

CHAPTER 1 - INTRODUCTION

1.1 Background

The Internet Service Provider (ISP) business in Indonesia has seen exponential expansion due to rising internet use and digital customer engagement (CHRISTIADI et al., 2018). ISPs still must contend with fierce competition in the market, so keeping customers is a critical component of their business plans. The pace at which consumers discontinue doing business with an ISP is known as customer churn, and it has a substantial effect on both profitability and long-term sustainability (Salma & Aprianingsih Ph.D, 2021a).

Figure 1.1 shows the turnover rates over the last five years to demonstrate the scope and patterns of customer churn in the Indonesian ISP industry. This graphic illustration, which was created using data from the PT XYZ one of the biggest ISP in Indonesia, highlights the continuous difficulty ISPs have keeping consumers.

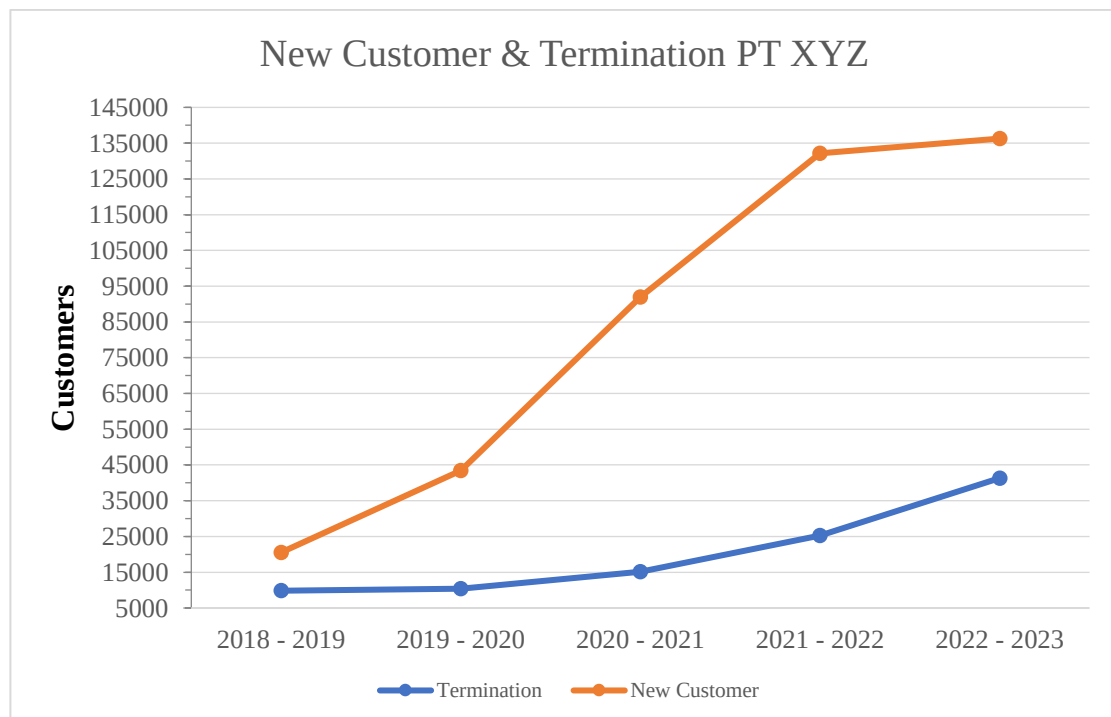


Figure 1.1. PT XYZ Termination Rate.

The graph makes it clear that throughout the previous five years, churn rates have growing up. This trend points to the impact of outside market variables as well as the differing effectiveness of client retention tactics. The conclusions based on this graph support the need to investigate sophisticated predictive and strategic methods, such as the MLP model combined with marketing intelligence that this research suggests.

New developments in data analytics have completely changed how we think about understanding consumer behavior. To anticipate churn, machine learning models—in particular, Multilayer Perceptron (MLP) neural networks—have shown efficacy in the analysis of intricate consumer data sets (Sjarif et al., 2020). By seeing nuances in patterns and correlations that conventional analytical techniques can overlook, these models provide deeper insights.

Table 1.1 shows several studies (Vafeiadis et al., 2015; Zhang et al., 2023) compares contemporary machine learning approaches—specifically, MLP—with classic analytical techniques to provide a better understanding of the developments in churn prediction methodology.

