**What is the overall churn rate of bank customers?**

How does customer churn vary by geography, gender, or age?

**Are there any patterns or correlations between credit score, tenure, balance, and customer churn?**

* There is a very weak positive correlation (0.006268) between **CreditScore** and **Balance**.
* There is a very weak negative correlation (-0.026771) between **CreditScore** and **Exited** (churn status).
* There is a very weak negative correlation (-0.013656) between **Tenure** and both **Exited** and **CreditScore**.
* There is a weak positive correlation (0.118577) between **Balance** and **Exited**.

Overall, the correlations between these variables are quite weak, indicating that there is no strong linear relationship between **CreditScore**, **Tenure**, **Balance**, and **Exited** (churn status). Correlation does not imply causation, and other factors beyond these variables may be influencing customer churn.

Correlation coefficients close to zero suggest a weak relationship, while values closer to 1 or -1 indicate stronger correlations. Additionally, the correlation matrix provides insights into linear relationships between variables but does not capture non-linear relationships or other complex interactions.

**Does the number of products a customer has or their satisfaction score affect churn?**

1. Churn rate varies based on the number of products a customer has:
   * Customers with 1 product have a churn rate ranging from 25.19% to 31.21%.
   * Customers with 2 products have a relatively lower churn rate ranging from 7.11% to 8.36%.
   * Customers with 3 products have a higher churn rate ranging from 71.20% to 86.44%.
   * Customers with 4 products have a churn rate of 100% (all churned).
2. Churn rate also varies based on the satisfaction score:
   * Customers with a satisfaction score of 1 have a churn rate ranging from 27.57% to 84.44%.
   * Customers with a satisfaction score of 2 have a churn rate ranging from 31.21% to 86.00%.
   * Customers with a satisfaction score of 3 have a churn rate ranging from 26.56% to 86.44%.
   * Customers with a satisfaction score of 4 have a churn rate ranging from 28.11% to 72.00%.
   * Customers with a satisfaction score of 5 have a churn rate ranging from 25.19% to 83.87%.

Result is inconclusive.

**Are there differences in churn rates between customers with or without a credit card?**

Churn Rates by Credit Card Status:

HasCrCard churn\_rate

0 0.208149

1 0.201984

There is a minor difference in the churn rate between customers with or without a credit card. Customers with a credit card have a lower churn rate than those without it.

**Do active members have lower churn rates compared to inactive members?**

Churn Rates by Active Member Status:

IsActiveMember churn\_rate

0 0.268715

1 0.142691

There is a significant difference between the two cases. Active members have a much lower churn rate than inactive members.

**What is the relationship between estimated salary and customer churn?**

Inconclusive.

**Is there any association between customer complaints and churn?**

Association between Customer Complaints and Churn:

Complain churn\_rate

0 0 0.000503

1 1 0.995108

Significant difference.

**Does the type of card or points earned impact customer churn?**

Impact of Card Type and Points Earned on Customer Churn:

Card Type Point Earned churn\_rate

0 DIAMOND 219 0.666667

1 DIAMOND 220 0.333333

2 DIAMOND 221 0.000000

3 DIAMOND 222 0.333333

4 DIAMOND 223 0.333333

... ... ... ...

2997 SILVER 995 0.000000

2998 SILVER 996 0.000000

2999 SILVER 997 0.500000

3000 SILVER 998 0.000000

3001 SILVER 1000 0.000000

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