**Customer churn analysis - Research Questions**

- Which age segments have higher churn and do they require a separate retention strategy?

- How does churn change depending on the length of service usage (tenure)?

- Which contract type has the highest churn and which has the lowest?

- Is there a usage threshold after which churn drops?

- Is there an increase in churn among customers who have not logged in for more than 14 days?

- How has churn changed among customers after the price increase compared to those who were not affected?

- What types of support requests are associated with the highest churn?

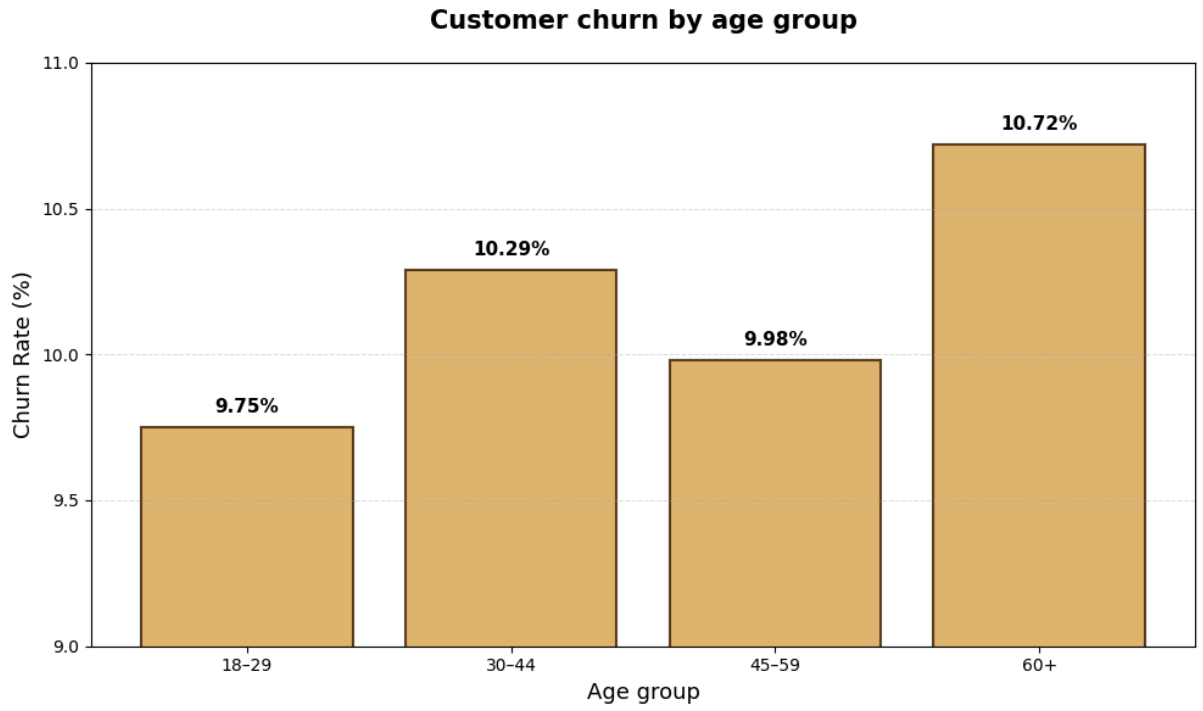
- How is avg_response_time related to churn? How does churn change with low CSAT?

- Do customers with low email open rates have higher churn compared to others?

- What is the financial impact of churn and which segments generate the most revenue loss?

**1. ## Churn by Age Segment**

We analyze whether customer age is associated with different churn rates by grouping users into meaningful age segments.




***Insight:***

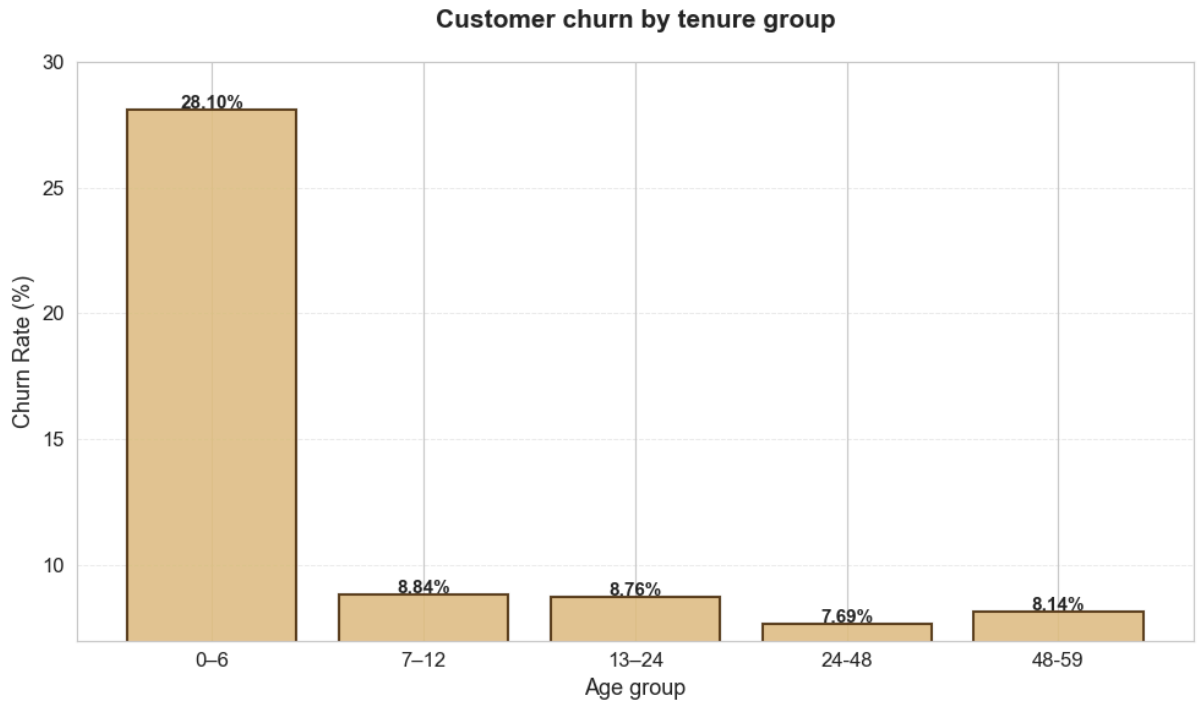
Churn rates are relatively consistent across all age segments, ranging from approximately 9.7% to 10.7%. No age group demonstrates a significantly higher or lower churn rate.