Table 1.1 Machine Learning Techniques Comparison (Vafeiadis et al., 2015; Zhang et al., 2023)

Technique	Description	Performance in Churn Prediction	Applications in Churn Prediction
Support Vector Machine (SVM)	Uses an optimal hyperplane for classification, effective for binary and multi-class problems.	Good Performance	Efficient in binary classification, including churn prediction.
Decision Tree	Tree-like structure for decision-making, uses splitting criteria at each node.	Moderate	Suitable for segmentation and classification in churn prediction.
Random Forest	Ensemble of decision trees, improves accuracy, and prevents overfitting.	Good	Useful for more accurate churn predictions than individual decision trees.
Naïve Bayes	Based on Bayes' theorem with independence assumptions, efficient in training and prediction.	Good	Applied in churn prediction, especially in telecom.
Logistic Regression	Uses logistic function for binary classification.	Good	Commonly used in churn prediction after data transformation.
Matrix Factorization	Decomposes a matrix into lower-dimensional matrices representing latent factors.	Moderate	Useful in uncovering underlying patterns for churn prediction.
K-nearest Neighbors (KNN)	Non-parametric method, classifies based on similarity to nearest neighbours.	Good	Applied for classifying customer churn based on similarity metrics.
MultiLayer Perceptron (MLP)	Mimics the human brain, good for complex pattern recognition.	Good Performance	Effective in predicting churn, showing better performance in some cases compared to other methods.
Convolutional Neural Network (CNN)	Utilizes convolutional layers to extract features, effective in image and sequence processing.	Good	Suitable for churn prediction by extracting relevant features from customer data.

The table illustrates how machine learning approaches, particularly Multi-Layer Perceptron (MLP), provide more accuracy and the capacity to handle more complicated datasets than previous methods, while providing a basic approach to data analysis (Sharma & Kumar Panigrahi, 2011). This move toward sophisticated analytics serves as the foundation for the technique used in this research and is essential for precisely forecasting customer churn.

The importance of marketing intelligence in the ISP industry has grown in tandem with technology developments (Plangger et al., 2022). This entails using consumer and market data strategically to guide decisions. To successfully handle customer churn, several studies (Bogaert & Delaere, 2023; Faritha Banu et al., 2022) have stressed the significance of combining marketing intelligence with predictive analytics.

Table 1.2 shows summarizes previous studies (Jahan & Farah Sanam, 2022; Shaker Reddy et al., 2023; Sonatha, 2013; T.Ş Gürsoy, 2010) in the fields of marketing intelligence and ISP customer churn to put the present research environment in perspective. The foundation for comprehending the complex nature of customer retention tactics and the use of sophisticated analytics in the telecom sector is created by this research.

Table 1.2 The Use of Machine Learning in Marketing Intelligence (Jahan & Farah Sanam, 2022; Shaker Reddy et al., 2023; Sonatha, 2013; T.Ş Gürsoy, 2010)

Aspect	Evolution of Customer Churn Analysis	Importance of Machine Learning	Importance of Marketing Intelligence
Objective	From basic churn prediction to advanced forecasting and targeting.	Used for predictive analysis and forecasting customer churn.	Guides the development of strategies for customer retention.
Techniques	Hybrid classification, logistic regression, decision trees, etc.	Employed for accurate predictions and model tuning.	Utilized to evaluate customer behaviour and develop campaigns.
Data Analysis	Use of exploratory data analysis (EDA) for deeper insights.	Facilitates high accuracy in churn prediction.	Helps in understanding customer retention and loyalty.
Modeling	Transition to complex models like CatBoost for higher accuracy.	Used to select the best classifiers and features.	Supports targeted marketing techniques.
Results	Improvement in accuracy and prediction of churn.	Demonstrates high accuracy and F1-scores.	Aids in customizing win-back strategies and retention.
Data Mining	Adoption of data mining for insightful churn analysis.	Processes data into actionable insights.	Informs the choice of best strategies for customer retention.
Customer Retention Strategies	Development of tailored campaigns based on churn analysis.	-	Central to the application of intelligence for customer churn.

The research that has been compiled above demonstrates how customer churn analysis is changing and how machine learning and marketing intelligence are becoming more and more important. More thorough research that incorporates these domains is still required, however, especially considering the Indonesian ISP market. To close this gap, this research applies Multilayer Perceptron (MLP) neural networks together with insights from marketing strategies to better forecast and control customer churn.

