

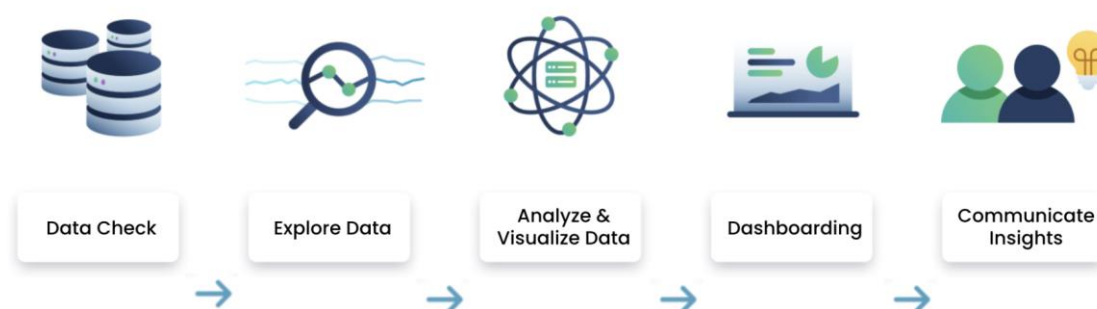
1. Introduction

For subscription-based businesses, reducing customer churn is a top priority. In this Power BI case study, I investigated a dataset from an example telecom company called Databel and analysed their churn rates. Analysing churn does not just mean knowing what the churn rate is; it is also about figuring out why customers are churning at the rate they are, and how to reduce churn. I have answered these questions by creating measures and calculated columns, while simultaneously creating insightful Power BI report pages.

2. Data Analysis Method

There are five different steps in the data analysis flow:

Data analysis flow in Power BI



2.1 Data Check

Normally, it is good to start the analysis by doing a data check to make sure the data received makes sense and is ready to work with. For example, checks for duplicate values or missing values and a sense check with other internal data sources.

2.2 Data Exploration

The best way to explore the data is to ask yourself different questions. An example question could be: Does an increase in revenue also lead to an increase in profit? I will also build my first visualisations in this step.

2.3 Analyse & Visualise Data

The next step is to analyse & visualize the data. It is key to choosing the right visualization to convey a message. This step also enables us to dig deeper into certain topics to make sure any insights are not missed.

2.4 Dashboarding

Now that an analysis is built, the next step is to portray that analysis clearly in one or more dashboards.

2.5 Communicate Insights

The final step is to communicate the insights with stakeholders.

3. The Business Problem

The problem I am working on is customer churn. I am using a fictitious churn dataset from a Telecom provider called Databel. As a consultant my task is to analyse why customers are churning, or in other words, leaving Databel.

But what is churn exactly? A good definition is the one from Investopedia: "The churn rate, also known as the rate of attrition or customer churn, is the rate at which customers stop doing business with an entity." You can compare churn with the leaky bucket problem. You can fill the bucket with more water (or new customers in this case), but your overall revenue would not increase if existing customers are leaving your company. It is easier to retain customers than to attract new customers, so for many companies, it is a priority to reduce churn.

The simplified formula for churn is to divide customers lost by the total number of customers:

```
Churn rate = customers lost / total number of customers
Churn rate = 10 / 100
10 / 100 = 10%
```

4. Dataset Description

The Databel dataset consists of 29 different columns and has one row per customer.

Customer status:		Contract information:	
Customer ID:	The unique ID that identifies a customer.	Contract Type:	Contains "Month-to-Month", "One Year" or "Two Year".
Churn Label:	Contains "Yes" or "No" to indicate if a customer churned.	Payment Method:	Preferred payment method of the customer indicated with "Credit Card", "Direct Debit" or "Paper Check".
Churn Reason:	The particular reason why the customer ended the contract.	State:	The code of the state where the customer lives.
Churn Category:	Groups multiple churn reasons together for analysis purposes.	Phone Number:	Phone number of the customer.
Demographics:		Group:	Indicates if the customer is part of a group contract. A group contract offers advantages and is generally cheaper. Contains "Yes" or "No".
Gender:	The gender of the customer, indicated by "Male", "Female" or "Prefer not to say".	Number of customers in a group:	Number of customers part of the group.
Under 30:	Indicates if the customer is under 30 with "Yes" or "No".	Subscription types & Charges:	
Senior:	Indicates if the customer is above 65 with "Yes" or "No".	Unlimited Data Plan:	Indicates if the customer has free unlimited download capacity with "Yes" or "No". This premium is reflected in the amount of the monthly charge.
Age:	The age of the customer.	Extra Data Charges:	Contains the extra charges for data downloads for customers who are not on an unlimited plan.
Subscription types & Charges:		Monthly Charges:	Average of all Monthly Charges to the customer.
Account Length (in months):	The number of months the customer has been with Databel.	Total Charges:	Sum of all monthly charges.
Local Calls:	Amount of local (within the US) calls from the customer.	Customer Service Calls:	The number of calls made to customer service.
Intl Calls:	Amount of international (outside the US) calls from the customer.	Avg Monthly GB Download:	Contains the average monthly download volume in gigabytes.
Intl Mins:	The number of minutes spent calling internationally. Intl Active: Indicates if the customer called internationally with a "Yes" or "No".		
Intl Plan:	Indicates if the customer has a premium plan to call internationally for free with "Yes" or "No". This premium is reflected in the amount of the monthly charge.		
Extra International Charges:	Contains the extra charges for international calls for customers who are not on an international plan.		

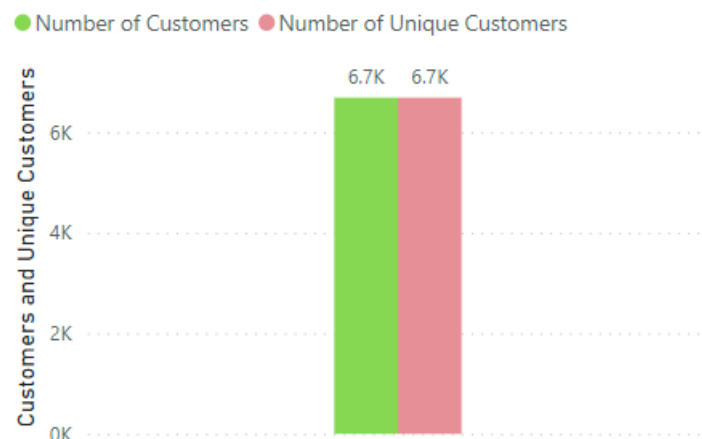
5. Exploratory Analysis

5.1 Data Check

In this first step, I created two measures to check if the count of Customer IDs is equal to the count of Unique Customer IDs. This has been done to check for duplicate rows which might affect the analysis.

- “Number of Customers”
- “Number of Unique Customers”

Number of Customers and Number of Unique Customers



- Both are equal, hence, there are no duplicate observations in the dataset.

5.2 Calculating Churn

Using the column “Churn Label” that indicates “Yes” or “No”, a new column called “Churned” has been created by converting its values to binomial values (1 for “Yes” and 0 for “No”).

The “Churned” column contained a 1 if a customer churned and a 0 if the customer did not. A new measure “Number of Churned Customers” has been created using the values of the “Churned” column. This was done by calculating the total number of churned customers by summing the “Churned” column.

Another measure “Churn Rate” was calculated and formatted as a percentage. This was done by dividing the churned customers by the total number of customers.

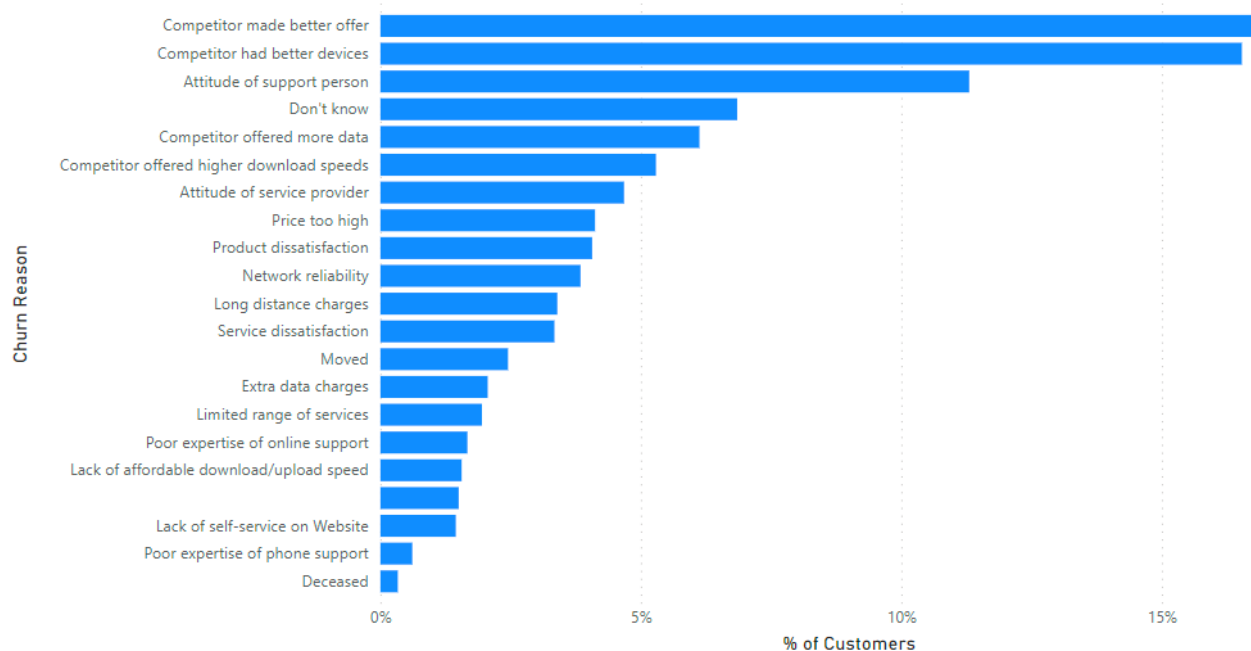
26.86%
Churn Rate

The total **Churn Rate** for Databel was **26.86%**.

