PWC project-customer churn

This report provides a detailed analysis of customer churn within a telecom company, identifying crucial factors influencing customer retention and attrition. The analysis reveals that approximately 26.6% of customers have churned, primarily due to dissatisfaction with fiber optic internet services, price sensitivity among month-to-month subscribers, senior citizen demographics, and certain payment methods. Logistic regression modeling, with an accuracy of 85%, is recommended for predicting future churn. Targeted recommendations have been developed to mitigate churn and foster customer retention.

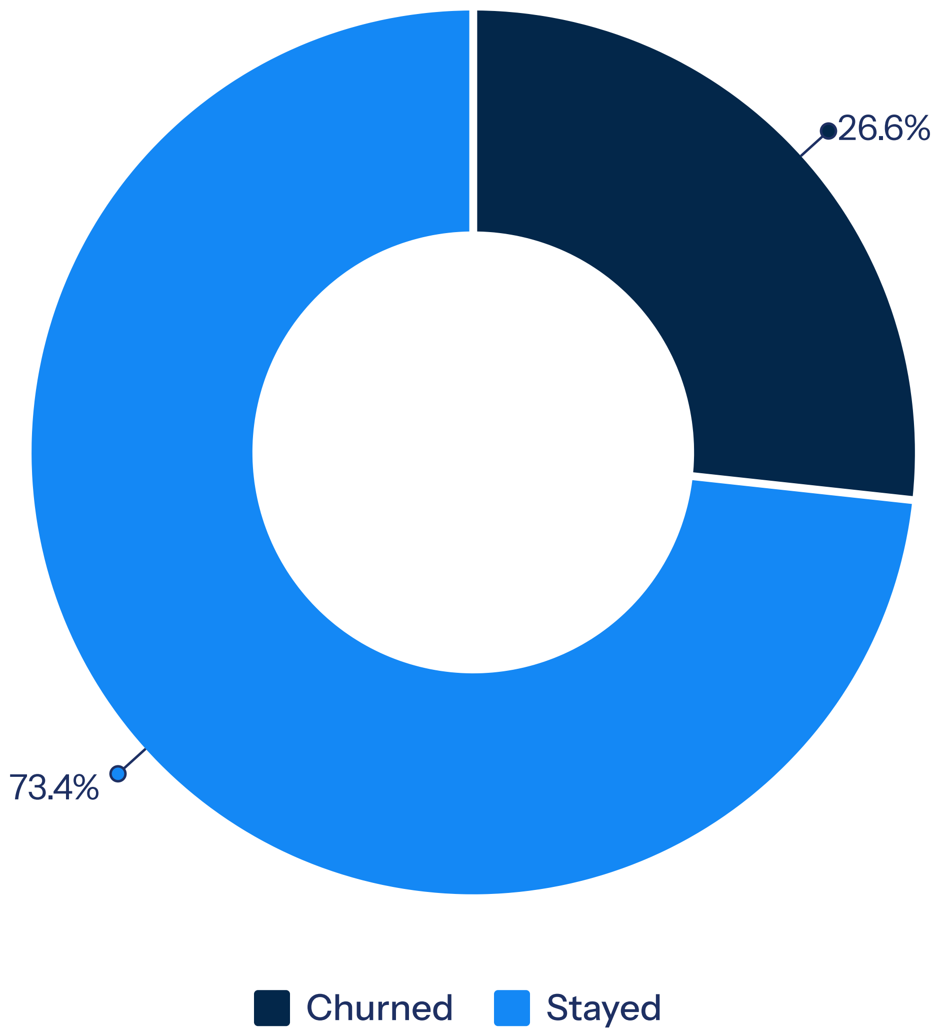
by Thanh Trung Nguyen

Introduction

Customer churn significantly impacts profitability and sustainability within the telecom industry. This report aims to identify high-risk customer segments, investigate underlying reasons for churn, and recommend actionable strategies to enhance customer retention through comprehensive exploratory data analysis and predictive modeling.

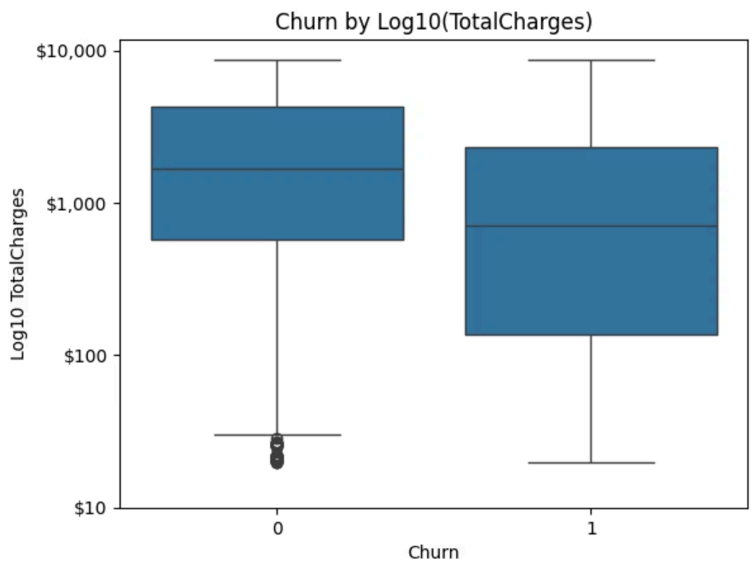
Overall Customer Churn

Out of a total of **7,043 customers**, PwC's analysis found that **1,869 customers have churned**, resulting in an overall churn rate of **26.6%**. This highlights a significant opportunity to improve retention practices, as nearly **one in four customers** are leaving the service. Reducing churn at this scale can lead to meaningful gains in revenue stability and customer lifetime value.



