

PwC Consulting Case

Study Telecom Customer Churn Analysis

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Background & Goals and Executive Summary

Background & Goals

PwC's Data & Analytics Consulting Division is working on a project for a major telecom company to tackle high customer churn. The project uses exploratory data analysis (EDA) to study customer demographics and behaviours and builds a churn prediction model. The goal is to pinpoint key churn factors and offer data-driven recommendations to boost customer retention and profitability.

Executive Summary

Customers exhibiting abbreviated tenure, recurrent technical difficulties, and those enrolled in month-to-month agreements demonstrate an elevated propensity for attrition. Furthermore, individuals incurring substantial monthly fees, utilizing electronic check transactions, or electing paperless billing manifest augmented churn probabilities. Disengagement from ancillary services such as OnlineSecurity, TechSupport, and Streaming modalities also exacerbates turnover.

To ameliorate churn, a suite of sophisticated strategic interventions is advocated. Bolstering customer service infrastructure, particularly in ameliorated technical interventions, and instituting incentives for protracted contractual commitments can fortify retention. A meticulous reassessment and recalibration of pricing paradigms, especially for premium offerings like fiber optic services, are imperative. The introduction of versatile payment alternatives and curated service bundle concessions can amplify customer contentment.

Additionally, leveraging predictive churn analytics and precision vulnerable clientele. These multifaceted strategies are engineered to enhance customer allegiance, elevate service gratification, and effectuate a discernible reduction in churn incidence.

Report Overview

Viewing the project comprehensively, data was gathered from 7,032 customers. Among them, the most extended customer tenure spanned 72 months, while the highest-priced monthly service package provided by the company reached a peak of US\$118.75. Concurrently, the probability of customers disengaging from the company exceeded 25%.