5.3 Investigating Churn Reasons

The logical next step was to investigate the different reasons why customers churned.

% of Customers by Churn Reason



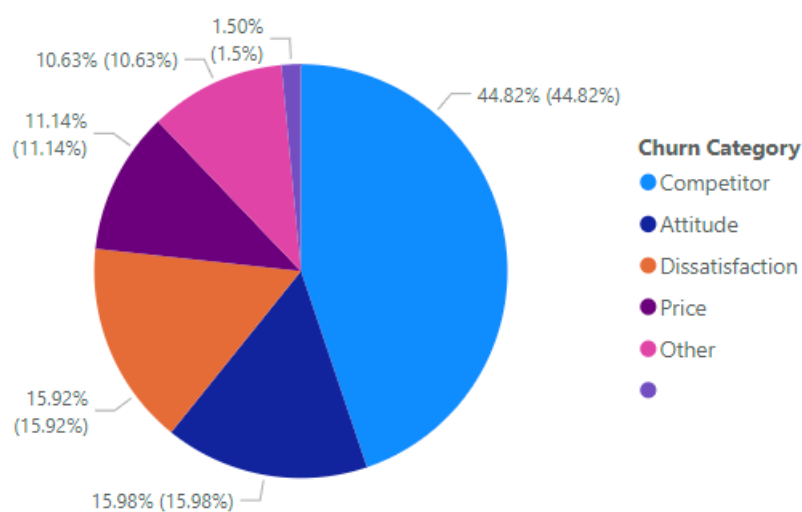
The top two reasons why customers churn are:

- “Competitor made a better offer”.
- “Competitor had better devices”.

5.4 Investigating Churn Categories

“Churn Reasons” column values have been grouped together in the “Churn Category” column. The “Extra data charges”, “Price too high” and other price-related reasons are grouped together in the “Price” category.

% of Customers by Churn Category

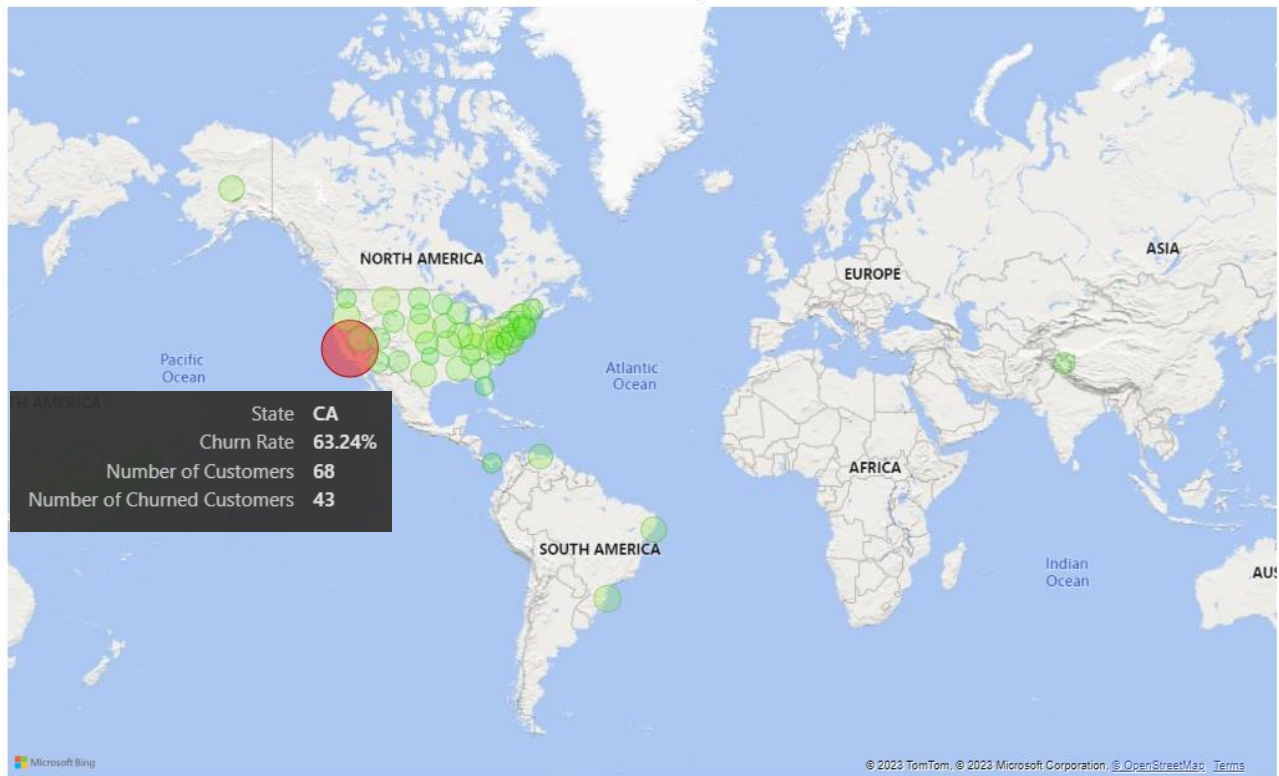


- The most prevalent Churn Category is “Competitor”.

5.5 Churning by State

It was known that the competitors have launched aggressive promos in certain states, and Databel is wondering if it has impacted their customers. Hence, a map visualisation was created to investigate the Churn by State.

Churn Rate, Number of Customers and Number of Churned Customers by State



- **California** has the **highest Churn Rate** of **63.24%** with 43 customers churning out of 68 customers in the State.

Insights discovered so far:

- The **Churn Rate** for Databel is approximately **27%**.
- Approximately **45%** of the **reasons** why customers churn are related to **Competitors**.
- The **Churn Rate** in **California** is abnormally high (**>60%**).

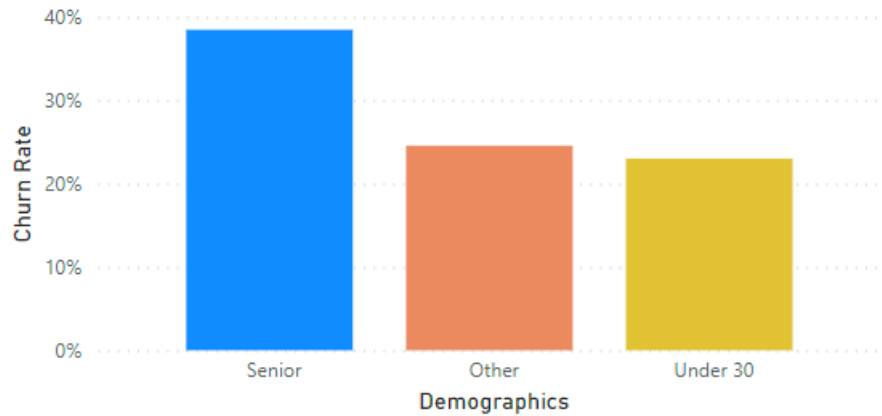
6. Investigating Churn Patterns

6.1 Analysing Demographics

I have gathered the categorised demographic variables related to age ("Under 30", "Senior", and "Age") in a new column called "Demographics". I have created three categories in this new column:

- "Senior" – for customers having Age ≥ 65
- "Under 30" – for customers having Age < 30
- "Other" – for customers having Age = 30