Numerical Attributes and Churn Relationship

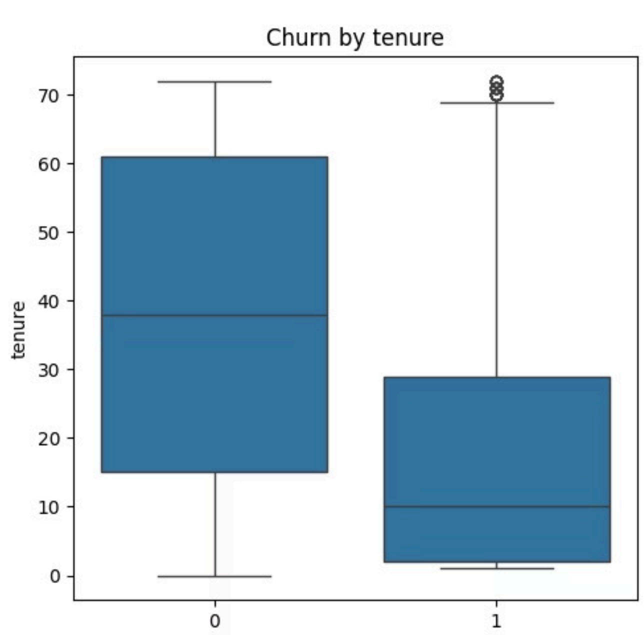
Total Charges (Log-Scale): Customers who churned generally had lower total charges, suggesting shorter service durations and less financial engagement.

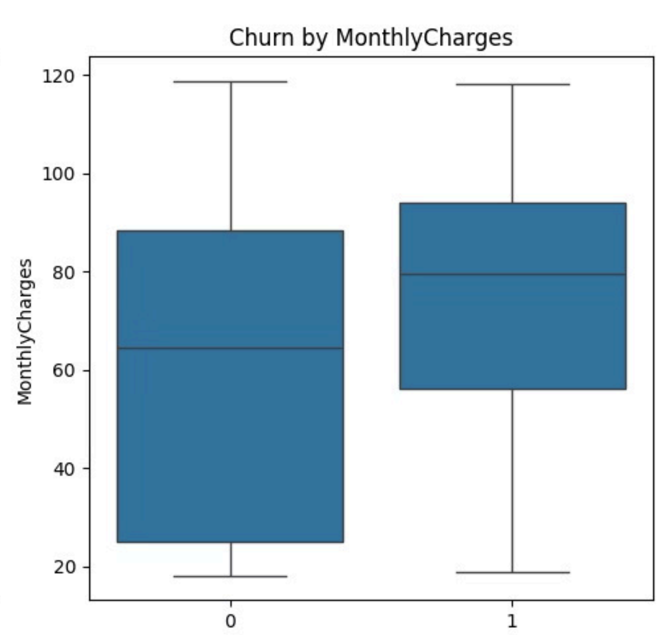


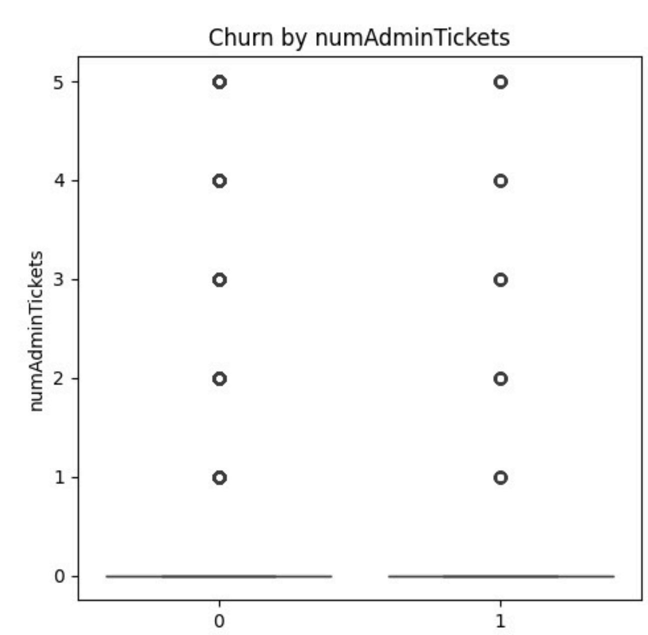
Tenure: A significant portion of churned customers had shorter tenure periods, emphasizing the importance of initial customer experience and onboarding.