***Business implication:***

Age alone does not appear to be a strong driver of customer churn.
Retention strategies should focus on behavioral and transactional factors such as usage patterns, contract type, pricing changes, and customer support interactions rather than demographic segmentation.

**2. ## Churn by Tenure Segment**

We analyze whether customer tenure by months is associated with different churn rates by grouping users into meaningful tenure segments.




***Insight:****

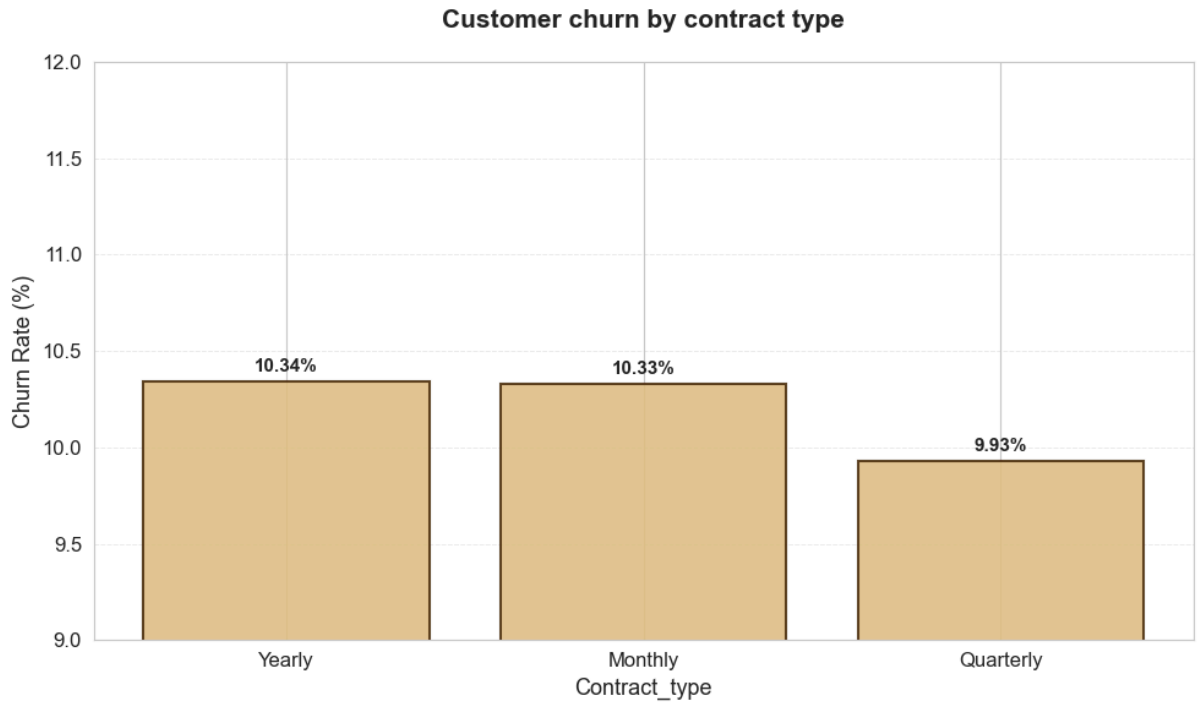
Customer churn is heavily concentrated in the early lifecycle stage.
The churn rate peaks during the first 6 months of usage (28.1%) and drops sharply to approximately 8% afterward, remaining relatively stable from 6 months up to 3+ years.

***Business implication:****

Customer tenure is a strong indicator of churn risk, with the first 6 months representing a critical retention period. Retention efforts should prioritize early-stage customers through improved onboarding, engagement monitoring, and early intervention strategies, as customers who remain active beyond this period demonstrate significantly higher long-term retention.

**3. ##Which type of contract has the highest churn rate, and which has the lowest?**

We analyze the churn rate for each contract type to find the type with the highest and lowest churn rates.