Churn Rate by Demographics

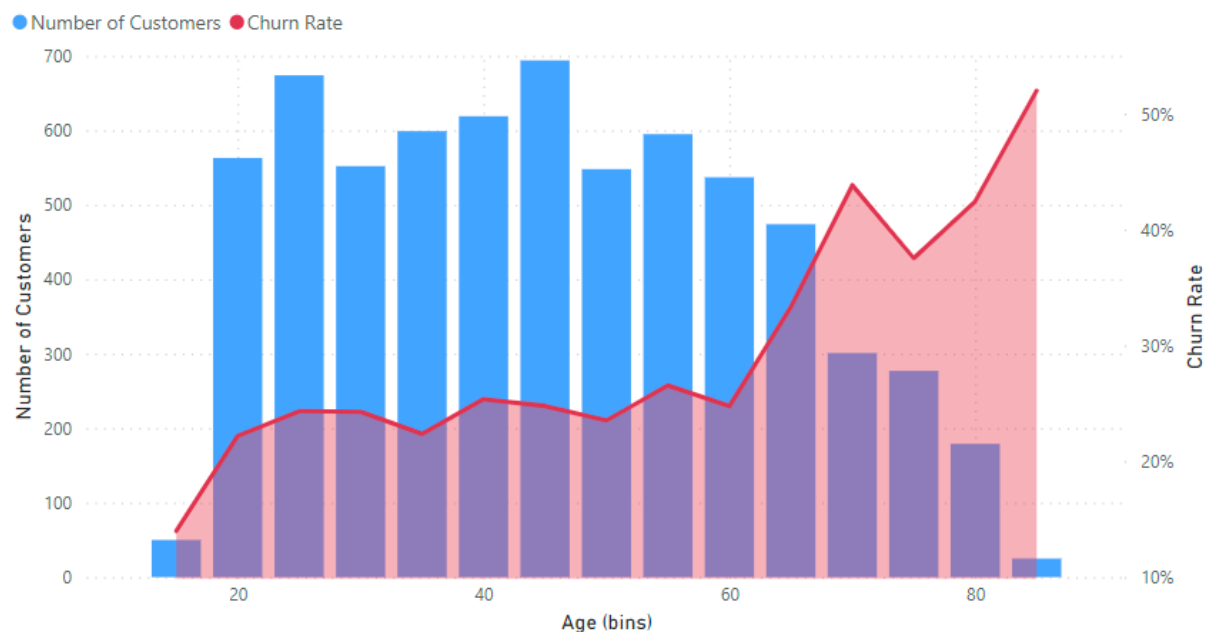


- The **Churn Rate** for **Senior Citizens** is significantly above the average (**38.46%**).

6.2 Age Groups

In the previous section, a great insight was discovered that Senior Citizens churn more often. This suggests that it might be a good idea to analyse the customer Age in general. Hence, I created different Age bins and visualised the Number of Customers per Age bracket and their respective Churn Rates.

Number of Customers and Churn Rate by Age (bins)

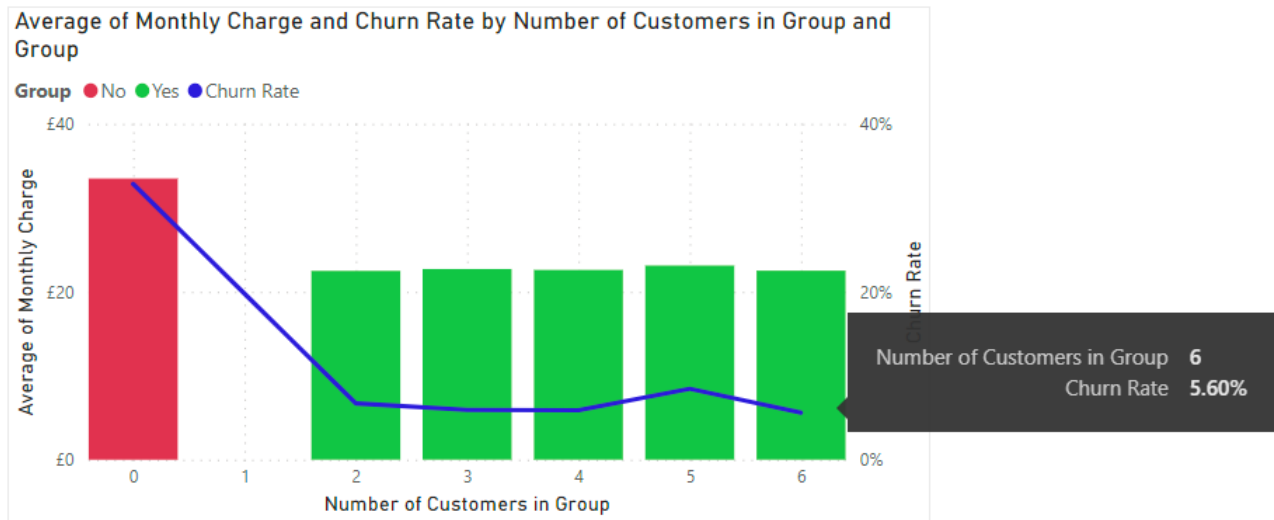


- The Age bracket 45-49 has the highest Number of Customers.
- The **Churn Rate** for customers **aged more than 80** is **52%**.
- As the **Age increases**, the average **Churn Rate** for **Age** brackets also **increases**.

6.3 Inspecting Group Contracts

Databel offers Group Contracts to customers from the same household. The advantage for the customers is a Discounted Rate, which is a great way for Databel to grow its customer base.

Hence I analysed if customers that are part of a group indeed have a lower phone bill and if it has an impact on the Churn Rate.



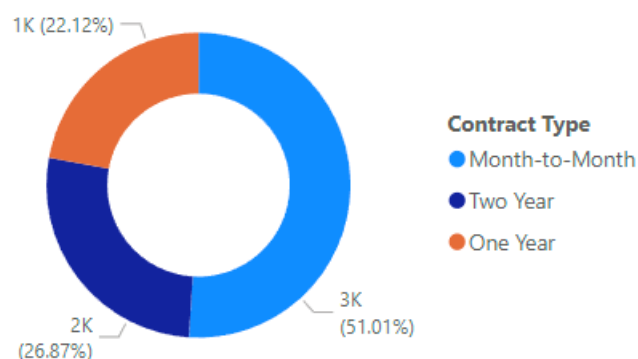
- It appears the “**Monthly Charge**” is significantly **lower** for people who are in a **group of 2 or more**.
- The **group size of 6** has the **lowest Churn Rate (5.60%)**.

6.4 Analysing by Contract Type

There are three different contract types:

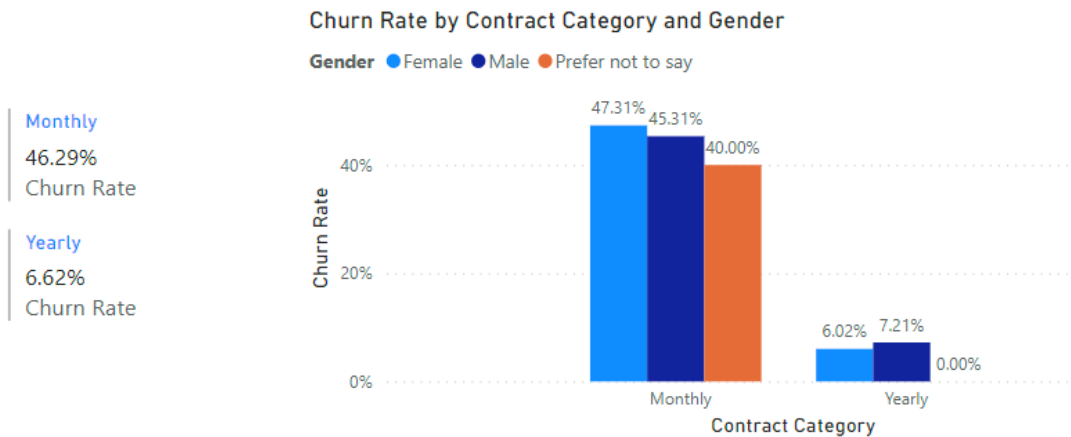
- “One Year”
- “Two Year”
- “Month-to-Month”

Number of Customers by Contract Type



- **More than half** of the customers have a “**Month-to-Month**” contract.

I have gathered the values of yearly contracts into a new column “Contract Category”. In this way, we can observe the difference between the customers who have only yearly contracts and those having monthly contracts.



- There is a huge difference, i.e., customers having **monthly contracts churn more** than the customers who have **yearly-based contracts**.
- **Churn Rate** for **female** customers in **monthly-based contracts** is the **highest (47.31%)**.