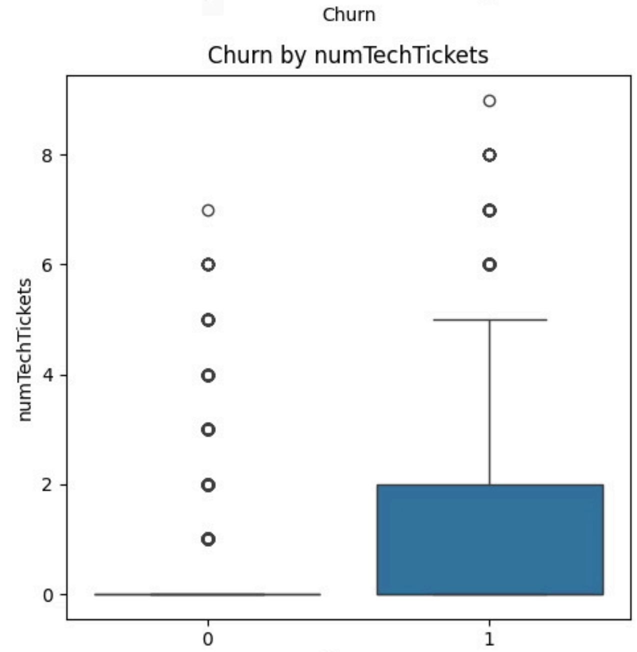
Monthly Charges: Churned customers typically faced higher monthly charges, indicating price sensitivity as a potential churn trigger.

Support Tickets: Customers frequently engaging with technical support showed higher churn rates, suggesting dissatisfaction or service issues.









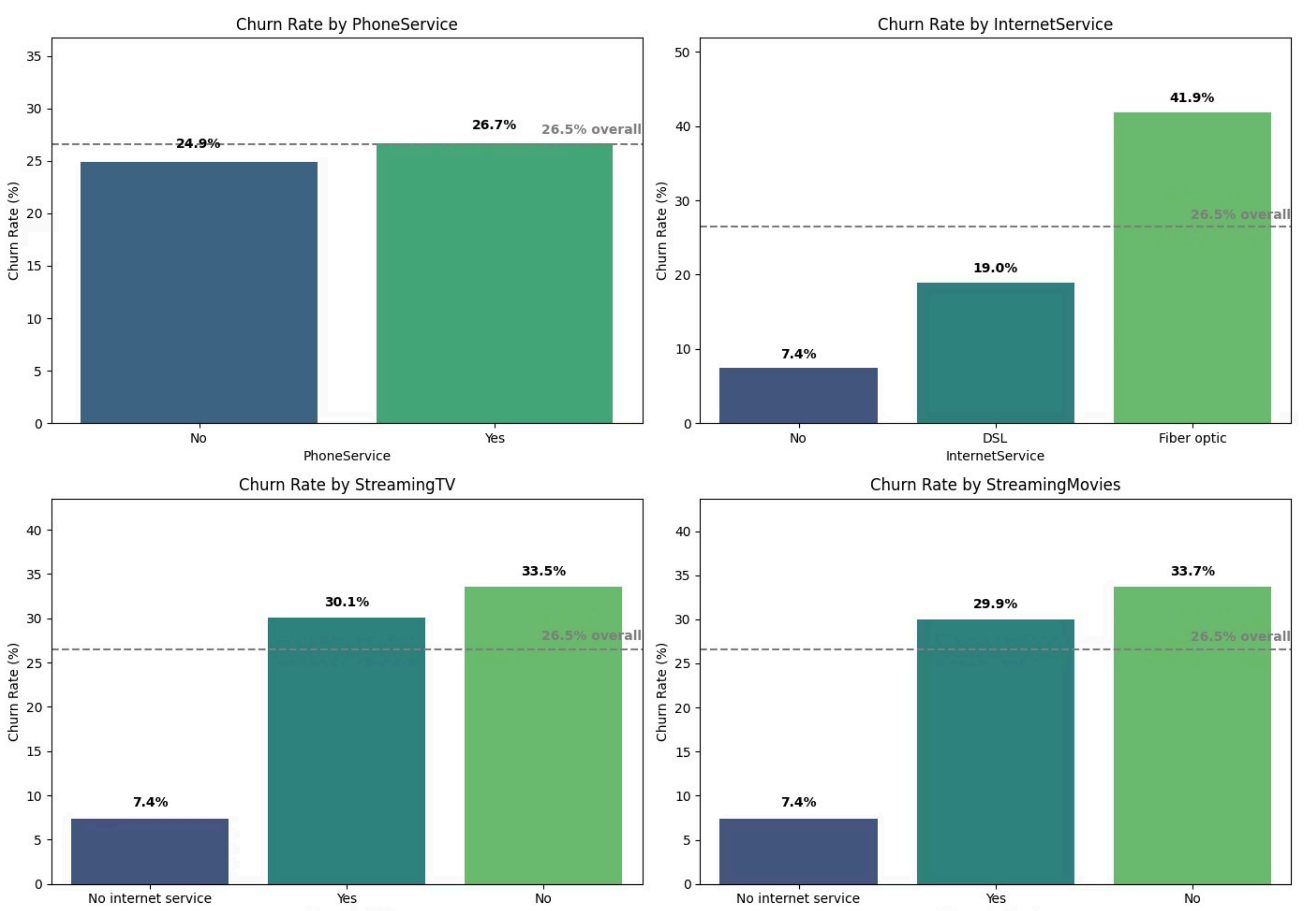
Services Used and Churn Impact

The baseline churn rate across all services is approximately **26.5%** as the overall average churn rate, calculated by dividing the number of churned customers by the total number of customers and multiplying by 100 (Churn Rate = (Number of Churned Customers / Total Customers) × 100). This benchmark helps in assessing whether individual services have higher or lower churn rates compared to the company-wide average, allowing for targeted insights and strategic decisions.

