,67%		16,67%	
	KALIMANTAN TIMUR	40,00%	40,00%			20,00%	
	KALIMANTAN UTARA	28,57%	57,14%			14,29%	
	KEPULAUAN BANGKA BELI..		100,00%				
	KEPULAUAN RIAU	66,67%			33,33%		
	LAMPUNG	40,00%	30,00%	10,00%		20,00%	
	MALUKU UTARA	33,33%	33,33%		33,33%		
	NUSA TENGGARA BARAT		100,00%				
	NUSA TENGGARA TIMUR	9,09%	72,73%		9,09%	9,09%	
	PAPUA	42,86%	50,00%		7,14%		
	PAPUA BARAT	25,00%	62,50%			12,50%	
	RIAU	38,46%	38,46%	7,69%		15,38%	
	SULAWESI BARAT	66,67%	33,33%				
	SULAWESI SELATAN	20,00%	50,00%		30,00%		
	SULAWESI TENGAH	66,67%	16,67%			16,67%	
	SULAWESI TENGARA	57,14%	28,57%	14,29%			
	SULAWESI UTARA	62,50%	25,00%			12,50%	
	SUMATERA BARAT	57,14%	14,29%	14,29%	14,29%		
	SUMATERA SELATAN	28,57%	42,86%	7,14%		21,43%	

Order Status (All) APPROVED CANCELED CREATED DELIVERED INVOICED PROCESSING SHIPPED UNAVAILABLE

Seller State (All) ACEH BALI BANTEN BENKGULU DI YOGYAKARTA DKI JAKARTA GORONTALO JAMBI JAWA BARAT JAWA TENGAH JAWA TIMUR KALIMANTAN BA... KALIMANTAN SEL... KALIMANTAN TE... KALIMANTAN TI... KALIMANTAN UT... KEPULAUAN BAN... KEPULAUAN RIAU LAMPUNG MALUKU

Estimated Time Delivery Difference Group (sheet Shipment Date Difference, Estimated Time Delivery Difference Group)

Estimated Time Delivery Difference Group

```
IF ISNULL([Fixed Order Id]: MAX([Delivered Date])) THEN "NOT ARRIVED YET"
ELSEIF [Fixed Order Id]: MAX(DATEDIFF('day', [Delivered Date], [Estimated Time Delivery Date])) >= 14 THEN "EXTREMELY EARLY"
ELSEIF [Fixed Order Id]: MAX(DATEDIFF('day', [Delivered Date], [Estimated Time Delivery Date])) >= 7 THEN "EARLY"
ELSEIF [Fixed Order Id]: MAX(DATEDIFF('day', [Delivered Date], [Estimated Time Delivery Date])) >= 0 THEN "NORMAL"
ELSEIF [Fixed Order Id]: MAX(DATEDIFF('day', [Delivered Date], [Estimated Time Delivery Date])) >= - 7 THEN "LATE"
ELSE "EXTREMELY LATE" END
```