***Insight:***

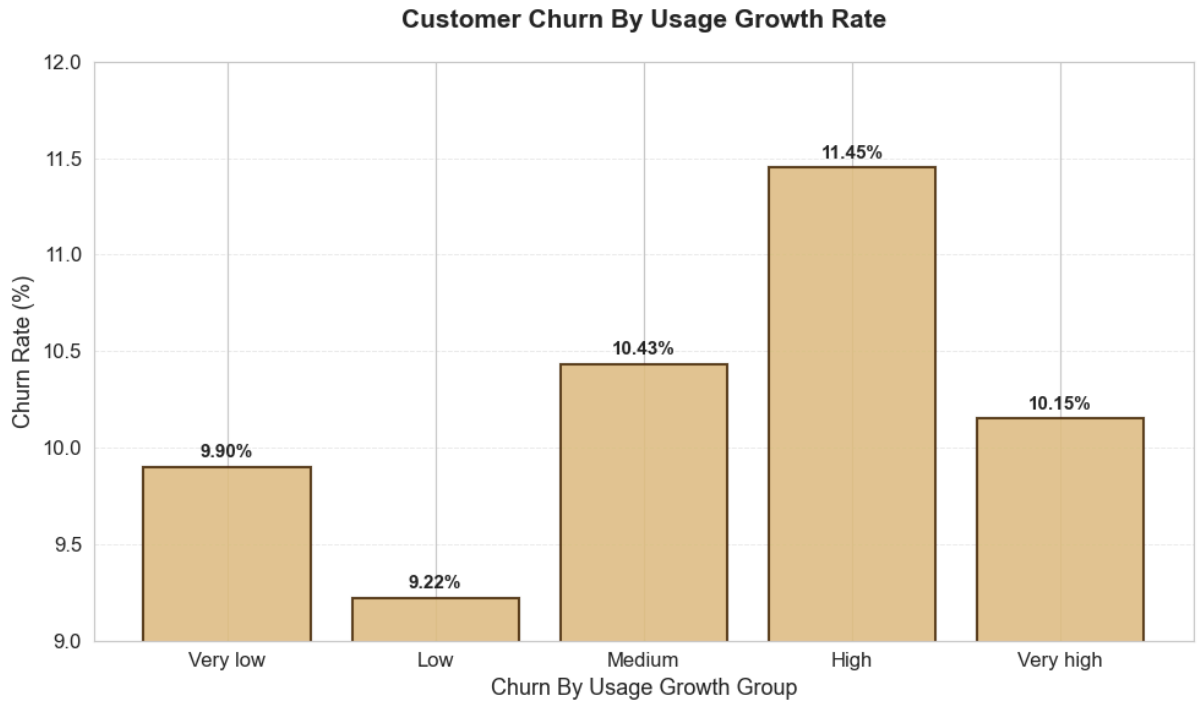
Quarterly contracts show a marginally lower churn rate (9.93%) compared to monthly and yearly plans (~10.3%). However, the differences between contract types are small.

***Business implication:***

Contract type alone does not appear to be a strong predictor of churn. Retention efforts should focus on behavioral and engagement factors rather than contract structure.

**4. ##Is there a threshold for useg_growth_rate at which churn increases or decreases?**

We examine whether churn changes monotonically with increasing usage_growth_rate and whether a threshold exists beyond which churn consistently increases or decreases.




***Insight:****

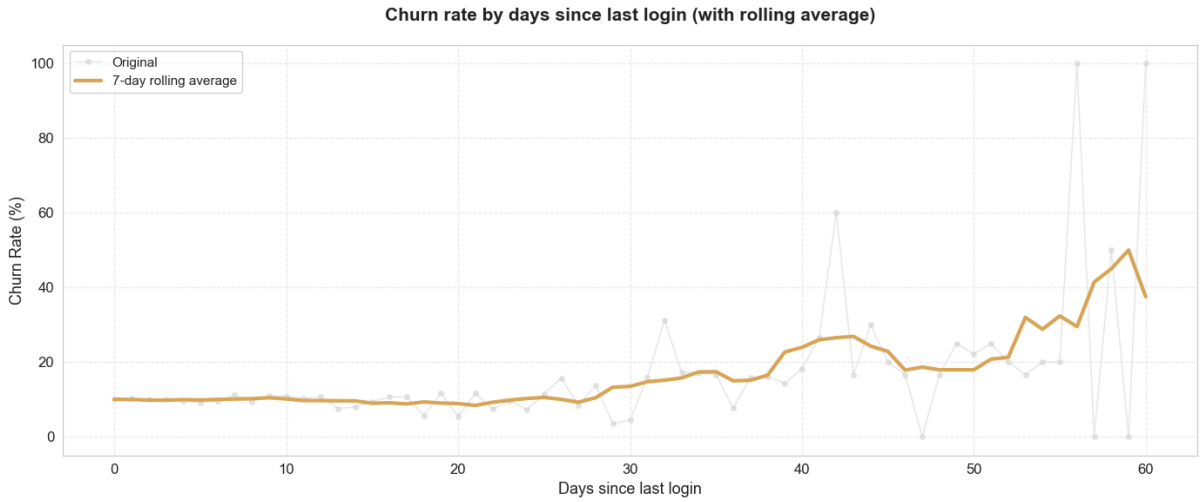
No monotonic relationship or stable threshold between usage_growth_rate and churn was observed. Churn rates fluctuate across usage growth levels, indicating a non-linear relationship rather than a clear increasing or decreasing trend.

***Business implication:****

Higher usage growth does not necessarily correspond to lower churn. Elevated churn at high usage growth levels may indicate short-term engagement spikes rather than long-term product adoption, suggesting that usage intensity alone is not a reliable retention indicator. Usage growth should be analyzed in combination with tenure and engagement stability, as isolated usage increases may reflect exploratory behavior rather than sustained value realization.

**5. ##Does churn increase after a certain period of user inactivity (e.g., 14 days), and how does the risk evolve as inactivity grows?**

Analysis of whether the period of last user inactivity affects the churn rate




***Insight:***

The churn rate remains stable at around 10% during the first 0–18 days since the last login.
Between 18 and 26 days, churn shows early signs of increase (1–2%), indicating the beginning of user disengagement.
After 26 days of inactivity, churn increases significantly (up to ~20%), and after 52 days, it rises sharply to ~40%, indicating a critical churn risk.
Overall, churn risk grows progressively with longer periods of user inactivity rather than increasing at a single fixed threshold.