6.5 Unlimited Plan

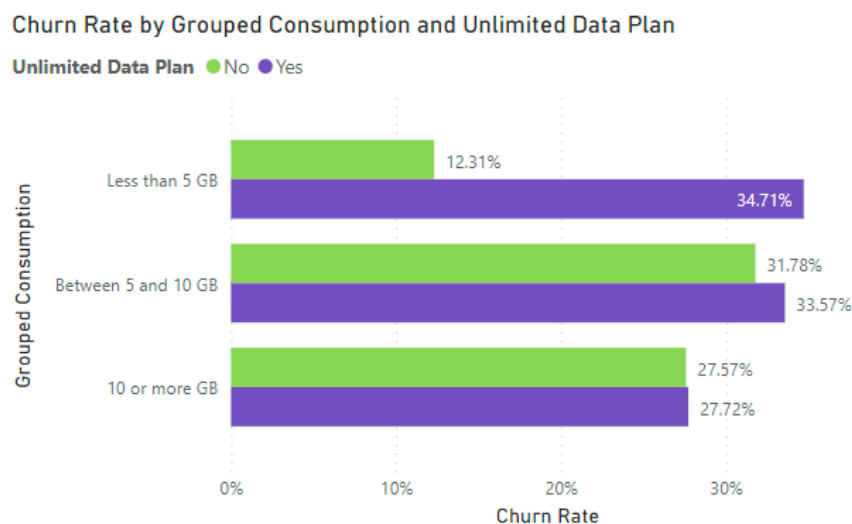
Databel has a hypothesis that people who are not on an unlimited data plan are more likely to churn. Hence, I investigated how the “Unlimited Data Plan” influences the Churn Rate.

Unlimited Data Plan	Number of Customers	Churn Rate
No	2193	16.10%
Yes	4494	32.11%
Total	6687	26.86%

- It appears that **customers** who are on an **unlimited plan** are **more likely to churn**.

To see if it is related to a certain amount of mobile data (GB) being used, I created a new column “Grouped Consumption” that classifies the average monthly GB download into the following groups:

- “Less than 5 GB”
- “Between 5 and 10 GB”
- “10 or more GB”



- **Churn Rate** for customers on an **Unlimited Plan** who **consume less than 5 GB of data** is the **highest (34.71%)**.

6.6 International Calls

This analysis includes an analysis of the international activity of customers and its relationship to churn to find out the behavior of customers who call internationally, and if paying for an International Plan influences their loyalty.

Intl Active	no	yes	Total
No	20.01%	71.19%	22.21%
Yes	40.34%	7.59%	34.31%
Total	27.07%	24.88%	26.86%

- The customers who **do not call internationally** but **pay for an International Plan** have the **highest Churn Rate** of **71.19%**.
- Dabel can contact customers who are on an international plan but have not called internationally and propose they downgrade their plan.
- Proposing a cheaper plan and explaining the rationale will increase customer satisfaction and stop customers from churning.

Daabel wants to focus on the budget on a state-by-state basis for the promotion of the International Plan.

Hence for the state with the highest Churn Rate (California), the following statistics were observed:

Intl Active	no	yes	Total
No	54.29%	100.00%	56.76%
Yes	72.00%	66.67%	70.97%
Total	61.67%	75.00%	63.24%



- There are **72%** of customers in **California**, who **actively make international calls** but **do not have an International Plan**.
- These customers without a plan can be potential clients for the new promotion of the International Plan in California.

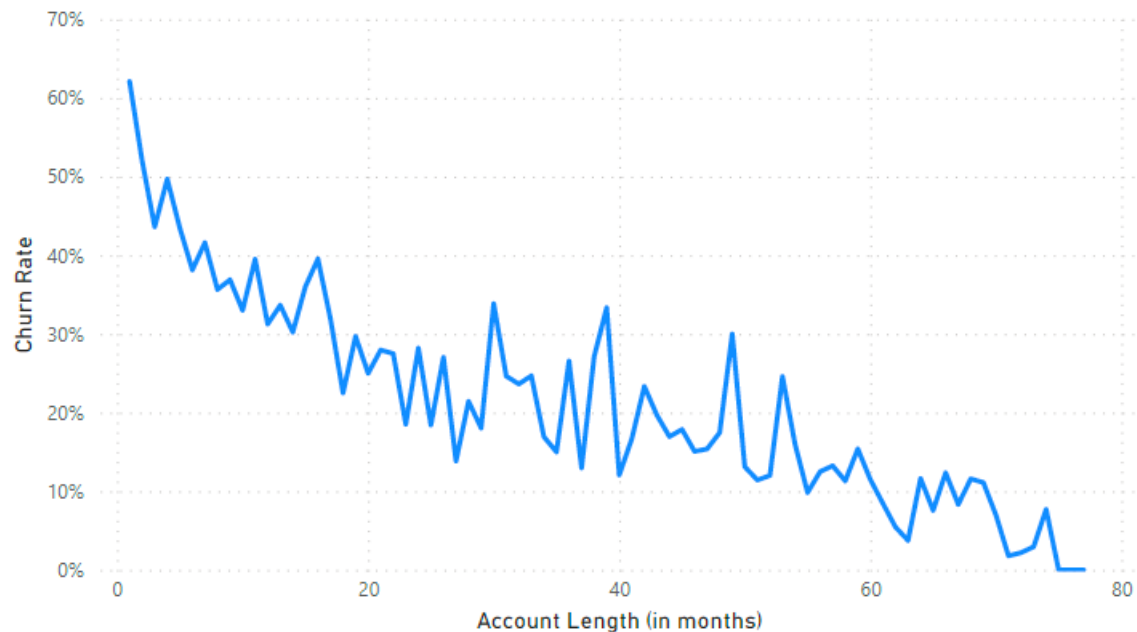
6.7 Customer Service

Databel also wants to improve its customer service since there have been some reported issues.

Hence, I have investigated three important topics related to customers:

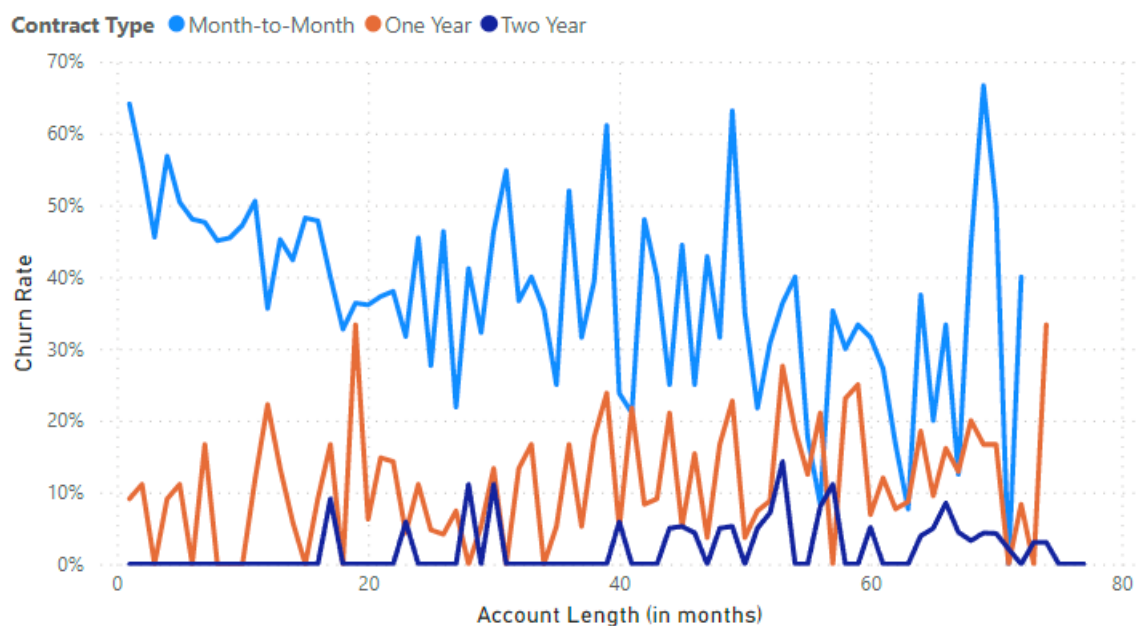
- The Payment Method
- The Contract Type
- How many months a person is a customer

Churn Rate by Account Length (in months)



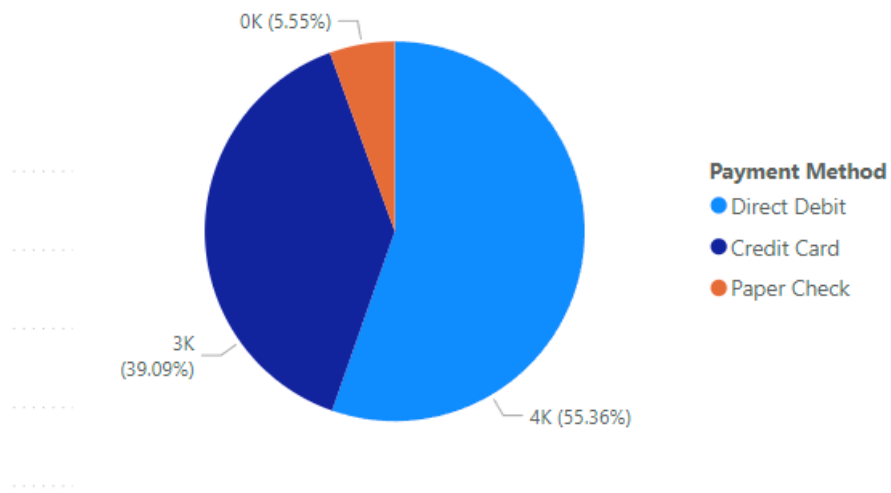
- The **Churn Rate decreases over time** (as the customers stay for a longer time with Databel).