Phone Service: Among the **6,529 customers** who subscribed to phone service, **1,745 have churned**, resulting in a churn rate of **26.7%**, which closely mirrors the overall churn rate of 26.6%. This indicates that phone service alone is not a major driver of churn. However, its impact may become more pronounced when bundled with higher-churn services like fiber optic internet.

Fiber Optic Internet: Of the **2,407 customers** using fiber optic internet, **1,008 have churned**, yielding the highest churn rate of **41.9%** across all service categories. This suggests substantial dissatisfaction—potentially due to issues with reliability, customer support, or pricing. Since fiber optic is marketed as a premium service, churn at this level poses a serious risk to customer trust and revenue.

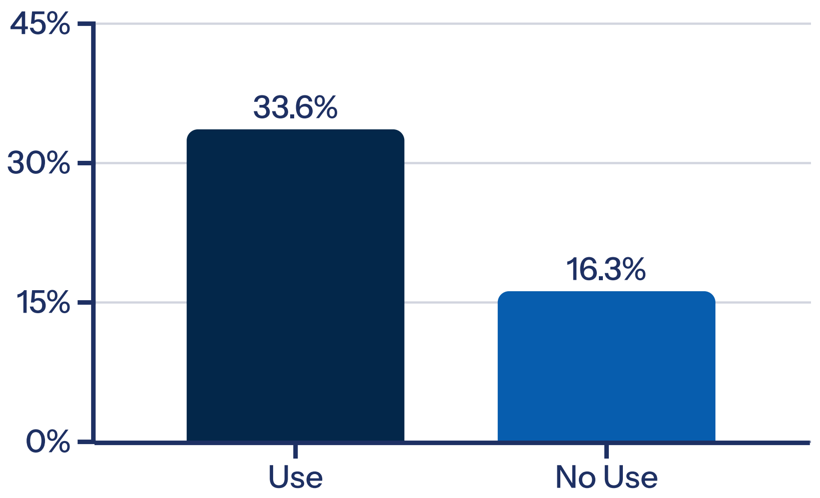
Streaming Services: Customers **without any streaming subscriptions** had a lower churn rate of **22.8% (808 out of 3,544)**, compared to **30.3% (1,061 out of 3,499)** among those who used at least one streaming service. This pattern implies that customers with simpler or more essential service bundles may feel more satisfied and stable, while those with streaming add-ons may have higher expectations or encounter more service-related issues.



Billing and Payment Methods

Paperless Billing

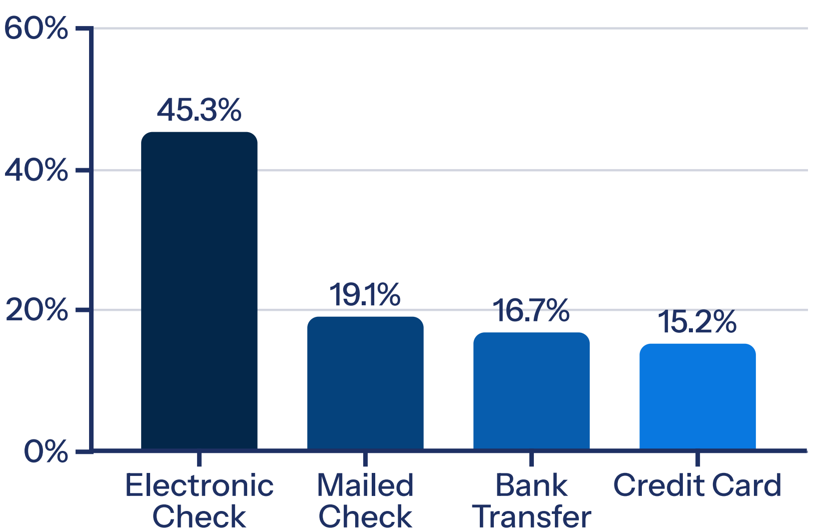
Among the **4,383 customers** who opted for paperless billing, **1,400 have churned**, resulting in a churn rate of **33.6%**. In contrast, the **2,771 customers** who did not use paperless billing experienced a lower churn rate of **16.3% (469 churned)**. This disparity suggests that customers receiving digital bills may feel less engaged or may face issues with billing clarity. Enhancing the transparency and accessibility of digital billing could help mitigate this churn risk.



Payment Method

- **Electronic check** users show the highest churn rate at **45.3%**, with **1,071 out of 2,365 customers** having churned.
- In comparison, churn is much lower among customers using:
    - **Credit card (automatic)**: **15.2% (232 out of 1,522)**
    - **Bank transfer (automatic)**: **16.7% (258 out of 1,544)**
    - **Mailed check**: **19.1% (308 out of 1,612)**

These findings indicate that manual payment methods, especially electronic checks, may correlate with financial instability or dissatisfaction. Promoting **automatic and reliable payment options** like bank transfers and credit cards could help enhance customer retention through greater convenience and trust.