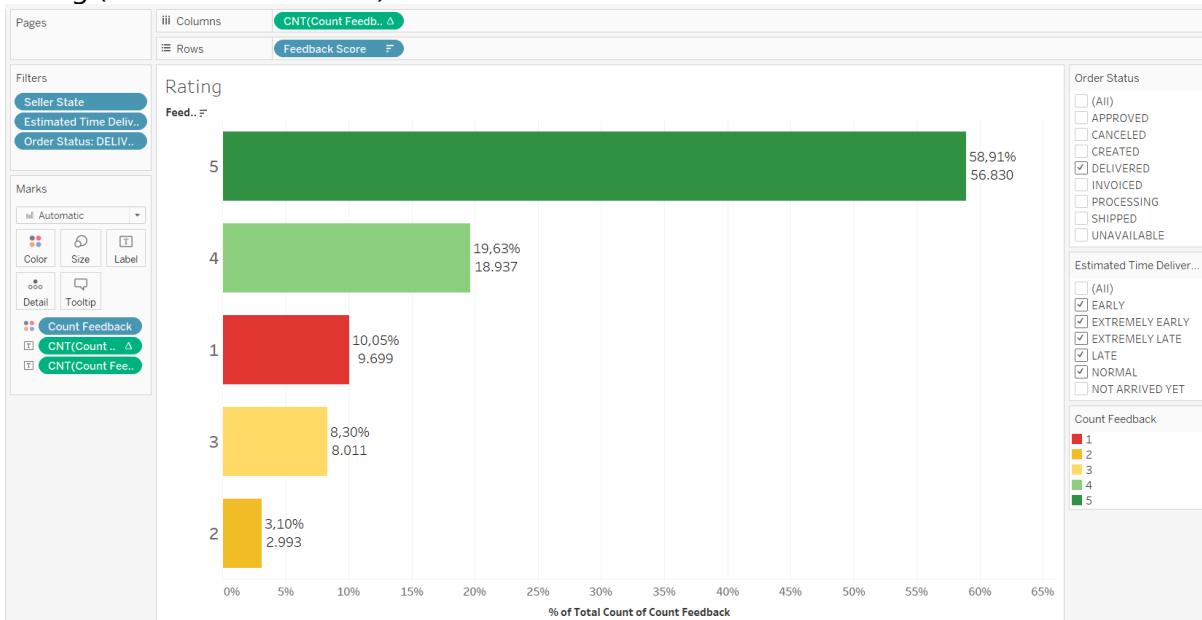
The calculation is valid.