***Business implication:***

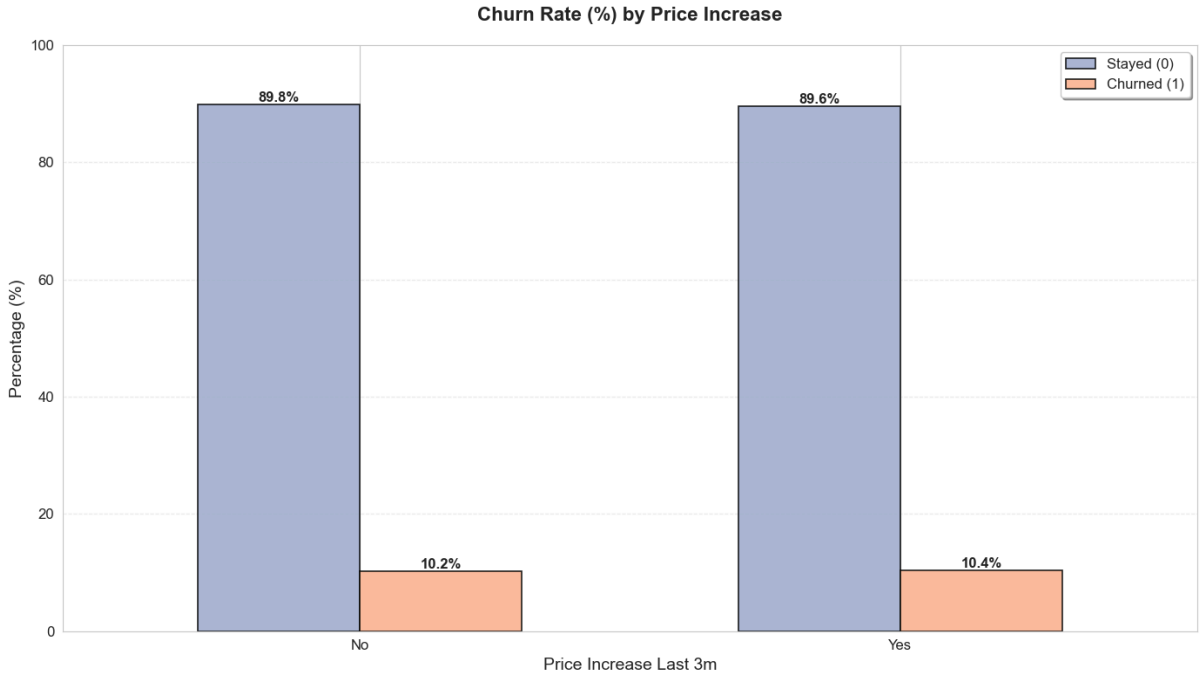
Prolonged user inactivity is a strong indicator of churn risk.

- Users inactive for 18+ days should be targeted with early re-engagement actions
- Users inactive for 26+ days represent a high-risk group requiring stronger retention measures

Additional analysis of unresolved support issues or payment-related problems among inactive users may help identify underlying churn drivers. Targeted re-engagement campaigns for inactive but registered users could reduce churn risk.

**6. ##How did customer churn change after the price increase compared to those who were not affected?**

We analyze whether the price increase affects the percentage of customer churn.




***Insight:****

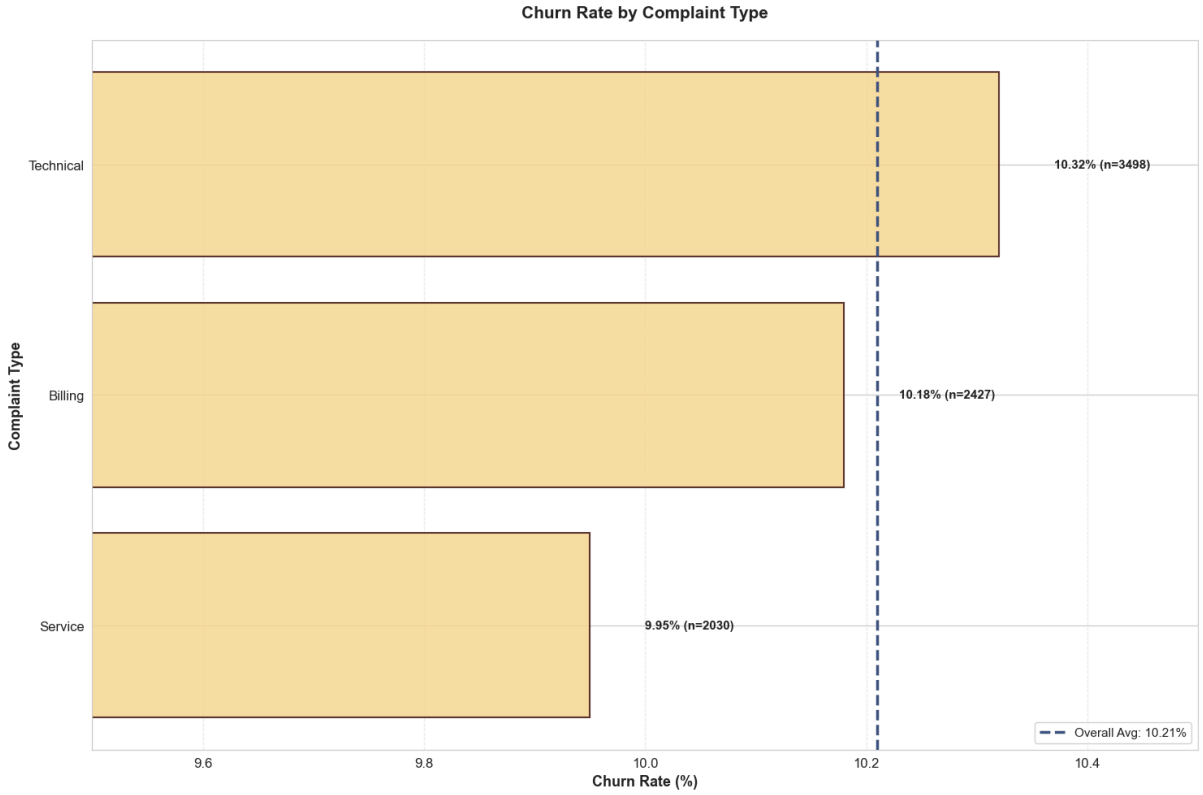
The churn rate among customers affected by the price increase is slightly higher (10.4%) compared to those who were not affected (10.2%). However, the difference is minimal, suggesting that the price increase alone does not have a significant impact on customer churn.

