

STREAMING DATA ANALYTICS

TELECOM CUSTOMER CHURN



DASHBOARD USING MONGODB ATLAS

*"Every churned customer tells a story,
listening to it is the first step to growth."*

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STREAMING DATA ANALYTICS

INTRODUCTION

The telecom customer churn dataset used in this project includes comprehensive information on 7,043 customers from a California-based telecom company in Q2 2022. It is specifically structured to analyse customer attrition (churn) and containing key metrics like customer tenure, monthly charges, total revenue, and churn status, along with demographic insights like location (city, geo points), gender, age, and subscribed offers.

By identifying key drivers contributing to churn, such as service dissatisfaction, competition, pricing sensitivity, and customer behaviour, this analysis aims to provide actionable recommendations to reduce attrition, enhance customer retention, and improve overall service quality, ultimately supporting targeted retention strategies.



DATASET : TELECOM CUSTOMERS CHURN

[Dataset Link](#)

	Customer	Gender	Age	Married	Number of Dependents	City	Zip Code	Latitude	Longitude	Number of Referrals	Tenure in Months	Offer	Phone Service	Monthly Long Distance	Multiple Lines	Internet Service	Internet Type	Monthly Charge	Online Security	Online Backup	Device Protection	Annual Fee
1	0002-ORFBO	Female	37	Yes	0	Frazier Park	93225	34.827662	-118.999073	2	9	None	Yes	42.39	No	Yes	Cable	16	No	Yes	No	
2	0003-MANFE	Male	46	No	0	Glendale	91206	34.162515	-118.203869	0	9	None	Yes	10.69	Yes	Yes	Cable	10	No	No	No	
3	0004-TLHLJ	Male	50	No	0	Costa Mesa	92627	33.645672	-117.922613	0	4	Offer E	Yes	33.65	No	Yes	Fiber Optic	30	No	No	Yes	
4	0011-IGKFF	Male	78	Yes	0	Martinez	94553	38.014457	-122.115432	1	13	Offer D	Yes	27.82	No	Yes	Fiber Optic	4	No	Yes	Yes	
5	0013-EXCHZ	Female	75	Yes	0	Camarillo	93010	34.227846	-119.079903	3	3	None	Yes	7.38	No	Yes	Fiber Optic	11	No	No	No	
6	0013-MHZWF	Female	23	No	3	Midpines	95345	37.581496	-119.972762	0	9	Offer E	Yes	16.77	No	Yes	Cable	73	No	No	No	
7	0013-SMEGE	Female	67	Yes	0	Lompoc	93417	34.753477	-120.550507	1	21	Offer A	Yes	9.36	No	Yes	Fiber Optic	14	Yes	Yes	Yes	
8	0014-BMAQU	Male	52	Yes	0	Napa	94558	38.489789	-122.27011	8	63	Offer B	Yes	12.96	Yes	Yes	Fiber Optic	7	Yes	No	No	
9	0015-UOCCJ	Female	68	No	0	Simi Valley	93063	34.296813	-118.685703	0	7	Offer E	Yes	10.53	No	Yes	DSL	21	Yes	No	No	
10	0016-OLUIS	Female	43	Yes	1	Sheridan	95681	38.984756	-121.345074	3	65	None	Yes	28.46	Yes	Yes	Cable	14	Yes	Yes	Yes	
11	0017-DINOC	Male	47	No	0	Ycho Santa	92091	32.99356	-117.207121	0	54	None	No		Yes	Yes	Cable	10	Yes	No	No	
12	0017-IUDMV	Female	25	Yes	2	Sunnyvale	94086	37.378541	-122.020456	2	72	None	Yes	16.01	Yes	Yes	Fiber Optic	59	Yes	Yes	Yes	
13	0018-NYRDU	Female	58	Yes	0	Antelope	95843	38.715498	-121.363411	0	5	None	Yes	18.65	No	Yes	Fiber Optic	10	No	No	No	
14	0019-EFAEP	Female	32	No	0	La Mesa	91942	32.782501	-117.01611	0	72	Offer A	Yes	2.25	Yes	Yes	Fiber Optic	16	Yes	Yes	Yes	
15	0019-GFNTW	Female	39	No	0	Los Olivos	93441	34.70434	-120.02609	0	56	None	No		Yes	Yes	DSL	19	Yes	Yes	Yes	
16	0020-INWCK	Female	58	Yes	2	Woodlake	91286	36.464635	-119.094348	9	71	Offer A	Yes	27.26	Yes	Yes	Fiber Optic	12	No	Yes	Yes	
17	0020-JDNXP	Female	52	Yes	1	1 Reyes St	94956	38.060264	-122.830646	0	34	None	No		Yes	Yes	DSL	20	Yes	No	Yes	
18	0021-KXGKC	Female	72	No	0	San Marcos	92078	33.119028	-117.366036	0	1	Offer E	Yes	7.77	Yes	Yes	Fiber Optic	22	No	No	No	
19	0022-TCICI	Male	79	No	0	Daly City	94015	37.680844	-122.48131	0	45	None	Yes	10.67	No	Yes	DSL	17	Yes	No	Yes	
20	0023-HGHWL	Male	67	No	0	Morgan Hill	95037	37.161544	-121.649371	0	1	None	No		Yes	Yes	Cable	9	No	No	No	
21	0023-UNUPN	Female	79	Yes	0	Ahwahnee	93601	37.375818	-119.739935	0	50	None	Yes	31.43	Yes	No						
22	0023-XUCPT	Female	26	Yes	0	Arnellan B	96140	39.221434	-120.091806	1	13	None	Yes	43.56	Yes	Yes	Fiber Optic	52	No	Yes	Yes	
23	0027-KWYKW	Female	30	Yes	2	Alpaugh	93201	35.859626	-119.498771	1	23	Offer D	Yes	34.91	Yes	Yes	Fiber Optic	30	No	No	No	
24	0030-FNXPP	Female	22	No	0	Keeler	93530	36.560498	-117.962461	0	3	None	Yes	3.12	No	No						
25	0031-PVLZI	Female	34	Yes	0	Korbel	95550	40.7666	-123.80458	0	4	Offer E	Yes	12.43	No	No						
26																						