Churn Rate by Account Length (in months) and Contract Type



- Most of the **decrease in Churn Rate** is for **Month-to-Month Contracts**.
- There is not much variation in Churn Rate for One Year and Two Year Contracts.

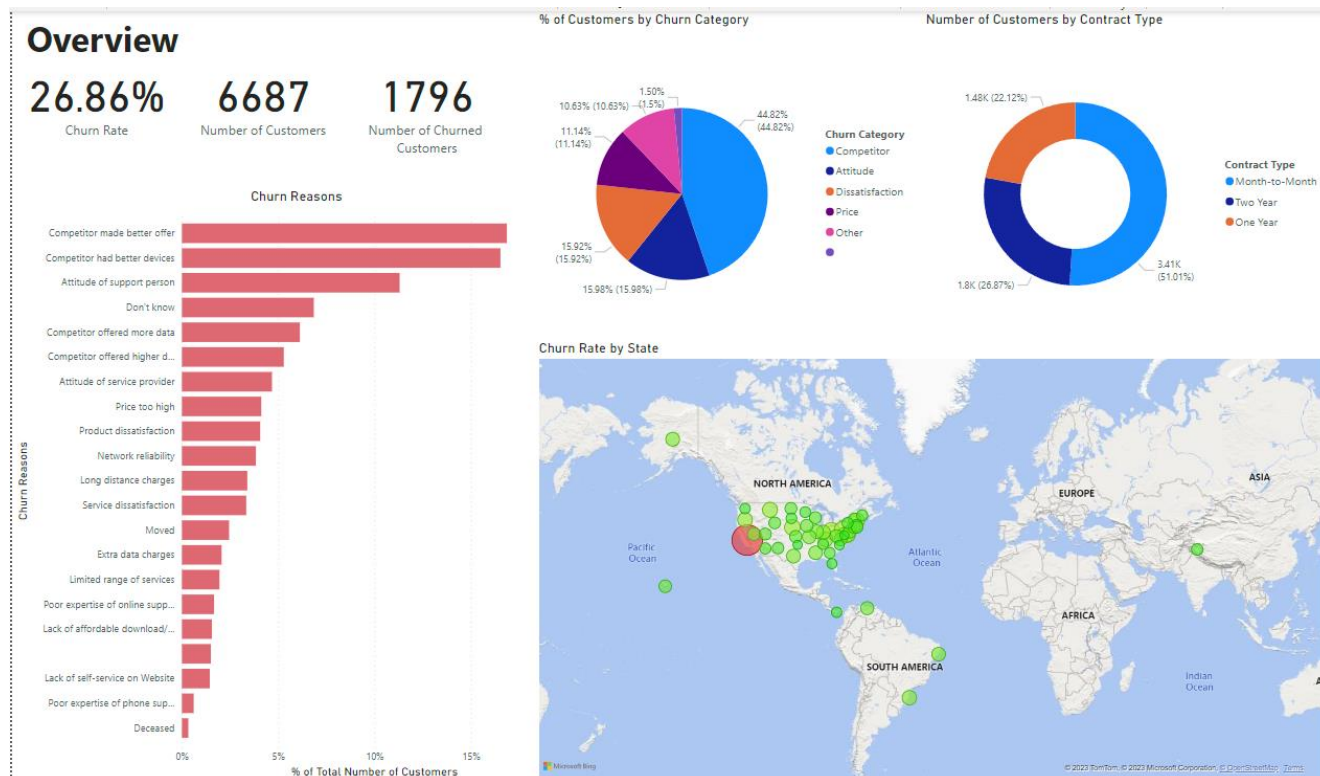
Number of Customers by Payment Method



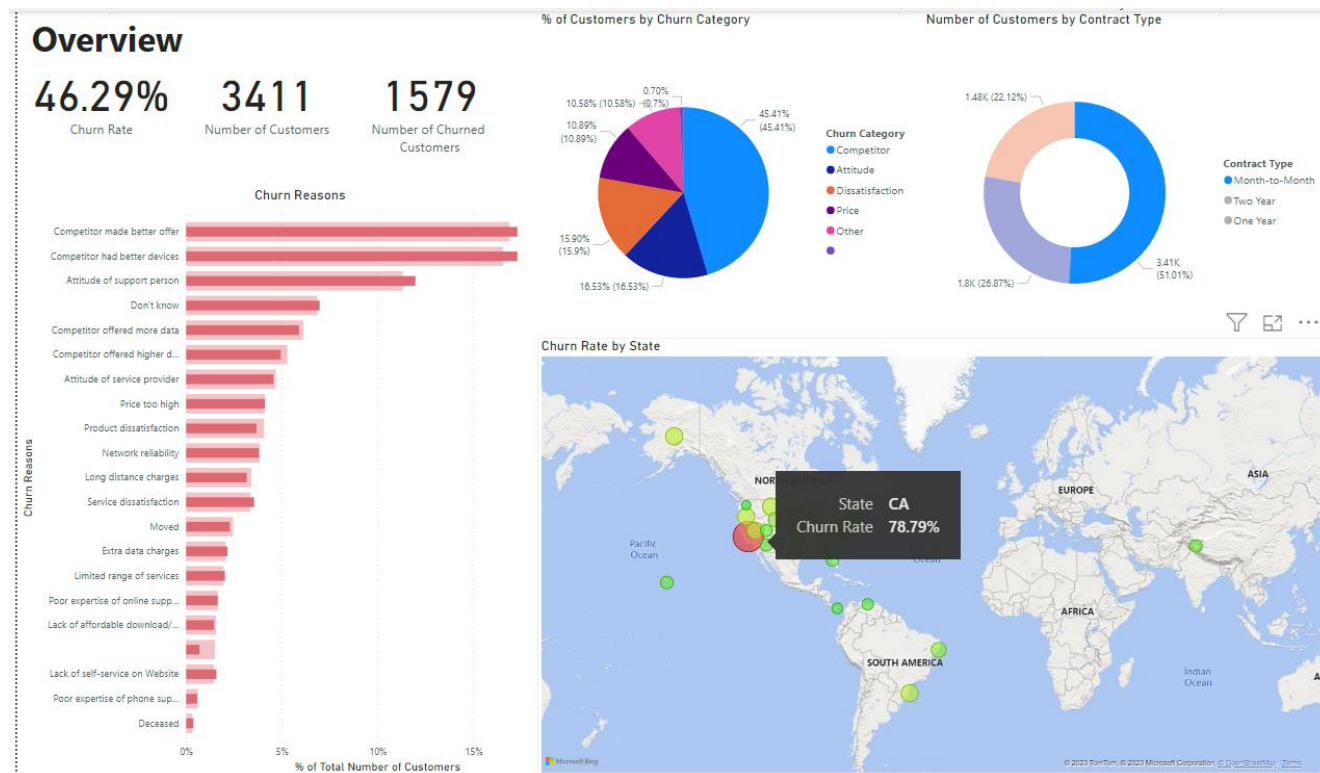
- Exploring the different payment methods, **Paper Check** is the **least** used by the customers.

7. Creating the Dashboard

7.1 Page 1 - Overview

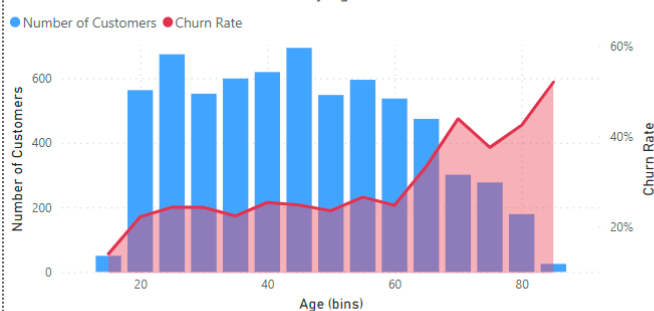


If we check for the state having the highest Churn Rate (**California**) for customers who have a **Month-to-Month Contract Type**, the Churn Rate is approximately **79%**.