***Business implication:****

Since the difference in churn rates between the two groups is negligible, price increases are unlikely to be the primary driver of customer churn. Retention efforts should focus on other factors such as product usability, customer satisfaction, perceived value, and engagement. A more comprehensive analysis of multiple churn drivers may help identify more effective retention strategies.

**7. ##What types of support requests are associated with the highest churn rates?**

Analyze whether there is a complaint_type that has the highest percentage of churn.




***Insight:***

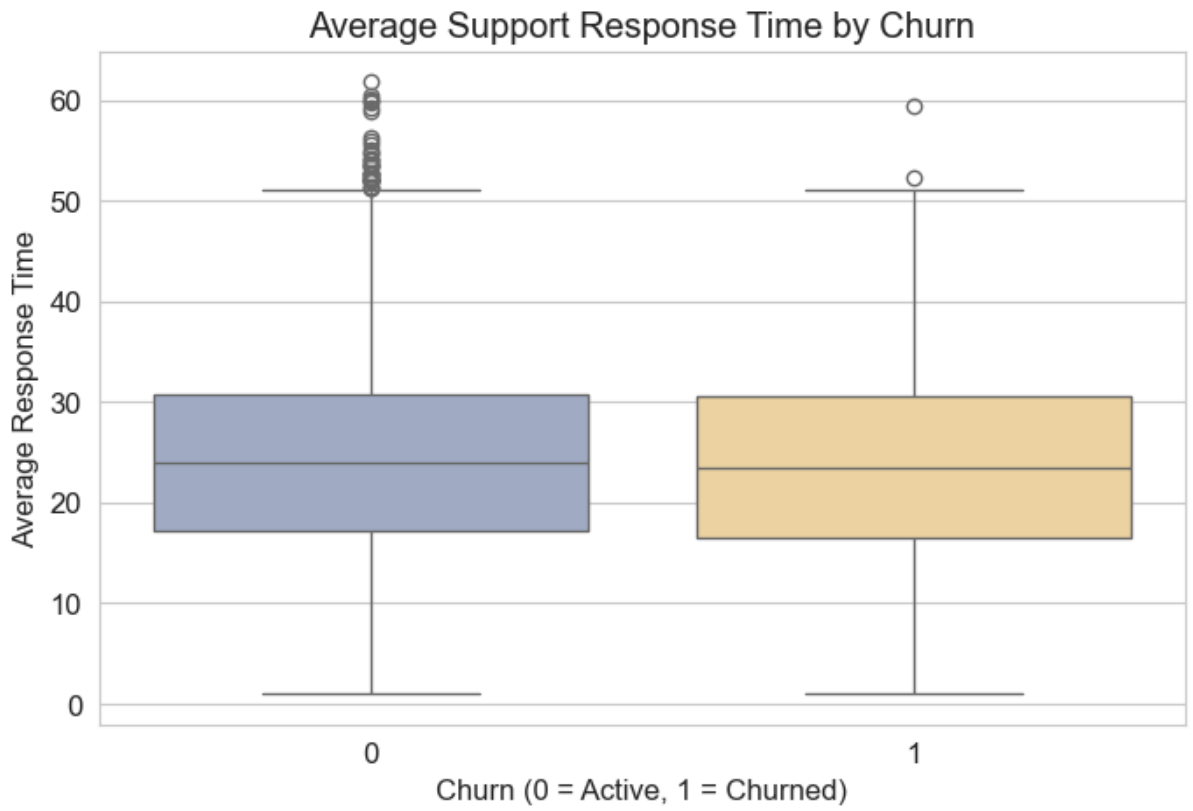
All types of appeals have almost the same percentage of outflow (the difference is within 1%) and do not differ significantly from the average percentage of outflow (the difference is up to 1%). Therefore, no complaint_type alone does not have a significant impact on customer churn.

***Business implication:***

Since no support request type shows a significantly higher churn rate on its own, churn risk is likely driven by the quality of issue resolution rather than the nature of the issue itself. Further analysis should focus on combinations of factors such as resolution time, customer satisfaction (CSAT), and post-support engagement to better identify at-risk users.

**8.1 ##How is avg_response_time related to churn?**

Analyze how avg_response_time affects customer churn.




***Insight:***

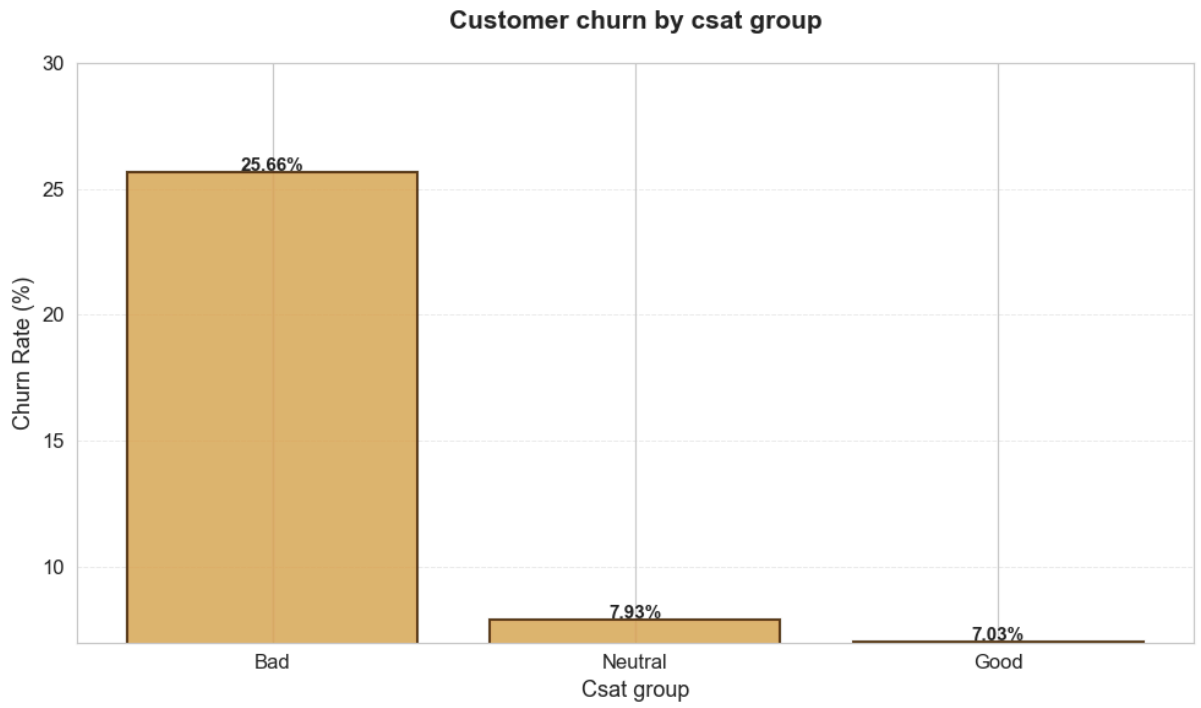
The distributions of avg_response_time for churned and active users are very similar, with nearly identical average values. While active users show more extreme outliers (very long resolution times), there is no clear evidence that longer response times alone are associated with higher churn.