Number of rows: 7043

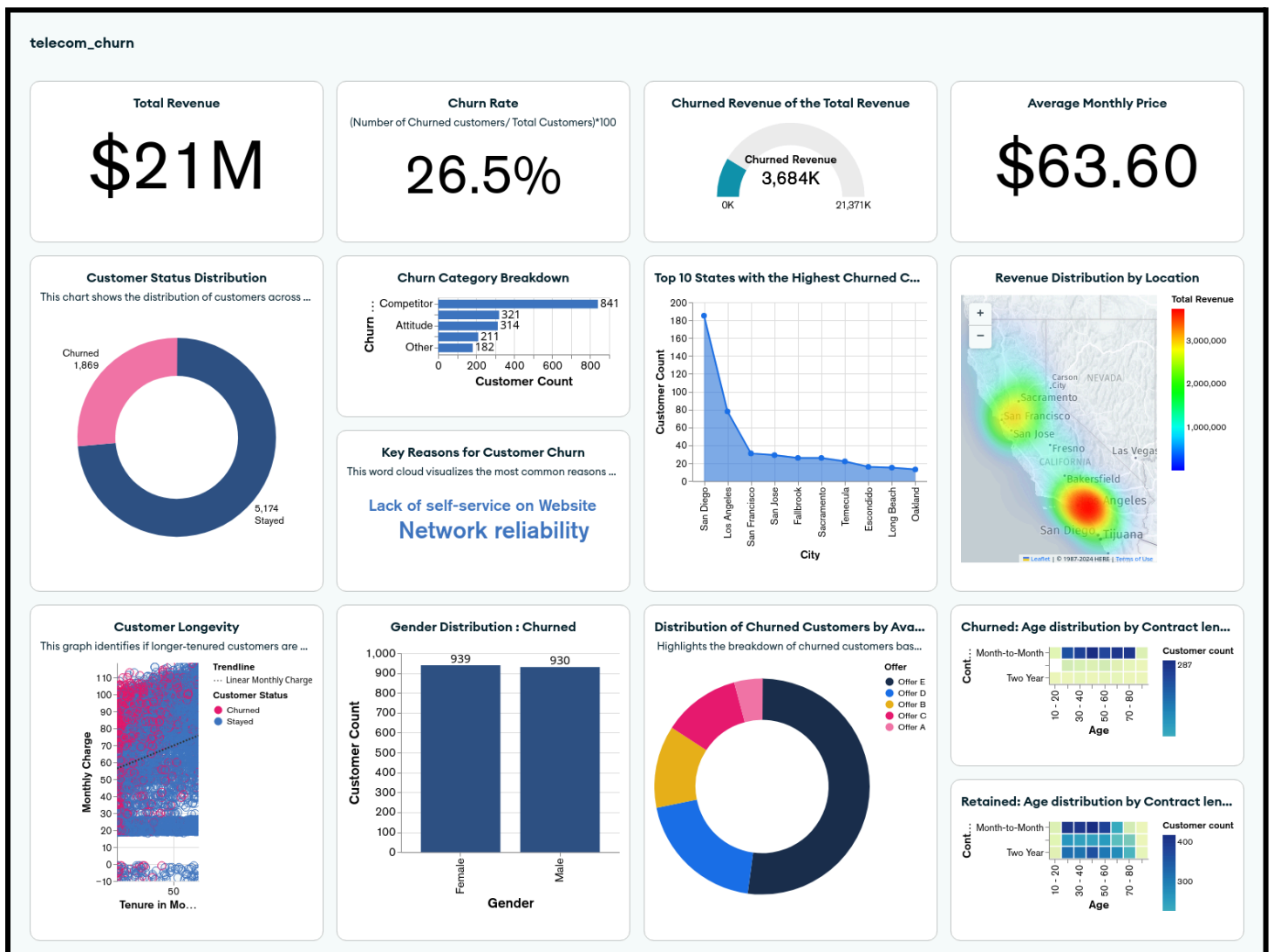
Number of columns: 38

VARIABLE DESCRIPTION

- Customer ID:** A unique ID that identifies each customer.
- Gender:** The customer's gender: Male, Female
- Age:** The customer's current age, in years, at the time the fiscal quarter ended (Q2 2022)
- City:** The city of the customer's primary residence in California
- Latitude:** The latitude of the customer's primary residence
- Longitude:** The longitude of the customer's primary residence
- Number of Referrals:** Indicates the number of times the customer has referred a friend or family member to this company to date
- Tenure in Months:** Indicates the total amount of months that the customer has been with the company by the end of the quarter specified above
- Offer:** Identifies the last marketing offer that the customer accepted: None, Offer A, Offer B, Offer C, Offer D, Offer E
- Contract:** Indicates the customer's current contract type: Month-to-Month, One Year, Two Year