Contract Type Analysis

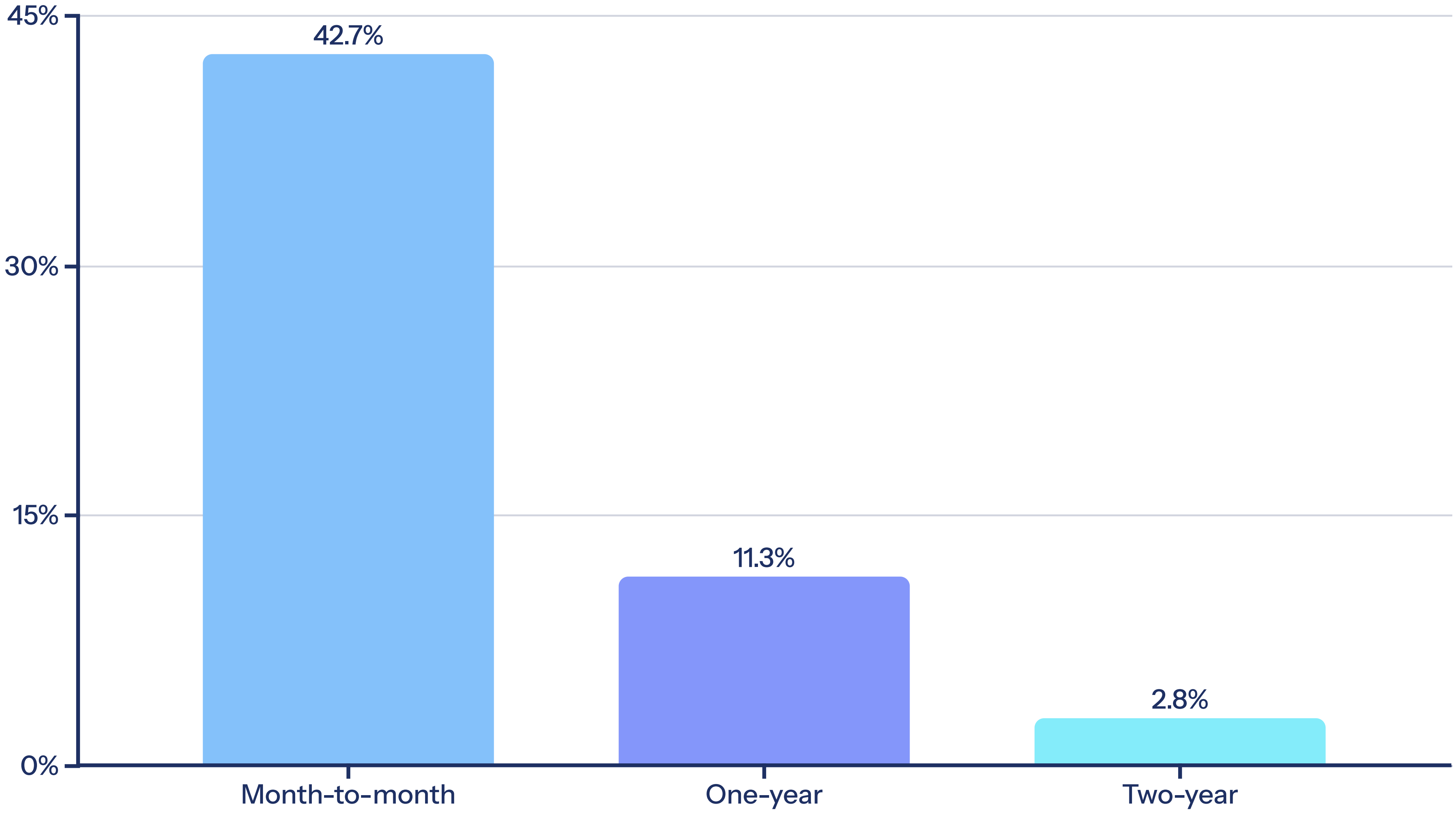
Customers on **month-to-month contracts** exhibit the highest churn rate at **42.7%**, with **1,655 out of 3,869 customers** discontinuing their service. This significantly outpaces the churn rates of customers on longer-term contracts:

- **One-year contracts**: **11.3% churn** (166 out of 1,472 customers)
- **Two-year contracts**: **2.8% churn** (48 out of 1,702 customers)

These figures clearly indicate that short-term contract holders are far more likely to churn, likely due to greater flexibility, dissatisfaction with service, or lack of perceived commitment.

To combat this, PwC recommends that the company **incentivize upgrades to longer-term contracts** through promotions, loyalty benefits, or bundled savings. The stark contrast in churn rates suggests that customers on one-year or two-year plans are substantially more loyal and satisfied.

By increasing the share of long-term contract users, the company can **stabilize its customer base**, reduce acquisition costs, and improve overall profitability — a strategy aligned with sustainable growth and customer lifetime value.