***Business implication:***

Average response time by itself is not a strong churn driver. To better understand its impact, it should be analyzed together with qualitative metrics such as CSAT or complaint type, where slow responses may amplify negative customer experience.

**8.2 ##How does churn change when CSAT is low?**

Analyze how low or high scores affect customer churn




***Insight:***

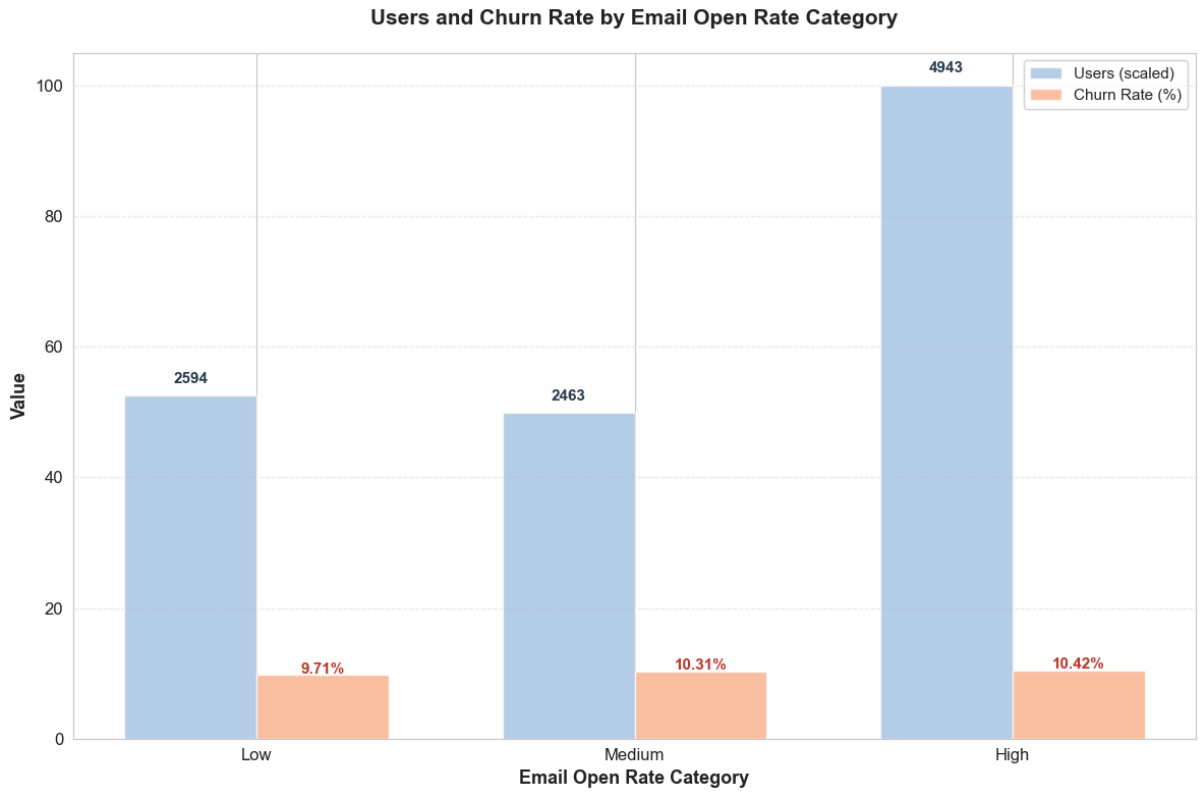
A low Csat_score (1-2.5) indicates customer dissatisfaction, which affects churn. For a low score, the churn rate is 25.66%, which is more than 3x higher than for customers with CSAT above 2.5. Meanwhile, neutral (2.5-3.5) and high (3.5-5) scores have a small difference between them, only 0.9% with churn rates around 7–8%

***Business implication:***

Low CSAT scores represent a high-risk churn segment. Focusing on issue types, resolution time, and proactive outreach for customers with CSAT between 1 and 2.5 may significantly reduce early churn.

**9. ##Do customers with low email open rates have higher churn rates compared to others?**

Analyze whether low email open rates contribute to increased customer churn.