The purpose of the research is to create complete customer retention strategies for Indonesian ISPs by combining marketing information with MLP predictive modeling. The work of (Shaker Reddy et al., 2023) who illustrated the advantages of fusing machine learning insights with strategic marketing tactics, serves as an inspiration for this strategy.

By combining various approaches, the research adds to the body of knowledge by providing an all-encompassing framework for ISPs. This methodology aims to provide useful information for marketing and retention tactics in addition to anticipating customer churn.

1.2 Research Problems

Customer turnover is a complicated concern for the telecommunications industry, influencing profitability and brand reputation substantially. This issue extends beyond mere loss of consumers; it involves understanding the underlying reasons for their departure and how to keep them from leaving in the first place. In the instance of PT XYZ, as shown in Figure 1.2, the disparity between income from new customers and churn losses suggests an urgent need for more effective churn management measures. Furthermore, as seen in Figure 1.3, the growing trend in customer terminations, despite a higher intake of new consumers, emphasizes the importance of the problem. To overcome this difficult challenge, marketing intelligence must be incorporated into the strategy. Marketing intelligence is employed with the aim of supporting sustained revenue growth and strengthening PT XYZ's market position. This approach goes beyond merely detecting churn drivers; it proactively forecasts future customer behavior patterns, enabling the implementation of customized retention strategies.