- Monthly Charge:** Indicates the customer's current total monthly charge for all their services from the company
- Total Revenue:** Indicates the company's total revenue from this customer, calculated to the end of the quarter specified above

13. **Customer Status:** Indicates the status of the customer at the end of the quarter:
Churned, Stayed, or Joined
14. **Churn Category:** A high-level category for the customer's reason for churning, which is asked when they leave the company: Attitude, Competitor, Dissatisfaction, Other, Price (directly related to Churn Reason)
15. **Churn Reason:** A customer's specific reason for leaving the company, which is asked when they leave the company (directly related to Churn Category)

DASHBOARD

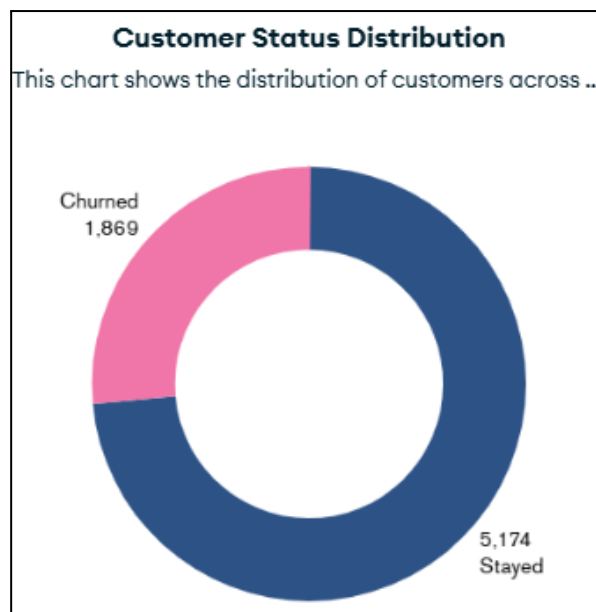
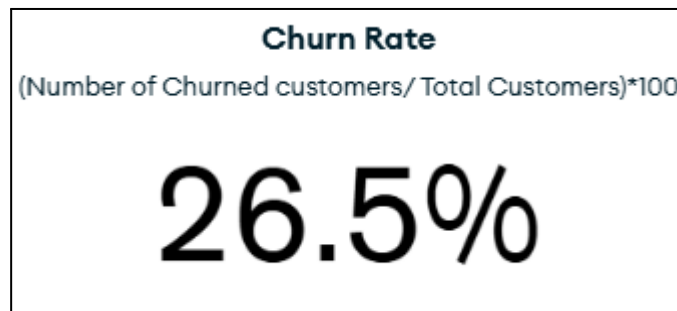


CHARTS

1. What is the current churn rate?

Churn Rate Gauge Chart

Description: This chart provides a snapshot of the overall churn rate, showing the percentage of customers who have left the service relative to the total customer base.