8 Dependencies

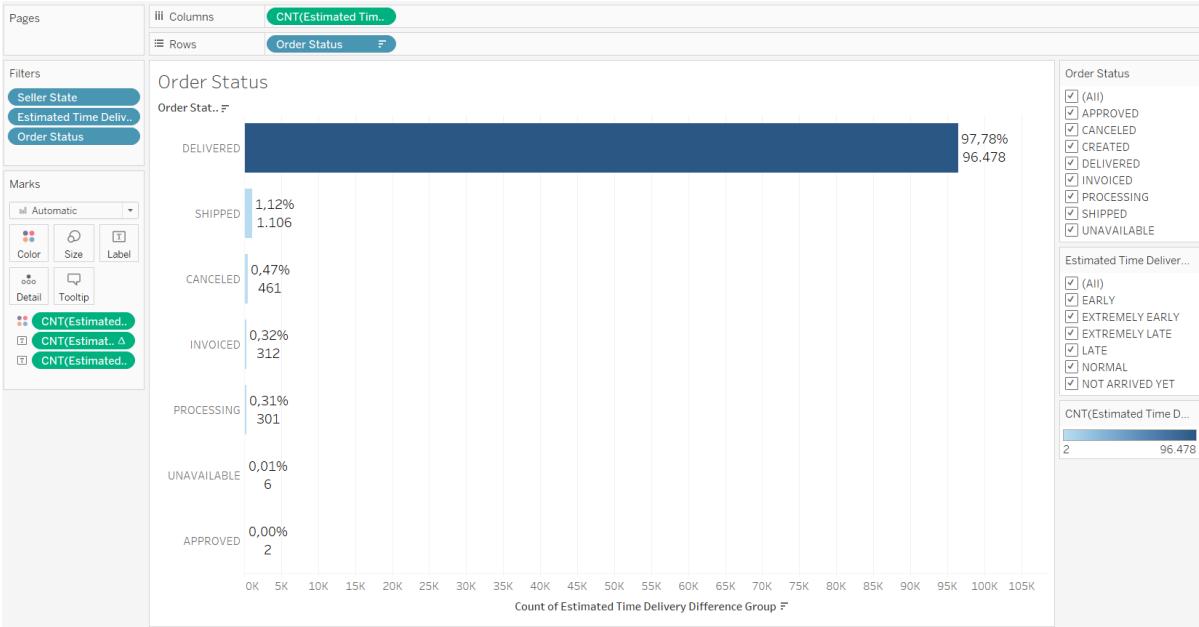
Apply

OK

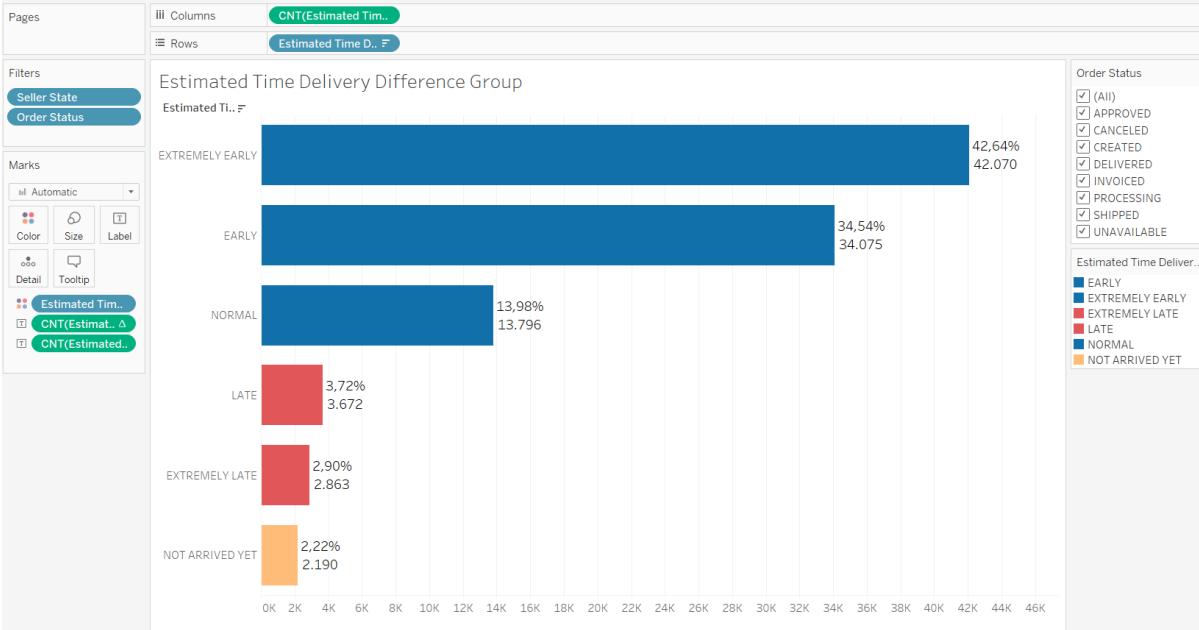
Rating (Business Questions 4)



Order Status (Business Questions 4)



Estimated Time Delivery Difference Group (Business Questions 4)



Recency

Recency

X

```
FIXED [User Name] : MIN(DATEDIFF('day', ([Order Date]), #2018-10-18#)) }
```

▶

The calculation is valid.

14 Dependencies ▾

Apply

OK

Frequency

Frequency

X

```
{ FIXED [User Name]:COUNTD([Order Id]) }
```

▶

The calculation is valid.

16 Dependencies ▾

Apply

OK

Monetary (sheet Average Monetary)

Monetary

X

```
{ FIXED [User Name]:SUM([Total Payment]) }
```



The calculation is valid.

13 Dependencies ▾

R (sheet R X F)

R

X

```
IF [Recency] <= 165 THEN "4"  
ELSEIF [Recency] <= 270 THEN "3"  
ELSEIF [Recency] <= 399 THEN "2"  
ELSE "1" END
```



The calculation is valid.

13 Dependencies ▾

F (sheet F X M, R X F)

F

X

```
IF [Frequency] == 1 THEN "1"  
ELSEIF [Frequency] == 2 THEN "2"  
ELSEIF [Frequency] == 3 THEN "3"  
ELSE "4" END
```



The calculation is valid.