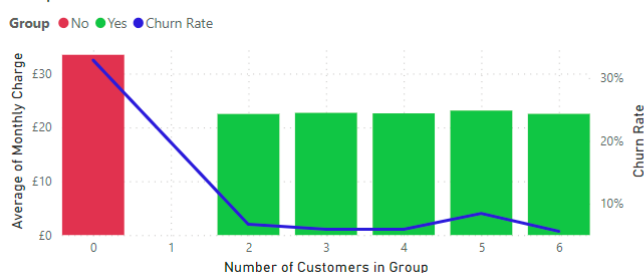


Age Groups, Payments, and Contracts

Number of Customers and Churn Rate by Age (bins)



Average of Monthly Charge and Churn Rate by Number of Customers in Group and Group



Account Length (in months)

1 77



6123

Total Customer Service Calls

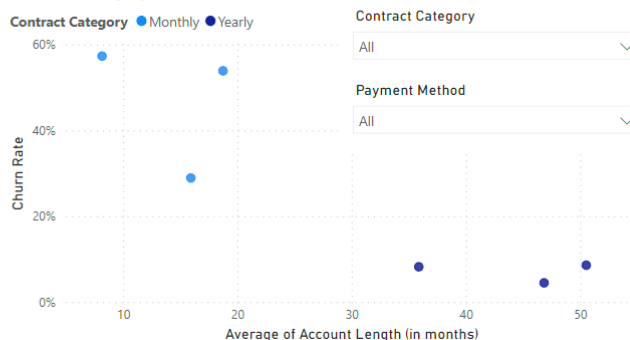
0.92

Avg Customer Service Calls

26.86%

Churn Rate

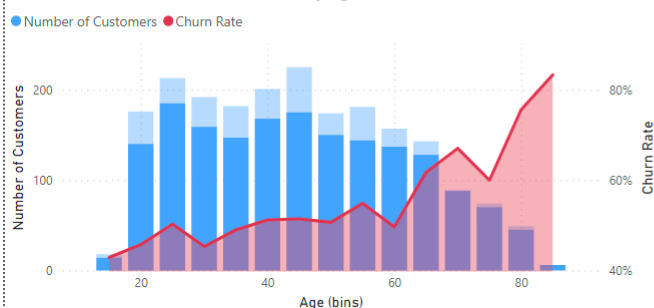
Average of Account Length (in months) and Churn Rate by Payment Method and Contract Category



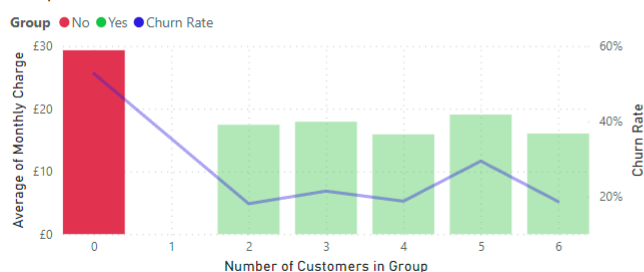
The **Churn Rate** for customers who are **not in a Group Plan**, that belong to the **Age Group 50**, and who have an **Account Length** of **12 months or less** is **50.67%**.

Age Groups, Payments, and Contracts

Number of Customers and Churn Rate by Age (bins)

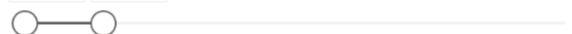


Average of Monthly Charge and Churn Rate by Number of Customers in Group and Group



Account Length (in months)

1 12



2536

Total Customer Service Calls

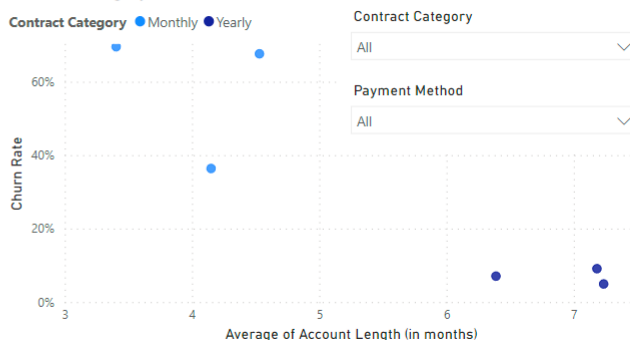
1.44

Avg Customer Service Calls

52.68%

Churn Rate

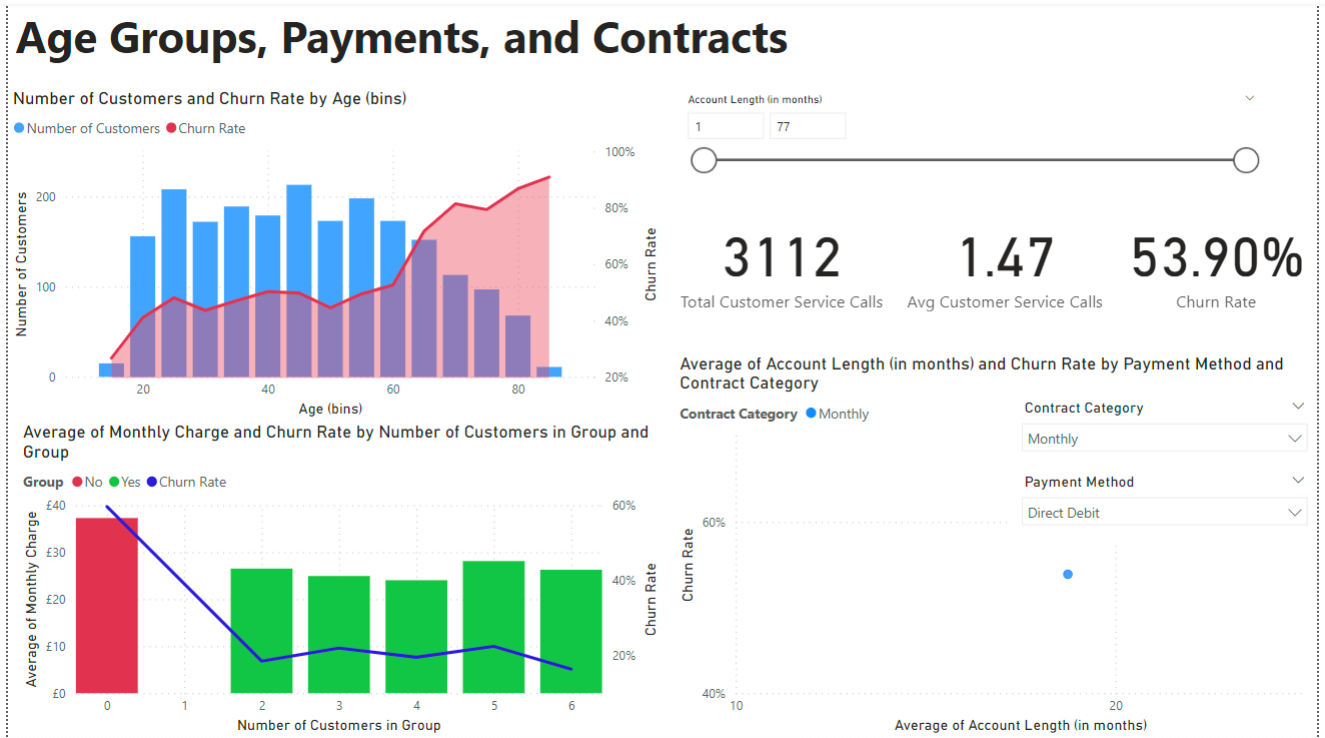
Average of Account Length (in months) and Churn Rate by Payment Method and Contract Category



After the **Age** of **50**, we start to see the **Churn Rate** increase.

Fortunately, the other graph tells us that moving customers to a One Year or Two Year Contract could greatly reduce churn.

The **Average Number of Customer Service Calls** for customers who are on a **Monthly Contract** and pay by **Direct Debit** is **1.47** and the **Churn Rate** is **53.90%**.