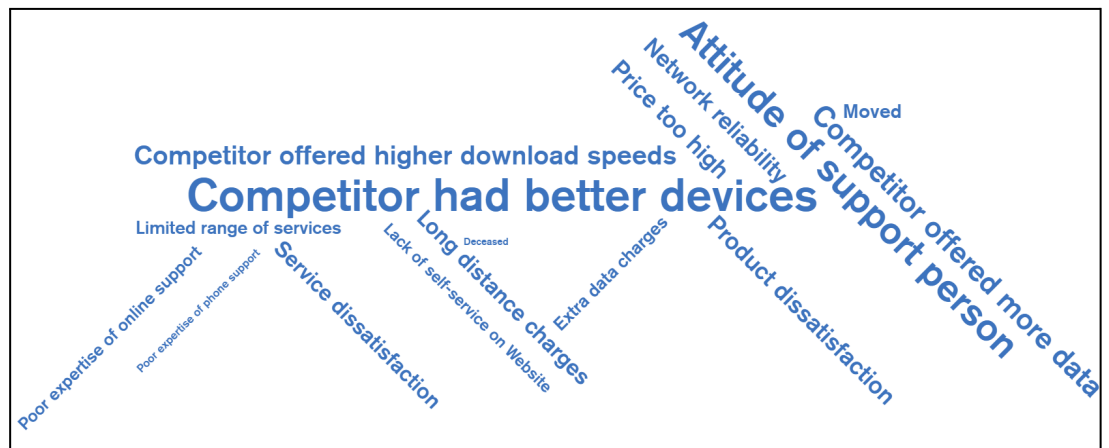


Insights: The churn rate of 26.5% indicates that over a quarter of the telecom company's customer base has left the service. This high churn rate suggests underlying issues that may need addressing, such as customer satisfaction, competitive pricing, or service quality. Reducing churn should be a priority, as retaining customers is often more cost-effective than acquiring new ones.

2. Why are customers leaving the service?

a. Word Cloud: Key Reasons for Customer Churn

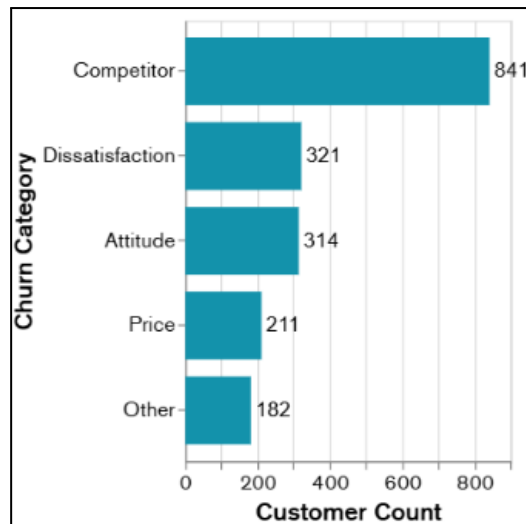
Description: This visualization highlights the most frequently cited reasons for churn, such as competitive pricing and services, network reliability, or customer service issues. Identifying the primary causes allows for targeted improvements to retain more customers.



Insights: The word cloud reveals that competition, service quality, and customer support are major drivers of customer churn. Common reasons include competitors offering better devices and download speeds, as well as dissatisfaction with customer support and network reliability. Addressing these areas—especially by enhancing product offerings and improving support quality—could help reduce churn.

b. Churn Category Breakdown

Description: This bar chart shows the distribution of churn reasons, helping to identify the primary factors driving customer attrition, such as competition, dissatisfaction, or pricing issues, to prioritize improvement efforts.