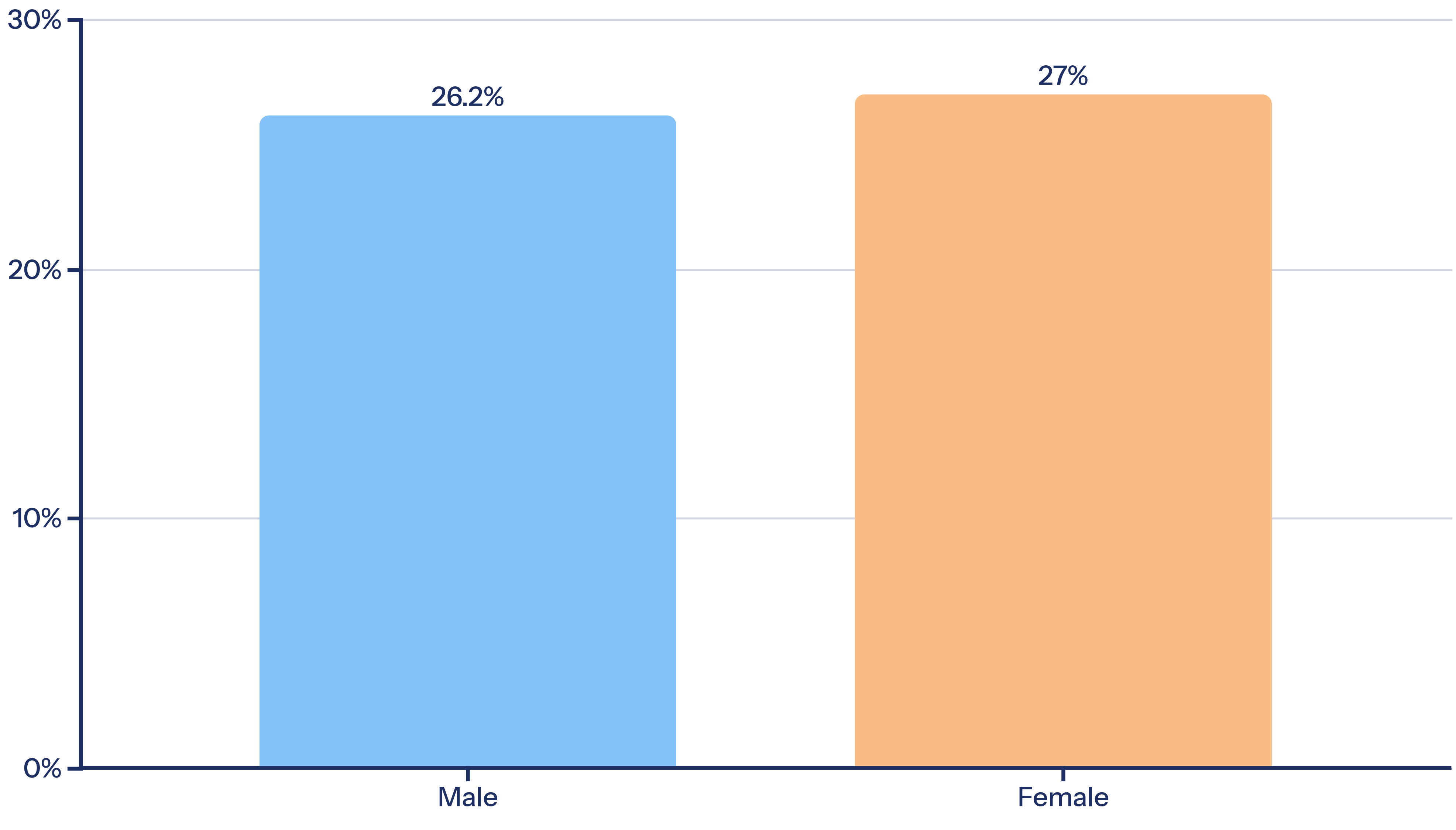


Demographic Insights – Gender

Churn rates show minimal variation across gender demographics, confirming that gender is **not a significant factor** in predicting customer churn.

- Among the **3,517 male customers**, **922 have churned**, resulting in a churn rate of **26.2%.**
- Among the **3,526 female customers**, **947 have churned**, for a slightly higher churn rate of **26.8%.**

The nearly identical churn rates suggest that **gender has little to no impact** on customer retention. Therefore, retention strategies should focus on more influential drivers such as **contract length**, **payment behavior**, **internet service quality**, and **billing experience**, rather than investing in gender-specific outreach or segmentation.