7032

customer contribution

72 months

is the longest recorded period of time a customer has stayed with a company

>25%

customer churn rate

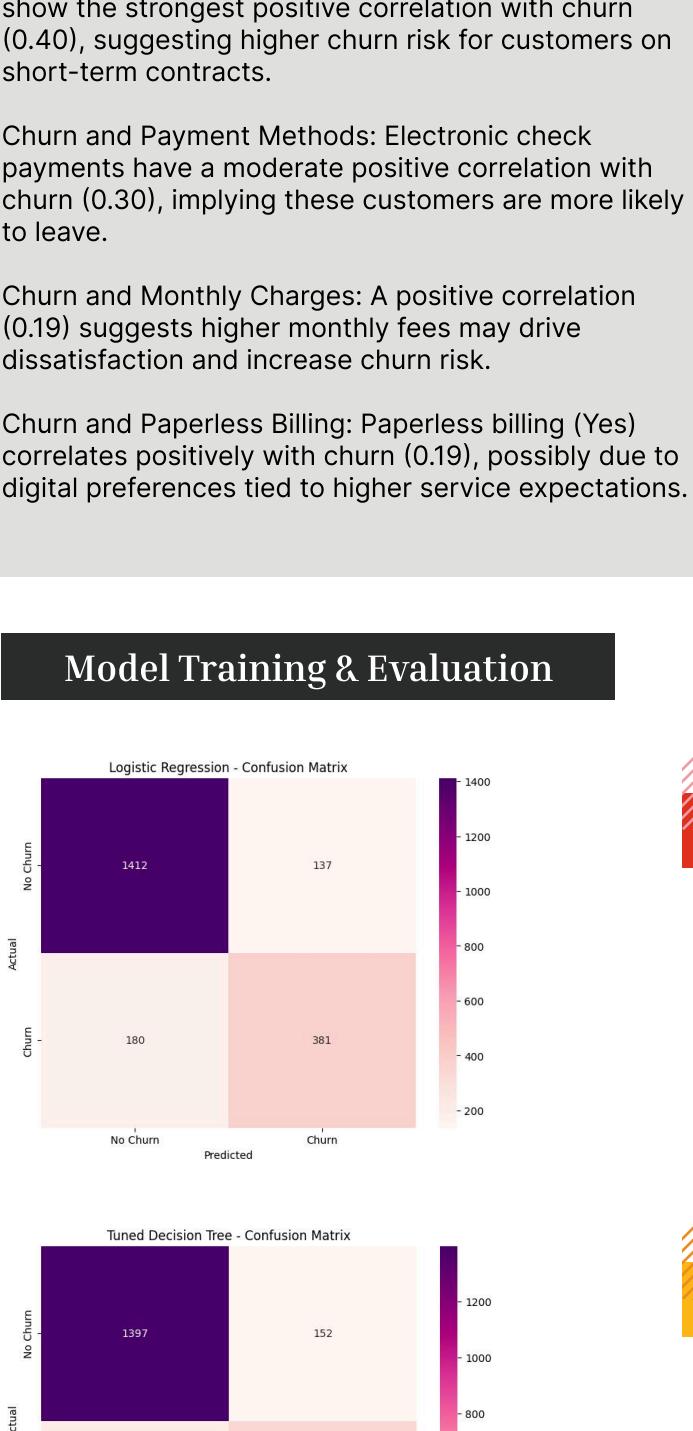
<5 months

is the period when customers are most likely to churn

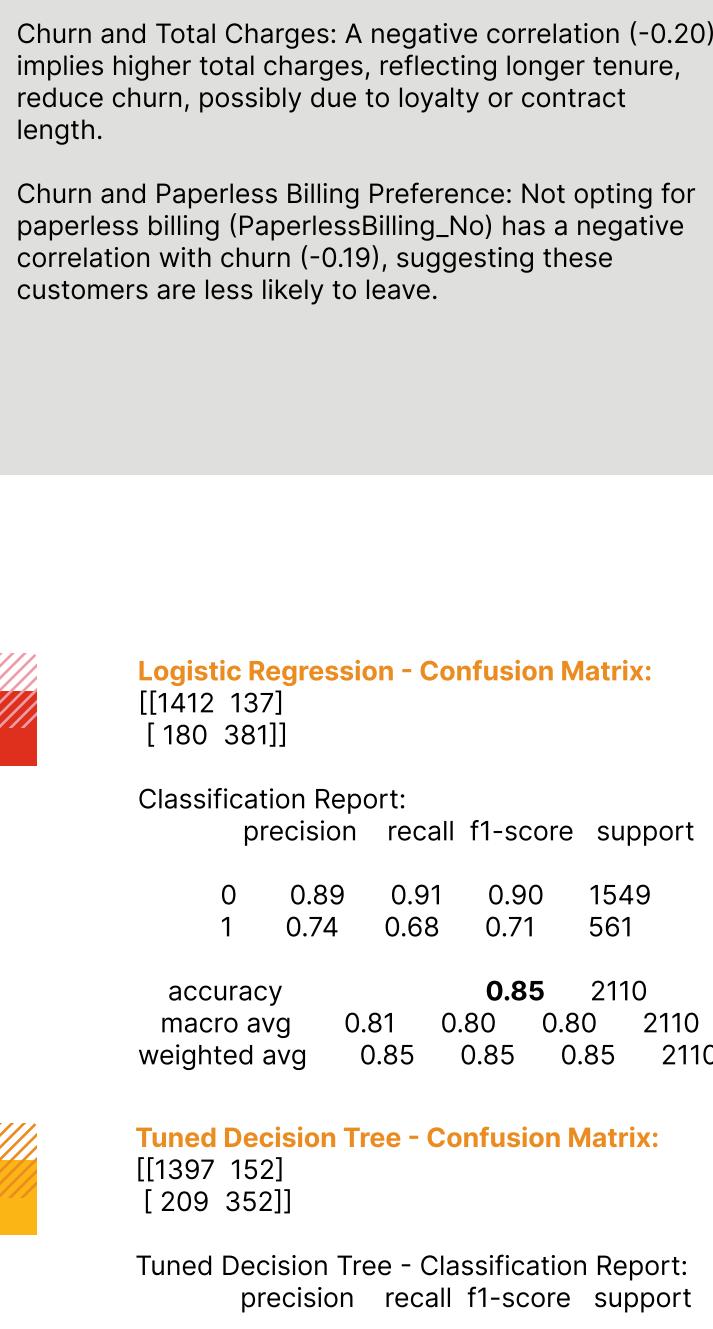
Understanding the Customer Base

Upon reviewing Distribution of tenure, it is apparent that the distribution of customer churn predominantly occurs within the first 10 months of service utilization. From the subsequent months onward, the churn rate commences a steady and gradual reduction.