***Insight:***

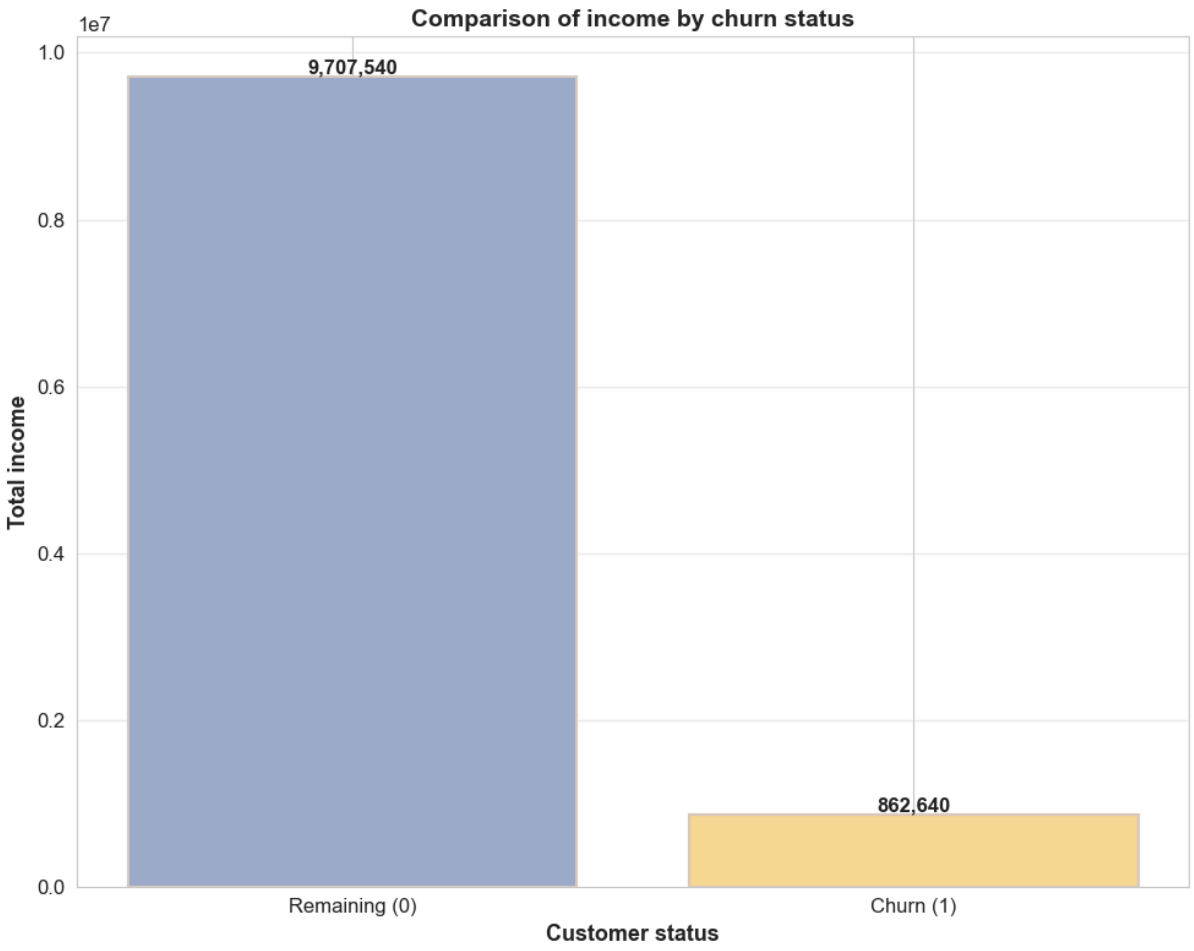
Customers with low email open rates show almost the same churn rate as more engaged users, with a difference between the groups of less than 1%.
This indicates that a low level of engagement with product communications does not show sufficient discriminatory power on its own.