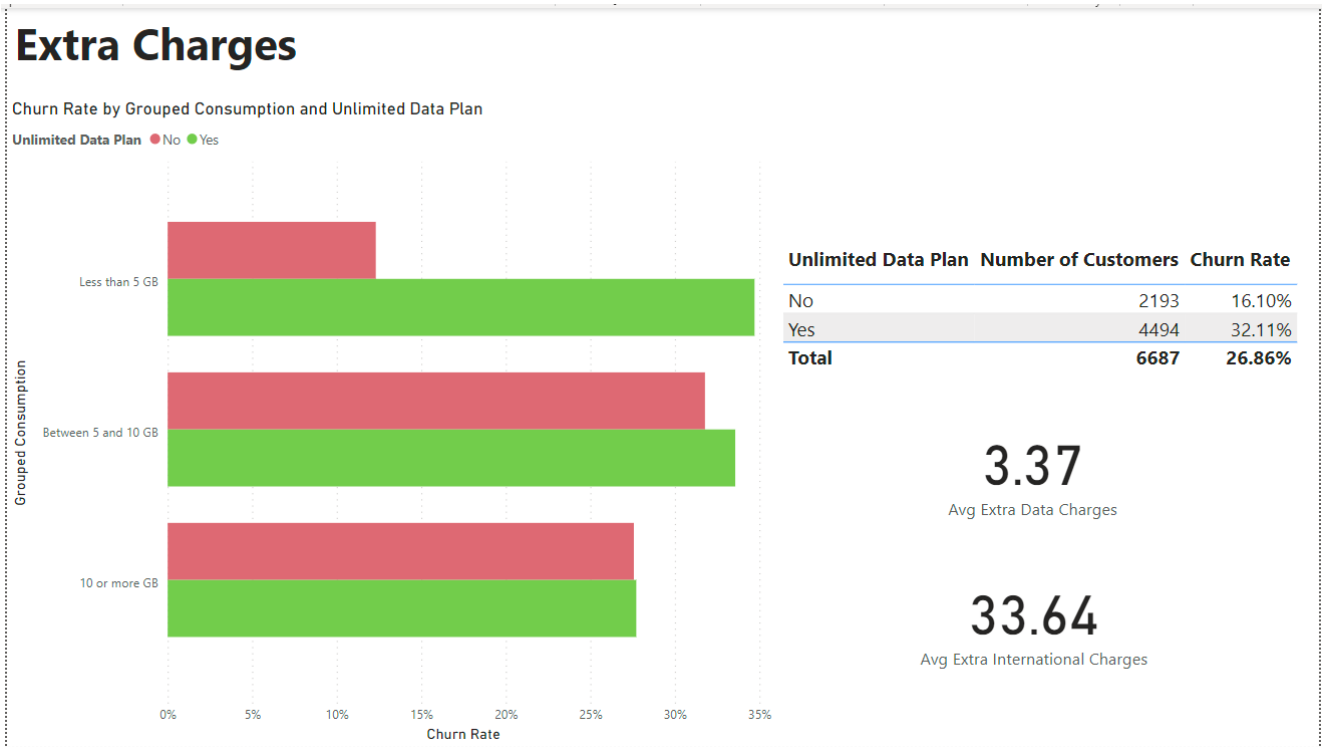
1.47 Calls per customer is high. Databel should definitely investigate this. Maybe there was a problem with the payment method that needs to be looked into.

Indeed, the Churn Rate is quite high for these customers (53.90%). Now it is clear that the ones who call customer service often are also the ones who churn more than average. In our case, they are the customers who have Monthly Contracts and prefer Direct Debit as a payment method.

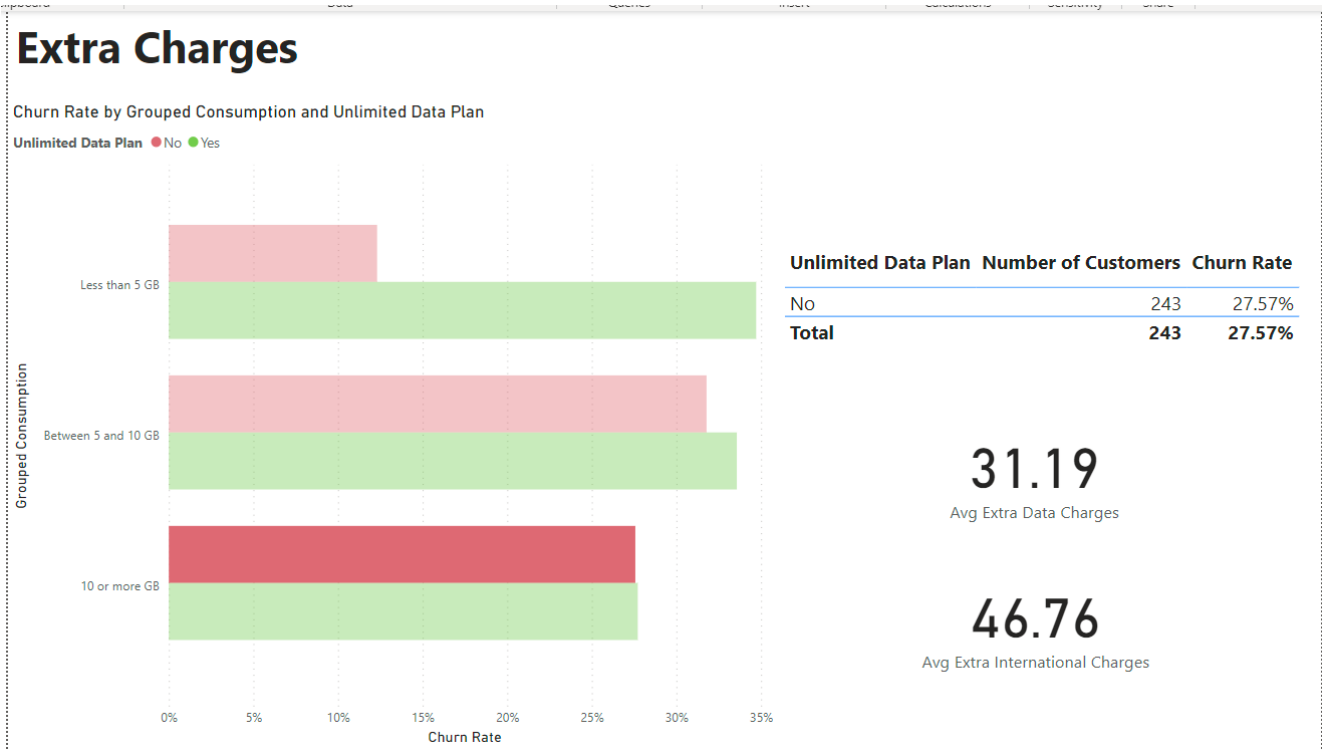
7.3 Page 3 - International and Data Plans

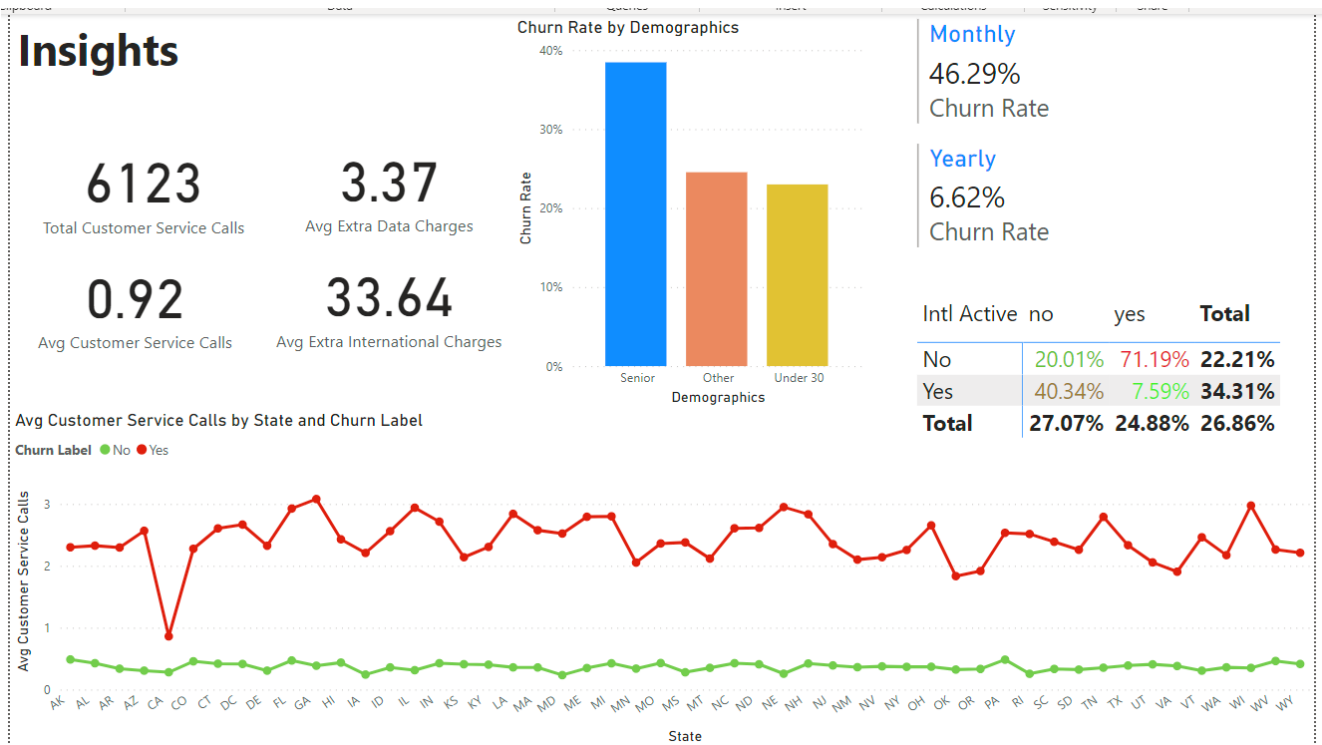
I have created two new measures per customer:

- “Avg Extra International Charges”
- “Avg Extra Data Charges”



The **Average Extra Data Charges** for customers who are **not on an Unlimited Data Plan** and **consumed 10 or more GB of data** are **31.19£**. This is a very huge amount.