Churn Percentage - Distribution of tenure for churned customers



Churn Percentage - Churn rate by tenure group



A more granular examination in Churn Rate by tenure group reveals that, when segmented into 10-month intervals, it becomes clear that within the initial two regions—spanning less than 20 months—the churn rate demonstrates a marked increase, significantly exceeding the average churn rate.

Customer Segments

Customer Segments

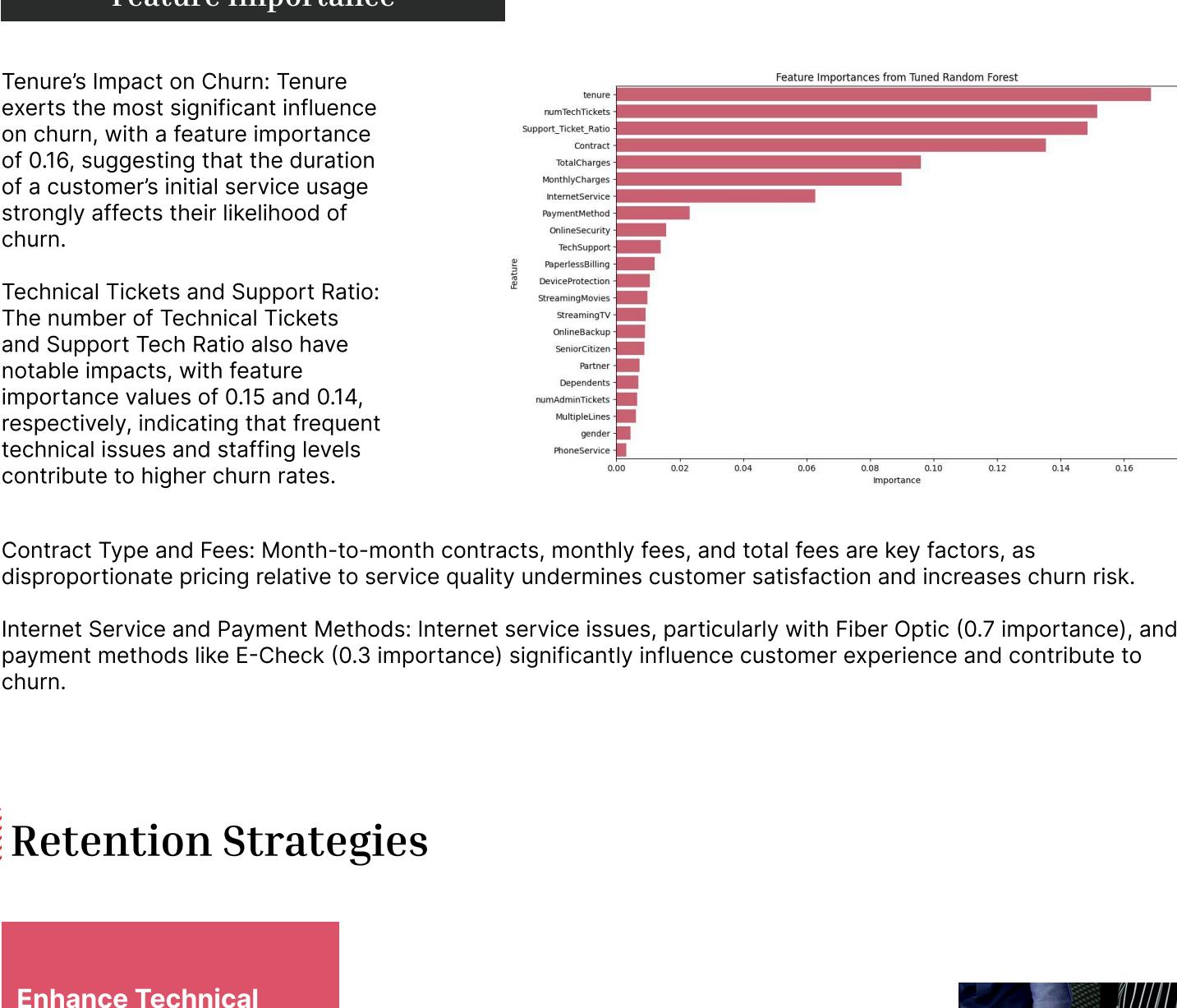
Age groups, gender distribution, and other demographic details

The four charts indicate a balanced male-to-female ratio, both overall and in terms of churn rates, showing no significant gender-based differences.