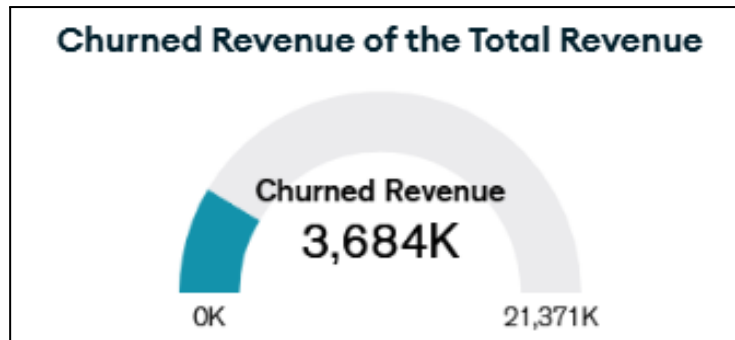
Insights: Majority of customer churn is due to competition, with 841 customers leaving for competitor offerings. Other significant factors include general dissatisfaction, customer attitude, and pricing issues. Focusing on differentiating services and enhancing value could help retain customers and reduce competitive churn.

3. How does churn impact revenue over time?

Churned Revenue v/s Total Revenue

Description: This chart illustrates the financial impact of churn by comparing total cumulative revenue to revenue lost from churned customers. It helps quantify the revenue at risk due to attrition and emphasizes the importance of retention efforts.



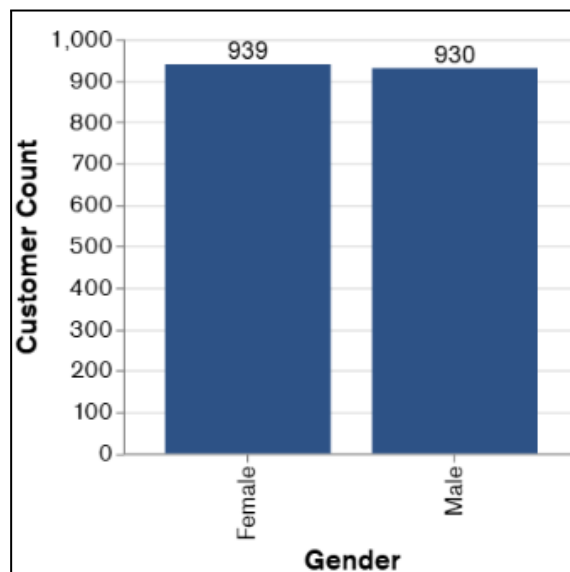


Insights: The churned revenue of 3,684K out of a total revenue of 21,371K highlights a substantial revenue loss due to customer churn, accounting for about 17% of the total revenue. This significant financial impact underscores the importance of implementing effective retention strategies to minimize revenue loss and stabilize overall financial performance. Retaining existing customers should be prioritized, as it directly correlates to maintaining the company's revenue base.

4. **Are certain demographics, locations, or service types associated with higher churn rates?**

a. **Gender Breakdown of Churned Customers**

Description: This chart displays the gender distribution among churned customers, offering insights into whether churn is disproportionately affecting one gender. Understanding the demographic profile of churned customers enables more personalized retention strategies.

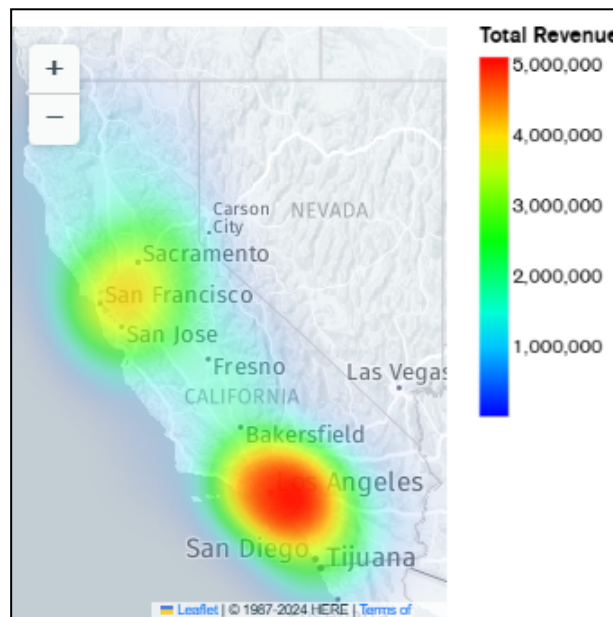


Insights: The gender breakdown of churned customers is nearly balanced, with 939 females and 930 males leaving the service. This indicates that churn is not heavily skewed towards one gender, suggesting that retention

strategies may need to focus on factors beyond gender-specific preferences. Instead, understanding other behavioral or service-related factors influencing churn could be more effective in reducing overall attrition.