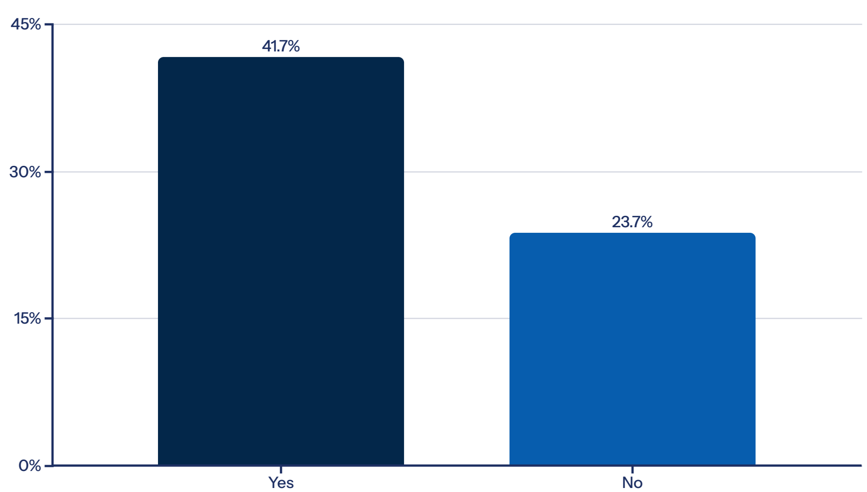
Demographic Insights - Age and Family Status

Senior Citizens

Out of **1,396 senior citizen customers**, **582 have churned**, resulting in a high churn rate of **41.7%**. In contrast, the **5,647 non-senior customers** had a churn rate of **22.8% (1,287 churned)**. This stark difference suggests that senior citizens may face challenges related to **technology use**, **pricing concerns**, or **service complexity**.

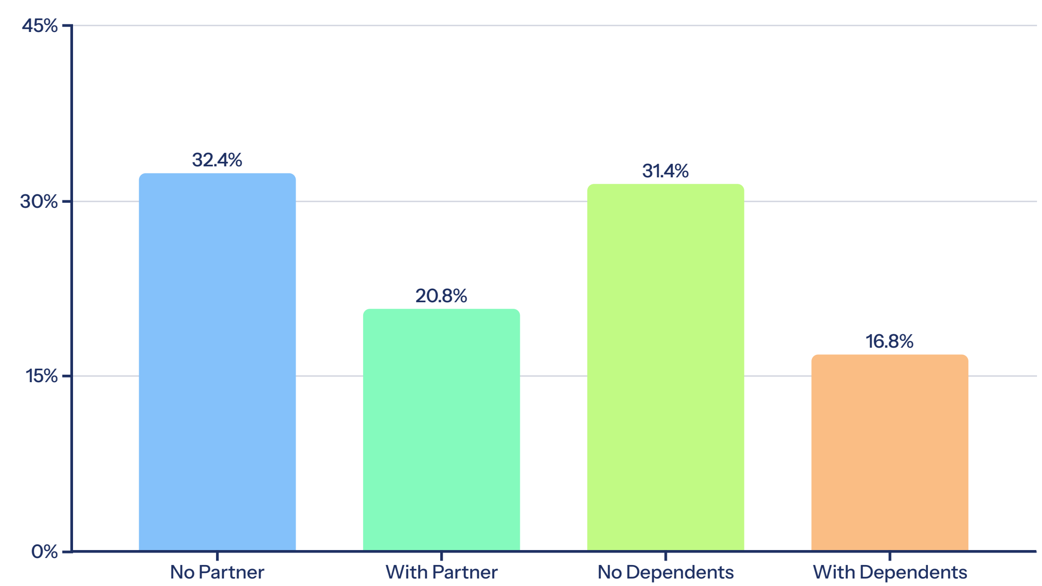
PwC recommends launching **targeted retention campaigns** for this segment, such as:

- Simplified service packages
- Personalized support for setup and billing
- Loyalty discounts for long-term use



Partner & Dependents

- **Partner Status:**
- Customers **without partners**: **32.4% churn rate** (1,210 out of 3,733)
- Customers **with partners**: **20.8% churn rate** (659 out of 3,171)
- **Dependents:**
- Customers **without dependents: 31.3% churn rate** (1,543 out of 4,933)
- Customers **with dependents**: **15.5% churn rate** (326 out of 2,110)



Predictive Modeling and Evaluation

Logistic Regression

PwC's churn prediction model using **logistic regression** achieved a strong overall **accuracy of 84.5%**, as visualized in the confusion matrix above. The model demonstrated a good balance between precision and recall, effectively distinguishing between customers who stayed and those who churned.

- **True Positives (Predicted Churn correctly): 388**
- **True Negatives (Predicted No Churn correctly): 1,396**
- **False Positives (Predicted Churn, but customer stayed): 153**
- **False Negatives (Predicted No Churn, but customer left): 173**