Customers lacking dependents or partners exhibit a higher churn rate, suggesting that family structure influences retention.

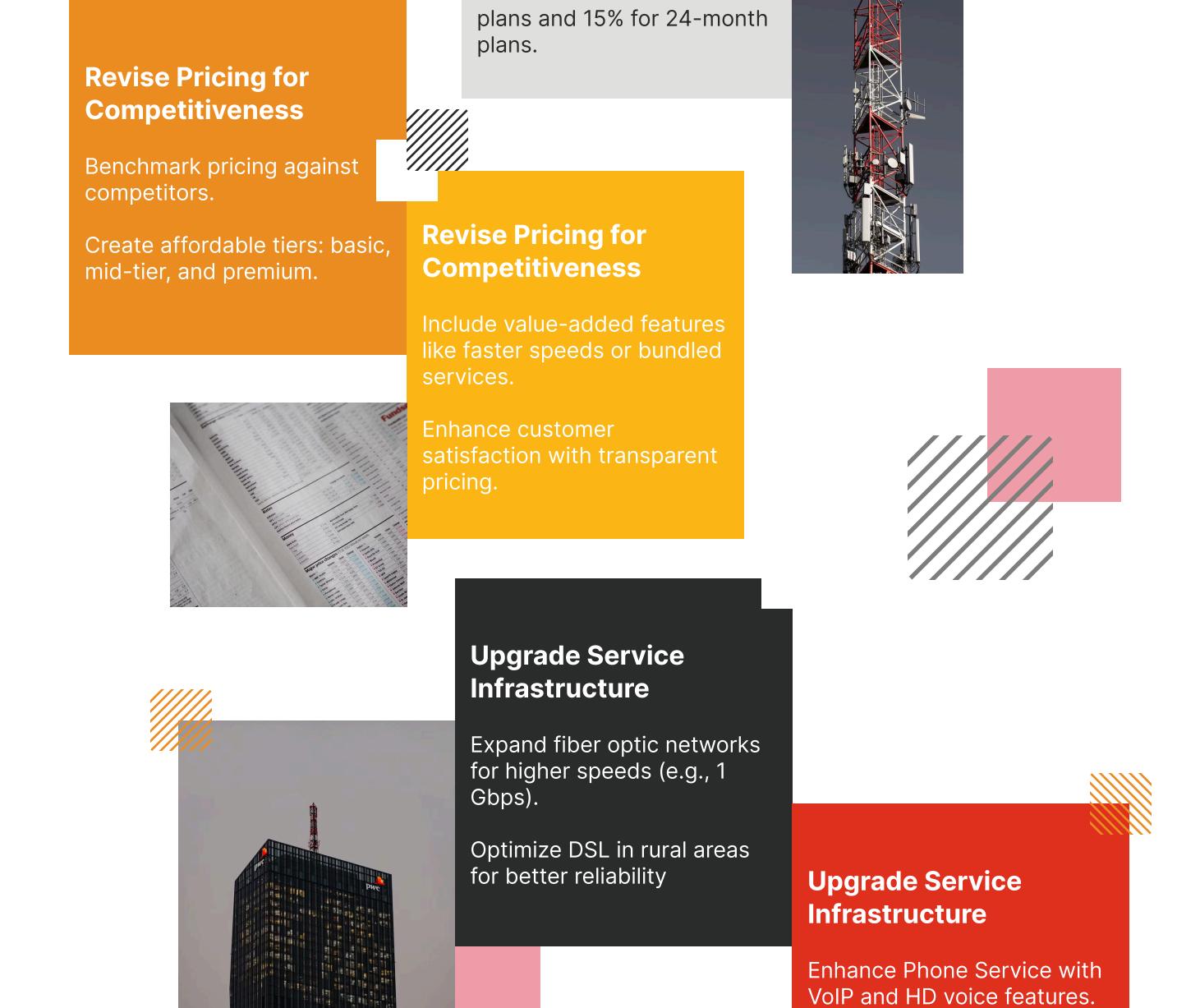
Senior citizens demonstrate a greater tendency to churn, indicating that age may play a role in customer attrition.