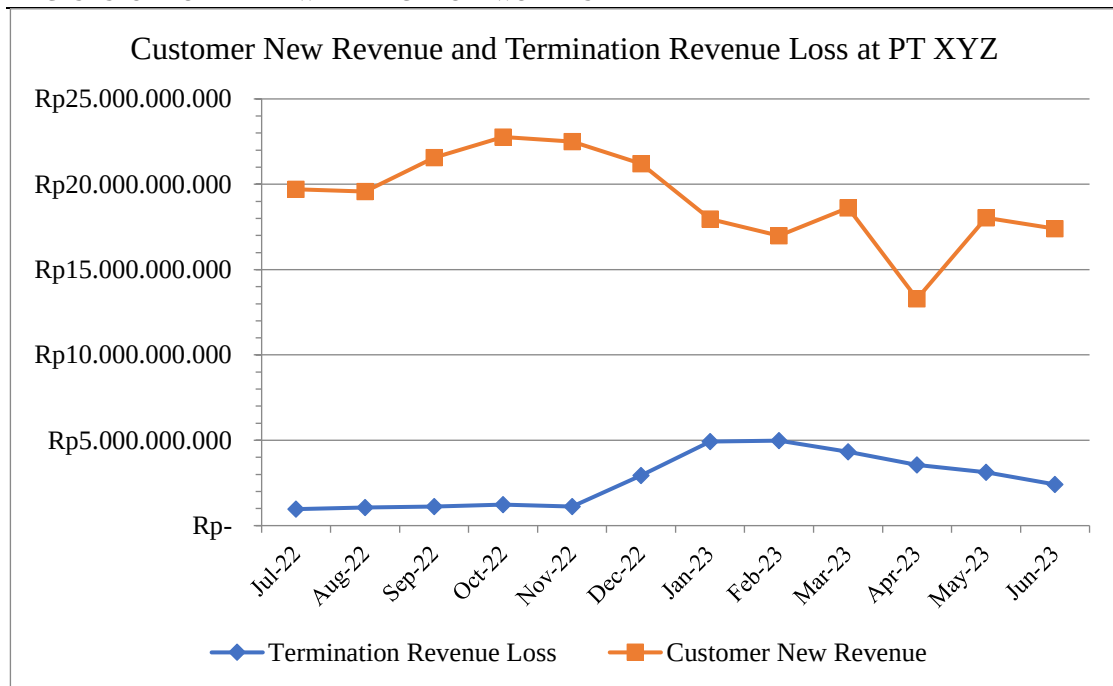


Figure 1.2. Customer New Revenue and Termination Revenue Loss at PT XYZ

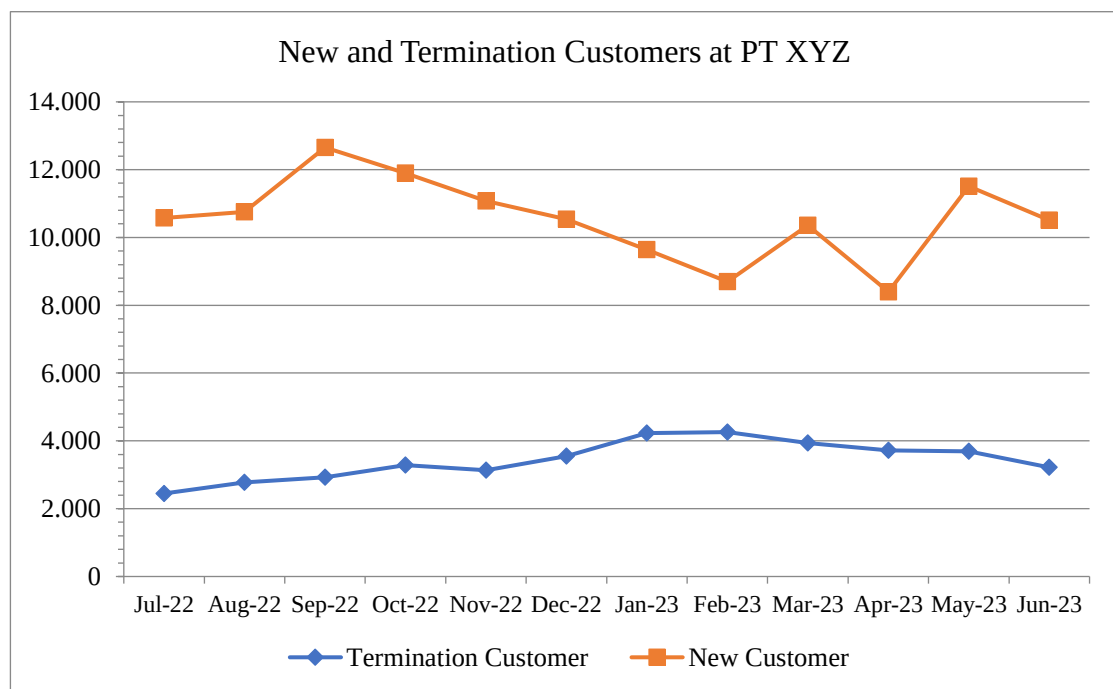


Figure 1.3. New and Termination Customers at PT XYZ

1.3 Research Objectives

1. Using a large dataset, investigate the precise patterns and causes that contribute to customer churn in PT XYZ.
2. Use a Multilayer Perceptron (MLP) neural network for predicting churn effectively.
3. Combine MLP's predictive ability with marketing analytics to develop targeted client retention tactics.
4. Make concrete suggestions for PT XYZ to enhance customer engagement, minimize churn, and improve overall happiness, all while taking into account the particular characteristics of the Indonesian market.

1.4 Significance of Study

Customer turnover is a crucial problem for any business, resulting in lost revenue, lower customer lifetime value, and a ruined brand image. This research is significant because it has the potential to give a full knowledge of customer churn at PT XYZ, which has significant consequences for revenue and client base stability. The research addresses a fundamental gap in implementing personalized predictive analytics inside PT XYZ's operational framework by examining churn trends, identifying important variables leading to customer exit, and constructing a predictive churn model. Many research isolates either churn prediction or marketing techniques. This research aims to close the gap by establishing a comprehensive method that combines churn prediction algorithms with targeted marketing actions for successful retention. The research's findings will help PT XYZ greatly by guiding strategic marketing choices and customer interaction strategies focused on retention, perhaps leading to increased loyalty and profitability. These steps are critical as the sector grapples with high churn costs and the competitive requirement of retaining a loyal client base. This research covers a research gap by addressing the need for a data-driven, machine learning approach to churn prediction that is customized to the specific context of PT XYZ and the Indonesian Service Providers market.

1.5 Research Questions

1. What patterns and factors are influencing customer churn at PT XYZ?
2. How effective is the MLP neural network at forecasting churn?
3. How can MLP predictive insights be used with marketing data to create targeted retention strategies?
4. What particular methods may be suggested for PT XYZ to improve customer engagement and minimize churn?

1.6 Expected Outcome

1. The research will result in the successful creation and validation of an MLP-based predictive model, which will act as a powerful tool for predicting customer churn within PT XYZ.
2. The research will give complete understanding into consumer behavior and preferences using the EDA analytical capabilities, generating useful facts that will influence and improve marketing and retention initiatives.
3. The research will provide a set of clear, actionable suggestions targeted to PT XYZ, aiming to increase customer engagement and minimize churn rates, with possible industry relevance.
4. This research will offer a substantial addition to the current body of literature by merging MLP with marketing intelligence in the context of the telecommunications industry, particularly adding value to studies within the Indonesian market.