b. Revenue Distribution by Location

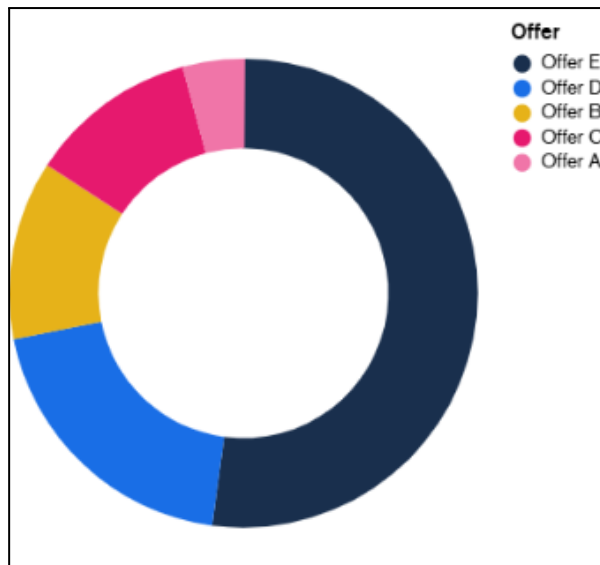
Description: This geographical heat map visualizes revenue concentration across different locations, helping identify regions that contribute the most to the company's revenue and potentially guiding location-specific marketing and service expansion efforts.



Insights: The revenue heat map reveals that the highest revenue concentrations are in Southern California, particularly around Los Angeles and San Diego, with additional moderate revenue from the San Francisco Bay Area. This distribution suggests that these regions are the strongest markets, and targeted retention and service expansion strategies in these areas could help maximize revenue retention and growth.

c. Distribution of Churned Customers by Availing Offers

Description: This chart shows the distribution of churned customers based on the specific offers they were using at the time of churn, helping to identify which offers may be associated with higher churn rates and need improvement or reevaluation.

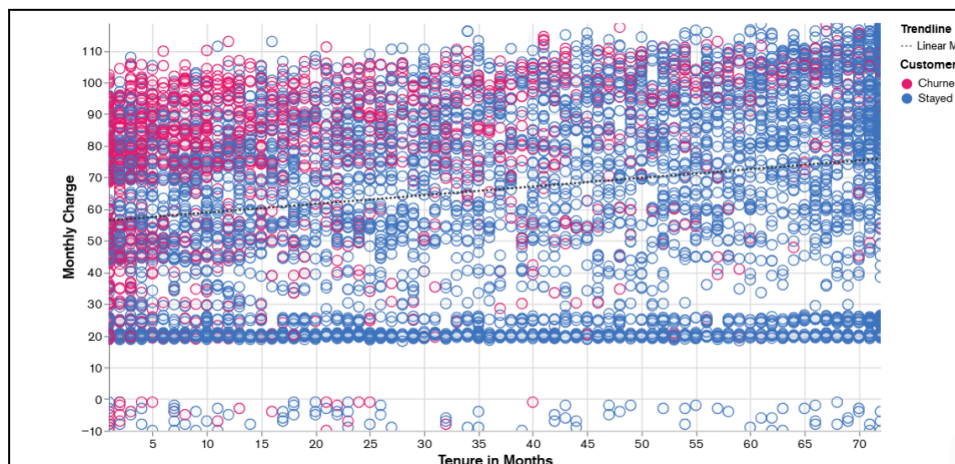


Insights: This chart highlights the distribution of churned customers across different offers. Offer E shows the highest churn rate, indicating it may not be meeting customer expectations or may lack competitive advantages. Offers with lower churn rates, like Offer A, could provide insights into features or benefits that appeal more strongly to customers.

5. What role does customer tenure play in churn?

Customer Longevity and Monthly Charges

Description: This scatter plot aims to analyze the relationship between customer tenure and monthly charges in relation to churn behavior. By identifying tenure and pricing patterns linked to churn, this visualization helps in developing targeted retention strategies for high-risk customers and reinforcing loyalty among long-term users.