Services Used - Breakdown of customers using Internet, Phone, TV services



The figures on services and churn rates show that phone service has little impact on churn. However, Internet service reveals a clear difference: Fibre Optic users have a higher churn rate than DSL users. Since Streaming TV relies on Internet service, its usage is also linked to a higher churn rate.

Billing Method - Churned customer prefer paperless billing or traditional methods



Concerning billing methods, a discernible variation emerges, as customers opting for paperless billing exhibit an increased churn rate. This trend may be attributable to persistent dissatisfaction with the electronic billing experience.

Feature Selection

Churn Rate by Number of Technical Tickets

The chart of Technical Tickets shows a strong link to churn: a single ticket leads to over 60% churn, rising to 95% with seven tickets. This highlights technical staff challenges as a key driver of customer churn.

Churn vs Support Ticket Ratio

The box plot of the Support Ticket Ratio shows non-churn customers have a low ratio, indicating rare technical issues. Churned customers, however, face issues 1-2 times, with outliers experiencing over eight instances.

Model Training & Evaluation

Among payment methods, Electronic Checks stand out with a churn rate nearing 50%, far higher than other options.

Month-to-month contracts show a high churn rate, exceeding 50%, compared to other contract types.

Feature Importance

Performance Metrics Overview: The table evaluates Logistic Regression, Decision Tree, Random Forest, and SVM on accuracy, precision, recall, f1-score, and F1-score.

Why Random Forest? Balanced Performance: Random Forest excels across all metrics—accuracy (0.85), precision (0.74), recall (0.68), and F1-score (0.71)—making it ideal for churn prediction by effectively balancing the identification of churners and minimizing false positives.

Robustness and Generalization: As an ensemble method, Random Forest mitigates overfitting by combining multiple decision trees, outperforming a single Decision Tree (precision 0.69) and ensuring reliability with noisy or variable real-world data.

Feature Importance: Random Forest provides valuable insights into feature importance, helping identify key churn risk factors.

Comparison to Alternatives: Logistic Regression, despite matching Random Forest's metrics, assumes linear relationships, potentially missing complex churn patterns. SVM (accuracy 0.84, F1-score 0.69) is slightly less effective and computationally intensive, while Decision Tree's lower precision (0.69) makes it less suitable.

Retention Strategies

Enhance Technical Staff Skills: Invest in targeted training for technical staff.

Promote Customer Loyalty with Pricing Incentives: Include perks like free upgrades to encourage commitment.

Revise Pricing for Competitiveness: Benchmark pricing against competitors. Create affordable tiers: basic, mid-tier, and premium.

Upgrade Service Infrastructure: Expand fiber optic networks for higher speeds (e.g., 1 Gbps). Optimize DSL in rural areas for better reliability.

Promote Customer Loyalty with Pricing Incentives: Enhance customer satisfaction with transparent pricing.

Upgrade Service Infrastructure: Improve electronic bill check payments with secure ACH and mobile options.

Contract Type: Monthly contract or Annual contract.

Payment Method: Credit card, bank transfer, e-wallet.

Churn Rate by Number of Technical Tickets.

Churn vs Support Ticket Ratio.

Churn Rate by Payment Method.

Churn Rate by Contract Type.

Churn Rate by MonthlyCharges.

Churn Rate by TotalCharges.

Churn Rate by PaperlessBilling.

Churn Rate by numTechTickets.

Churn Rate by numAdminTickets.

Churn Rate by Contract.

Churn Rate by PaymentMethod.

Churn Rate by MonthlyCharges.

Churn Rate