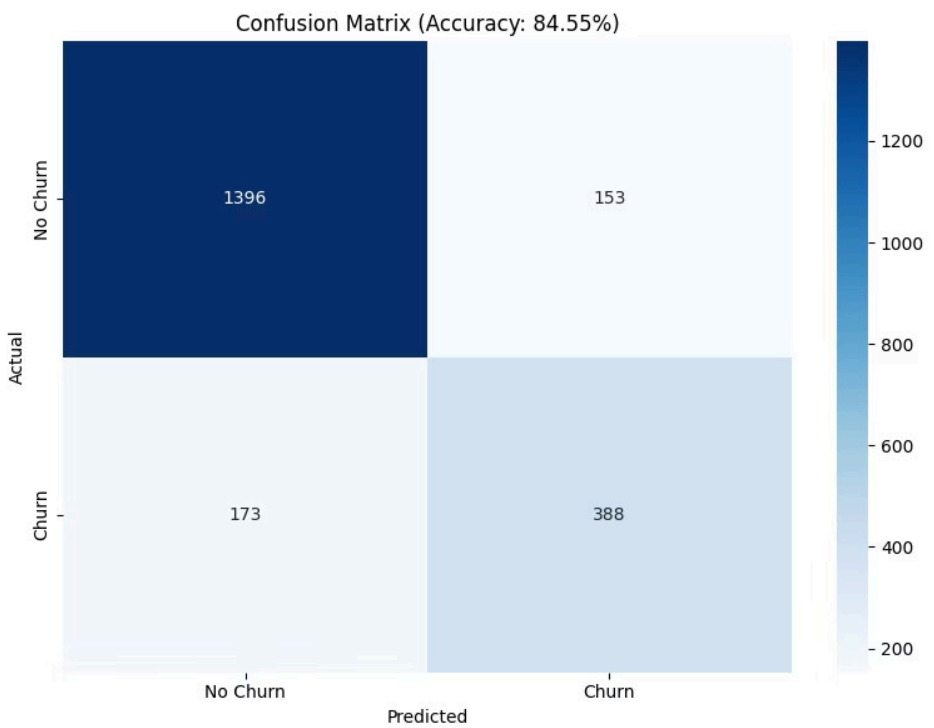
This performance indicates the model is **reliable for operational use** in identifying high-risk customers. PwC recommends leveraging this model for proactive retention strategies, such as targeted offers or interventions for customers likely to churn, particularly those flagged in the false negative segment.

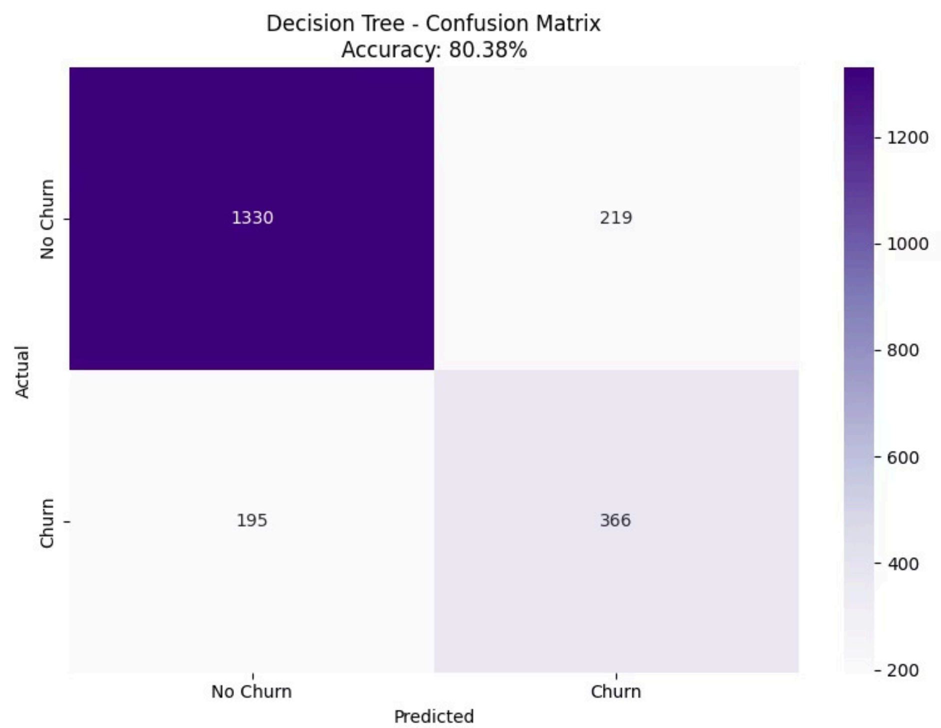
Decision Tree

While the decision tree model provides an interpretable structure for understanding churn drivers, its performance falls short compared to logistic regression. The model achieved an **accuracy of 80%**, with higher misclassification rates.

- **True Positives (Predicted Churn correctly): 366**
- **True Negatives (Predicted No Churn correctly): 1,330**
- **False Positives (Predicted Churn, but customer stayed): 219**
- **False Negatives (Predicted No Churn, but customer left): 195**

Although decision trees are easy to visualize and explain to non-technical stakeholders, the **lower precision and higher false positive rate** make them less suitable for high-stakes churn prediction. PwC recommends using logistic regression for deployment, reserving decision trees for exploratory analysis and feature importance insights.





Strategic Recommendations and Conclusion

Target High-Risk Segments

Concentrate retention efforts on fiber optic internet subscribers, senior citizens, and month-to-month subscribers.

Promote Automated Payments

Encourage customers to adopt automatic payment methods such as credit cards or bank transfers, improving convenience and retention.

Long-term Commitment Incentives

Develop incentives to convert month-to-month subscribers into long-term contracts, reducing churn risks.

Enhance Customer Communication

Improve transparency and user-friendliness in paperless billing processes and proactively address frequent technical support inquiries to preempt dissatisfaction.

This thorough analysis identifies critical factors influencing customer churn and provides targeted, actionable recommendations. By strategically addressing these areas, the telecom company can significantly enhance customer retention, reduce churn, and achieve sustainable business growth.