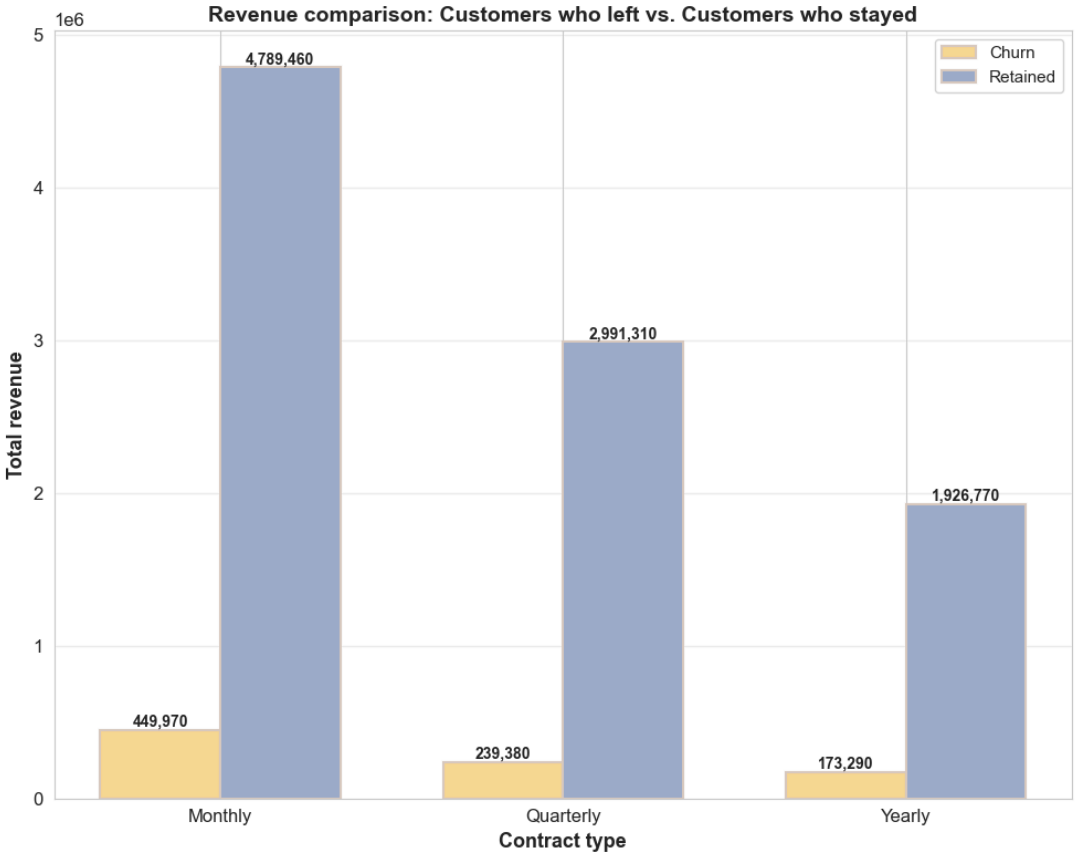
***Business implication:***

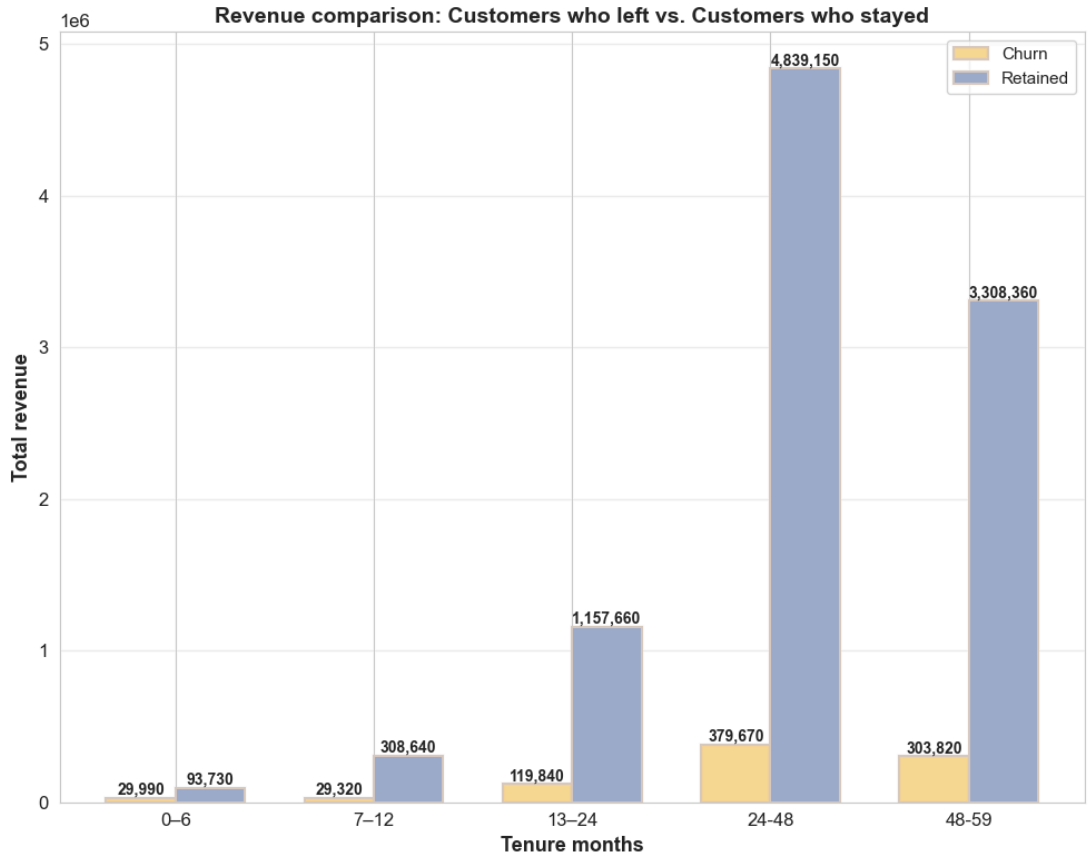
Email open rate should not be used as a standalone churn risk metric.
However, it may still be valuable when combined with behavioral or satisfaction-related indicators (e.g., product usage or CSAT) to identify disengaged users more accurately.

**10. ##What is the financial impact of churn, and which segments generate the greatest revenue losses?**

Investigate how much revenue the business loses due to customer churn and in which segments the losses are greatest.


Comparison of income by churn status
1e7
1.0
0.8
0.6
0.4
0.2
0.0
Total income
9,707,540
862,640
Remaining (0)
Churn (1)
Customer status


Revenue comparison: Customers who left vs. Customers who stayed
1e6
5
4
3
2
1
0
Total revenue
Churn
Retained
4,789,460
2,991,310
1,926,770
449,970
239,380
173,290
Monthly
Quarterly
Yearly
Contract type




***Insight:***

Customer churn has a significant financial impact on the business, resulting in a total revenue loss of approximately 860,000.
Segment-level analysis shows that contract type does not significantly influence revenue loss, as churn-related losses are relatively evenly distributed across contract types. Although monthly contracts account for the highest absolute revenue loss (~450,000), this is primarily driven by the larger customer base within this contract type rather than a higher churn risk.
A more meaningful pattern emerges when analyzing churn by customer tenure. The majority of revenue losses come from customers with a tenure of 24–59 months, accounting for approximately 670,000 of total churned revenue. These users represent long-term, high-value customers who contribute to stable and predictable revenue streams. Their churn therefore has a disproportionately negative financial impact compared to short-tenure users.

***Business implication:***

Revenue losses are primarily driven by churn among long-tenure customers, posing a risk to long-term revenue stability rather than short-term fluctuations. This suggests that overall churn rate alone is insufficient for evaluating business risk; revenue-based churn metrics should be prioritized.

To reduce financial losses, retention strategies should focus on early identification of disengagement among long-tenure customers, such as declining activity or support interactions with low satisfaction. Targeted retention initiatives—such as personalized offers, loyalty programs, or proactive outreach—can help preserve high-value customers and significantly reduce revenue loss without increasing customer acquisition costs.