14 Dependencies ▾

 Apply OK

M (sheet F X M)

 M

X

```
IF [Monetary] <= 58980 THEN "1"  
ELSEIF [Monetary] <= 98840 THEN "2"  
ELSEIF [Monetary] <= 159252.5 THEN "3"  
ELSE "4" END
```

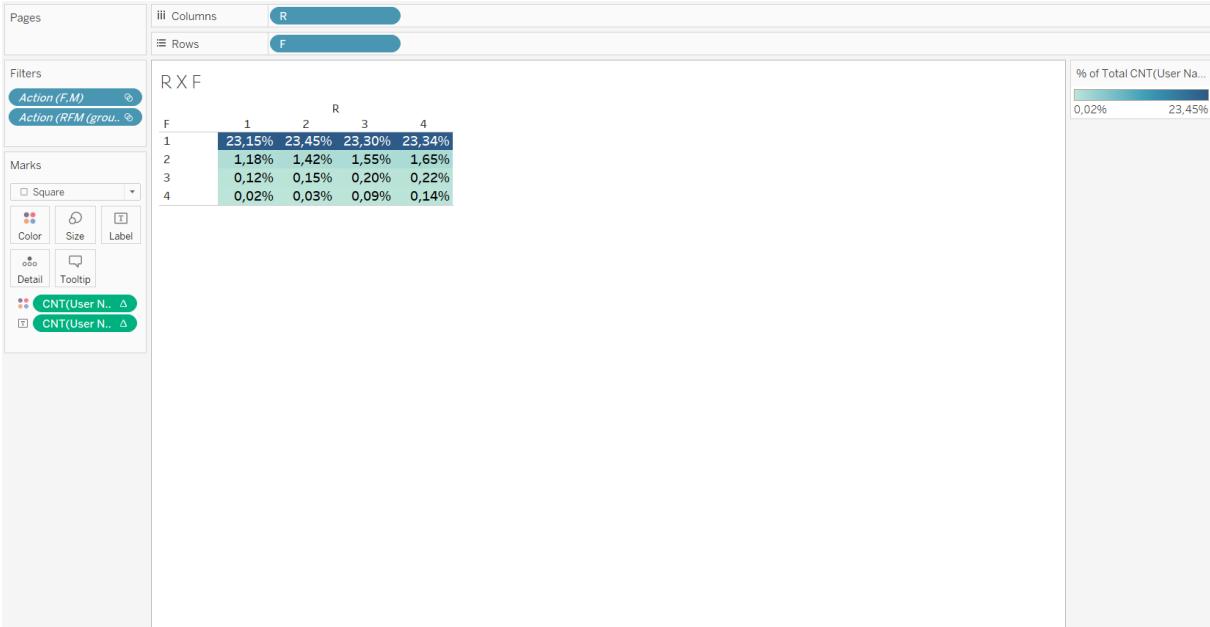


The calculation is valid.