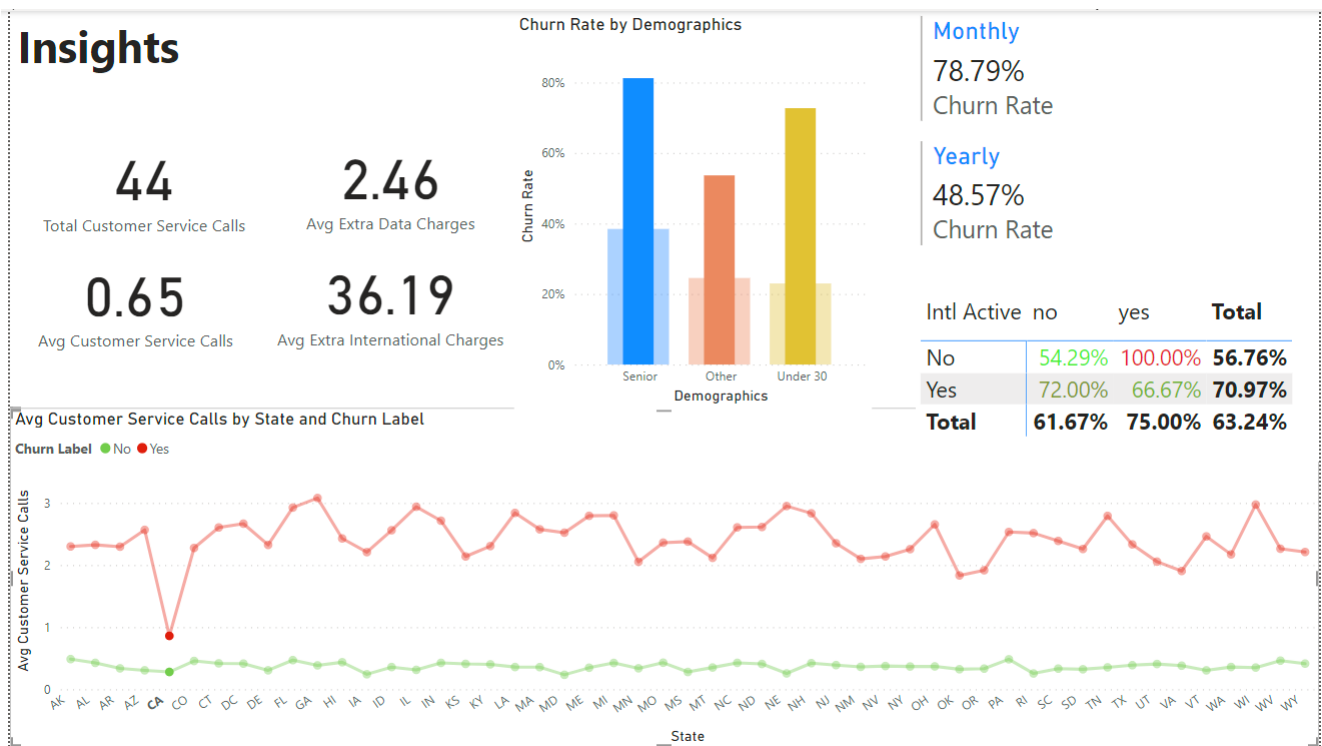




I have investigated the relationship between Churn Label and Avg Customer Service Calls by State.

The ones who churn have a higher rate of Customer Service Calls and it is the opposite for the non-churners.

The state having the **highest Churn Rate** and yet the **lowest sum of Customer Service Calls** is **California**, and the **number of Total Customer Service Calls** for California is **44**.



Even though we observe that the use of customer service is higher for churners, California is one of a kind.

The customers there have the highest Churn Rate. However, in the same state, the number of Customer Service Calls is the lowest.

8. Communicating Insights with Stakeholders

8.1 Insights Gained

After analysing the case study, the following important insights were gained:

(a) Churn Rate and Reasons for Churn

- The total churn rate for Databel is approximately **27%**.
- The top reasons for customer churn are "Competitor made a better offer" and "Competitor had better devices."
- The most prevalent churn category is "Competitor."

(b) Regional Analysis

California has the highest churn rate of **63.24%** with 43 customers churning out of 68 in the state.

(c) Age and Churn

- The churn rate for senior citizens is significantly above the average at **38.46%**.
- The age bracket 45-49 has the highest number of customers.
- As age increases, the average churn rate for age brackets also increases.
- The churn rate for customers aged over 80 is **52%**.

(d) Contract Types and Churn

- More than half of the customers (**51%**) have a "Month-to-Month" contract.
- Customers with monthly contracts churn more than those with yearly contracts.
- The churn rate for female customers with monthly contracts is the highest at **47.31%**.

(e) Usage Patterns and Churn

- Customers on unlimited plans are more likely to churn (**32%**).
- Customers on unlimited plans who consume less than 5 GB of data have the highest churn rate at **34.71%**.
- Customers who do not call internationally but pay for an International Plan have the highest churn rate of **71.19%**.
- Customers on international plans who have not called internationally can be contacted to propose downgrading their plan.

(f) Customer Service and Churn

- The average number of customer service calls for monthly contract customers paying by direct debit is **1.47**, with a churn rate of **53.90%**.
- High customer service calls and churn rate suggest the need for investigation, possibly related to payment issues.

(g) Payment Methods and Churn

- Paper check is the least used payment method by customers.
- The use of customer service is higher for churners, except for California where the churn rate is high, but the number of customer service calls is low.

(h) Contract Length and Churn

- Churn rate decreases over time, particularly for month-to-month contracts.
- Moving customers to one-year or two-year contracts can significantly reduce churn.

(i) Extra Charges and Churn

- Customers not on unlimited data plans who consume 10 or more GB of data have an average extra data charge of **£31.19**, indicating a significant amount.

Overall, these insights provide valuable information about churn patterns, customer behavior, and areas where intervention or improvement may be required to reduce churn rates and enhance customer satisfaction.

8.2 Recommendations

Based on the insights gained from the analysis, here are some recommendations for Databel to reduce customer churn:

(a) Improve Competitiveness

- Monitor and analyze competitor offers regularly to ensure competitiveness in pricing and device offerings.
- Offer exclusive deals or promotions to match or exceed competitors' offerings. For example, providing discounted device upgrades or price-matching competitor plans.

(b) Enhance Customer Experience

- Provide personalised attention and support to customers, especially those in higher churn risk groups such as senior citizens or customers with frequent customer service calls.
- Develop proactive customer outreach programs, such as regular check-ins or loyalty rewards, to strengthen customer relationships and address their needs.
- Investigate and address the high average number of customer service calls made by customers on Monthly Contracts and paying by Direct Debit. Identify and resolve any underlying issues causing these calls to improve customer satisfaction.

(c) Optimise Contract Types

- Encourage customers to move from Month-to-Month Contracts to longer-term contracts (One Year or Two Years). Highlight the benefits of stable pricing and potential savings, such as discounted rates or additional perks, to incentivize the transition.
- Offer flexible contract options, such as mid-term upgrades or downgrades, to cater to changing customer needs. This flexibility can help retain customers who may consider switching to competitors for better plans.

(d) Targeted Marketing

- Leverage customer data to identify customers in California who actively make international calls but do not have an International Plan. Launch targeted marketing campaigns to promote the International Plan to these customers, highlighting cost savings and added benefits. For example, offer discounted rates or exclusive international calling packages to entice them into subscribing to the International Plan.
- Identify customers who are not in a Group Plan, aged 50 or above, and have an Account Length of 12 months or less. Create personalized offers, such as discounts or add-on services, to address their specific needs and provide incentives for them to stay with Databel.

(e) Streamline Billing and Data Usage

- Review and optimise the Extra Data Charges for customers not on an Unlimited Data Plan but consuming 10 or more GB of data. Consider revising data plans or offering data add-ons to prevent customers from incurring high extra charges. For example, provide affordable data bundles for high data-consuming customers.
- Ensure clear communication regarding international call charges to customers who do not make international calls but are paying for an International Plan. Reach out to these customers, explain the situation, and offer to downgrade their plan to a more suitable and cost-effective option.

(f) Continuous Monitoring and Analysis

- Implement regular monitoring of churn rates and customer behavior patterns to identify emerging trends and address them proactively.
- Conduct periodic customer surveys or feedback sessions to gather insights on satisfaction levels, pain points, and areas for improvement. Utilize this feedback to refine products, services, and customer support processes.

By implementing these recommendations, Databel can enhance customer loyalty, reduce churn, and ultimately improve the overall customer experience. It is essential to continually evaluate and adapt strategies based on customer feedback and evolving market dynamics to ensure long-term customer retention.