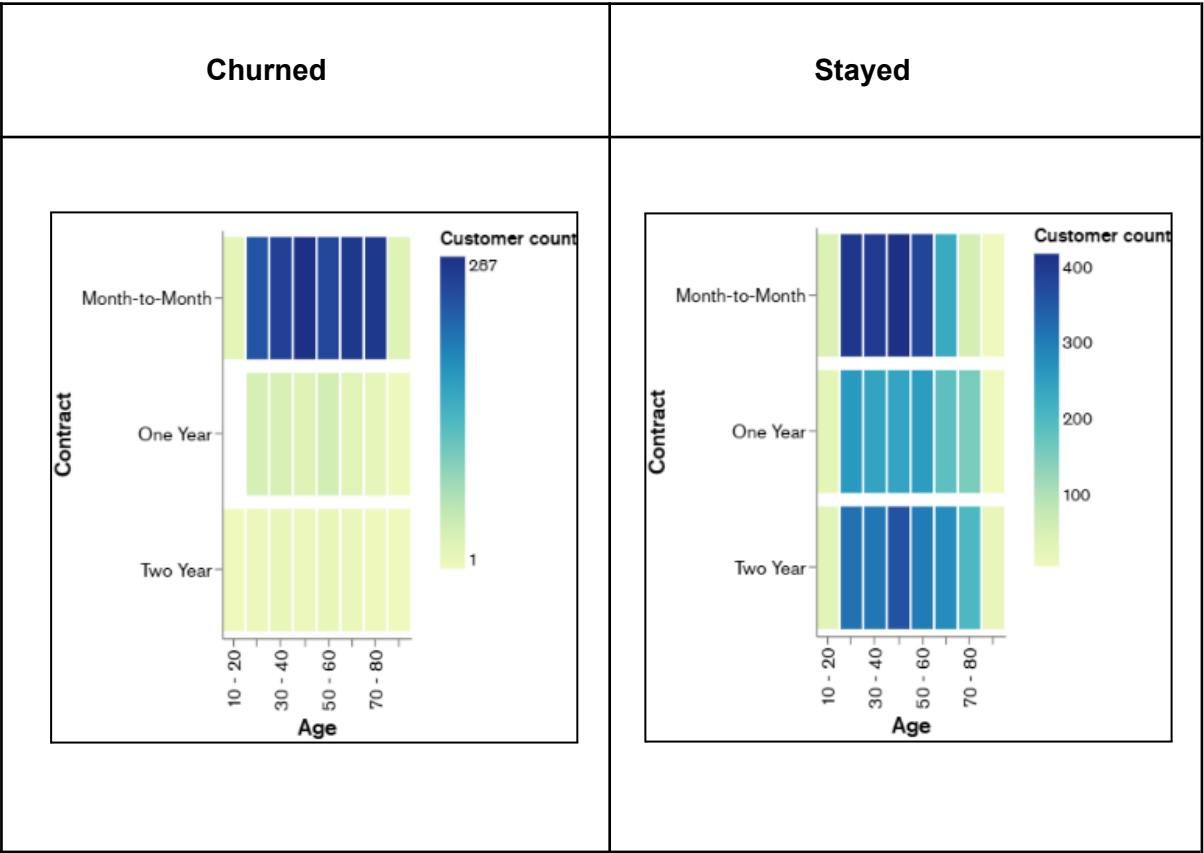


Insights:This scatter plot reveals that customers with shorter tenures (particularly under 20 months) and higher monthly charges are more prone to churn, highlighted by the higher density of red points in these areas. In contrast, customers with tenures exceeding 50 months are more likely to stay, regardless of their monthly charges, as indicated by the blue clusters. These insights suggest that implementing targeted retention strategies for new customers, especially those with high charges, and offering loyalty incentives for long-term customers could effectively reduce churn.

6. What customer profiles are associated with higher churn rates?

Age Distribution by Contract Length

Description: These heatmap shows the comparison between the age distribution for churned vs stayed customers' preferences across different contract lengths, helping identify age groups with higher churn based on contract type. This information could assist in designing contract options that appeal to specific demographics.