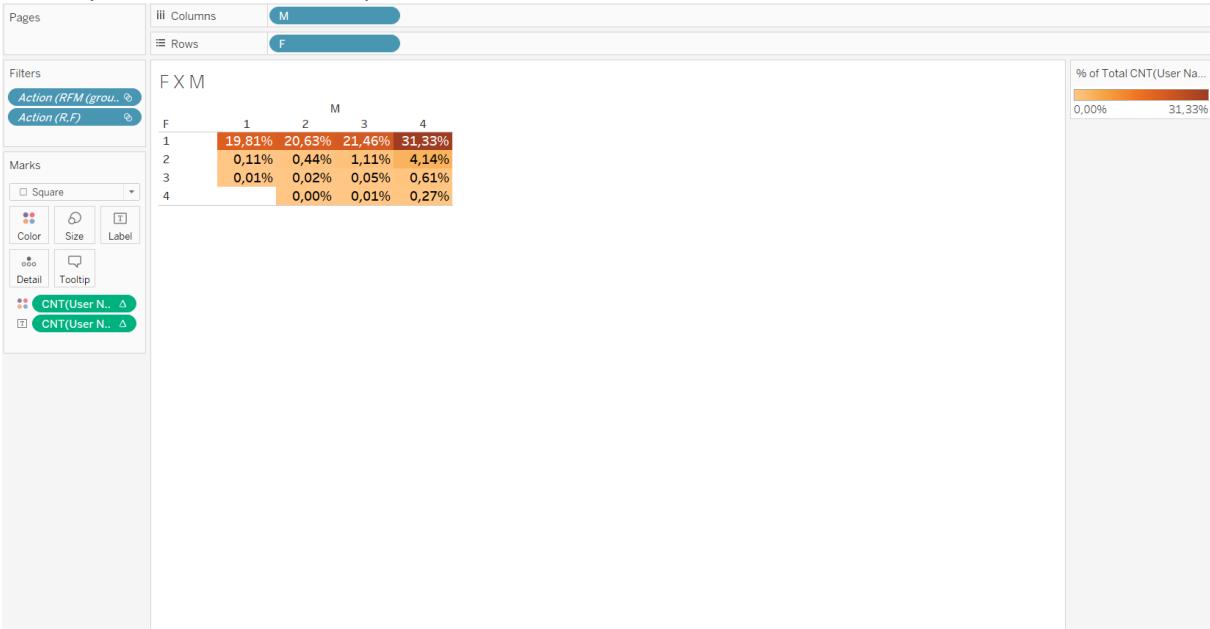
12 Dependencies ▾

 Apply OK

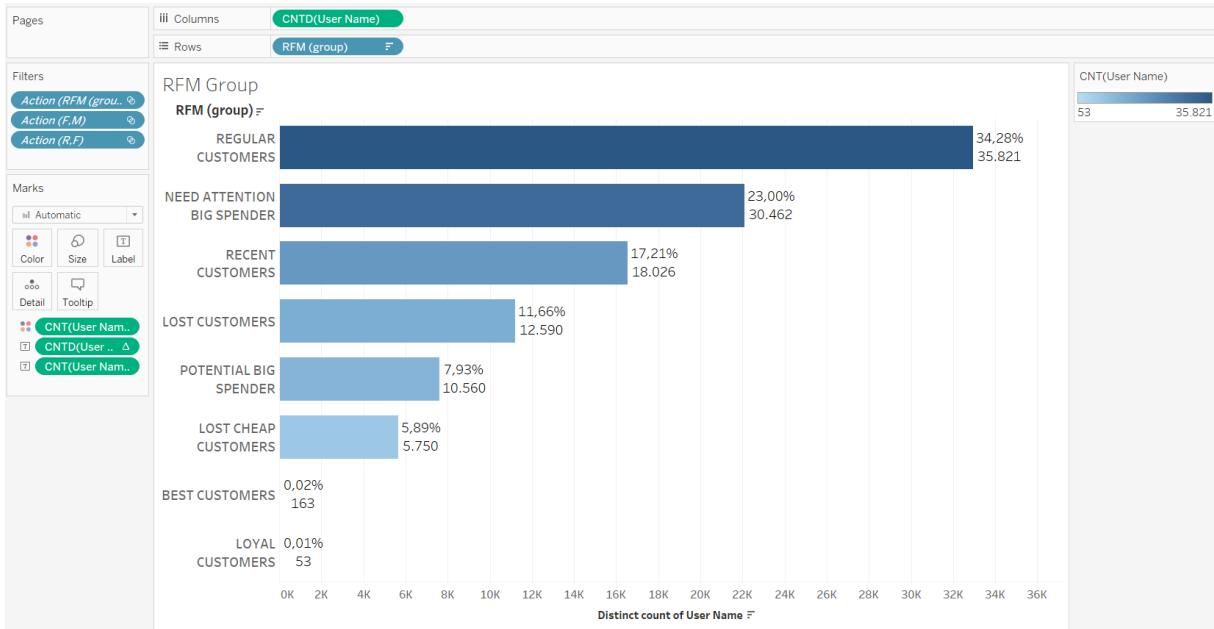
R X F (Business Questions 5)



F X M (Business Questions 5)



RFM Group (Business Questions 5)



Average Monetary (Business Questions 5)