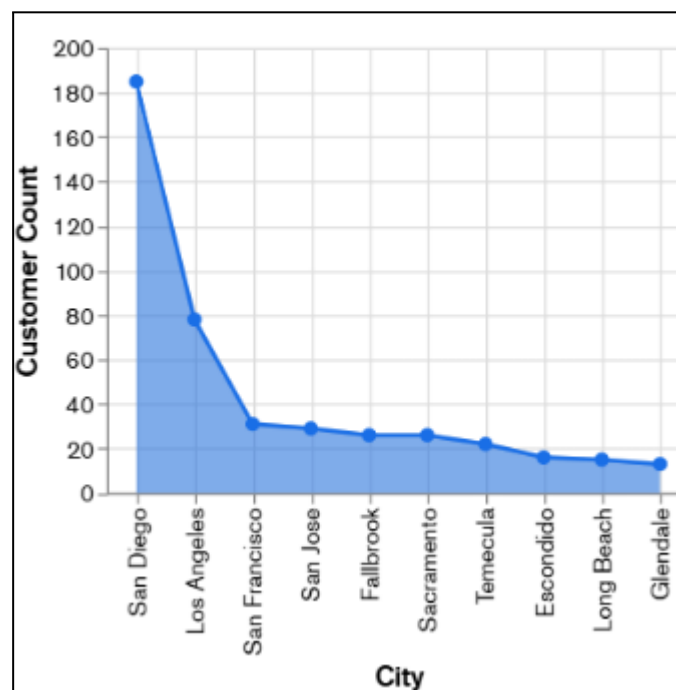


Insights: The heatmaps reveal that churn is primarily associated with customers on month-to-month contracts, particularly in younger age groups (20-40). This suggests that younger customers may prefer flexibility but are more likely to leave when dissatisfied. In contrast, customers on longer-term contracts (one or two years) tend to have lower churn rates, especially among older age groups, indicating a preference for stability. These insights suggest an opportunity to tailor retention strategies by offering more flexible month-to-month benefits for younger customers while promoting the value of long-term contracts for older demographics.

7. Which cities have the highest number of churned customers?

Top 10 Cities by Number of Churned Customers

Description: This column chart highlights the cities with the highest churn, helping to identify geographic areas where customer retention efforts may be most needed.



Insights: The chart shows that San Diego has the highest number of churned customers, followed by Los Angeles and San Francisco. This indicates that these cities might have specific factors, such as service issues or competitive alternatives, contributing to higher churn rates. Focusing retention efforts in these top cities by offering targeted promotions, improving service quality, or addressing local competitor challenges could help reduce churn and improve customer satisfaction in these areas.

MANAGERIAL IMPLICATIONS

1. Enhanced Value Proposition Against Competitors: With competition identified as a major driver of churn, particularly due to better devices, download speeds, and pricing, the company should focus on differentiating its offerings. This can be achieved by:

- Introducing competitive pricing models or bundled services.
- Providing enhanced internet speeds and value-added services.
- Offering device upgrade programs or exclusive perks.

2. Targeted Retention Efforts for High-Risk Segments: Analysis shows that customers with short tenures (under 20 months) and high monthly charges are at higher risk of churning. To address this:

- Develop personalized retention campaigns, such as discounts or rewards for new customers nearing the 20-month mark.
- Introduce flexible for month-to-month plans or service targeted at younger customers with higher monthly charges.

3. Improving Service Quality and Customer Support: Dissatisfaction with service quality and support is a significant churn driver. Investments should be made in:

- Strengthening network reliability in high-churn areas like San Diego and Los Angeles.
- Expanding and training customer support teams to deliver quicker and more effective resolutions.

4. Region-Focused Campaigns and Service Enhancements: High churn cities like San Diego, Los Angeles, and San Francisco require dedicated strategies:

- Conduct localized marketing campaigns promoting unique service offerings.
- Address specific service issues in these areas, such as network upgrades or exclusive promotions.

5. Optimizing Offers and Bundles: With Offer E showing the highest churn rate, it's essential to:

- Reevaluate the features and pricing of Offer E to meet customer expectations better.
- Identify the elements of successful offers, like Offer A, and replicate them across other plans.

6. Loyalty Programs for Long-Term Customers: Long-tenure customers (50+ months) show higher loyalty. To encourage retention:

- Launch loyalty programs offering discounts, exclusive deals, or early access to new services for long-term customers.
- Prioritize outreach to high-revenue customers showing early signs of churn (e.g., complaints or reduced usage).

CONCLUSION

The analysis highlights that customer churn in the telecom industry is driven by competition, dissatisfaction, pricing, and demographic-specific preferences. By implementing targeted retention strategies, such as improving service quality, offering personalized plans, focusing on high-churn regions, and enhancing customer support, the telecom company can reduce churn effectively. Retention efforts not only stabilize revenue but also enhance customer loyalty, paving the way for sustainable growth and a competitive edge in the market.