

# Churn Analysis of Indian Telecom Customers

Rohit Singh\* and Amit Anand Tiwari\*

## Abstract

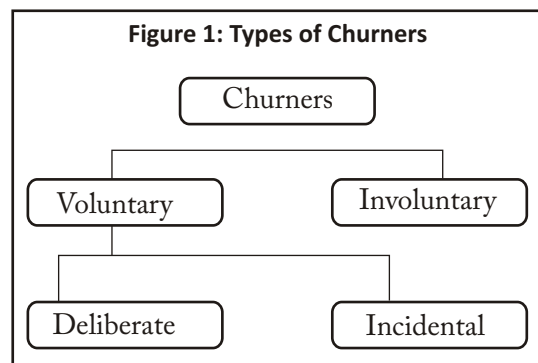
To sustain in the challenging environment of business, it is imperative that a company understands the behaviour of its customers and their responses towards the various attributes of the products and services offered by it and its competitors. It is also essential to analyse the reasons why customer make shifts for the same product from one firm to another, i.e. churn analysis. Here, we make an attempt to understand the impact of service factors like network connectivity, data and call tariffs, roaming facilities on the probability of customers' churn.

## Introduction

Berson et al. (2000) defined 'customer churn' as the process of subscribers (either prepaid or postpaid) switching from one service provider to the other. Churn can be active, deliberate, rotational, incidental, passive, involuntary. With proper management of customers, firms can minimise the susceptibility to churn and maximise the profitability of the company. Churn Prediction can also be described as a method which helps in identifying possible churners in advance. There are two main categories of churners viz. voluntary and involuntary.

Voluntary churners are more difficult to determine and occur when a customer initiates termination of service. Involuntary churners are easier to identify and include

those customers who are disconnected by the company for fraud, non-payment or underutilization of services. Voluntary churn can further be categorized as deliberate and incidental churn. Incidental churn happens because of any unexpected incident in customer's life such as change in financial condition churn and location churn etc. (Figure 1).



\*Assistant Professors, International Management Institute Kolkata

Deliberate churn happens because of many reasons like change in technology, service quality factors, economic, social and psychological factors, and convenience. The customer churn analysis feature helps firms identify and focus on higher value customers, determine what actions typically precede a lost customer or sale, and better understand what factors influence customer spending. When firms improve customer retention, it substantially improves the bottom line. Existing customers are the most valuable asset of any company. So the best marketing strategy is to retain such customers. Many studies have established that it is more profitable to keep a company's existing clients satisfied than to constantly attract new clients (Van Den Poel & Larivière, 2004:197; Coussement & Van Den Poel, 2008:313).

This article aims to find out the effect of quality of customer service and location on subscriber behaviour and churn rate because of the preference available to the subscriber. Mobile prepaid customers are vibrant in changing their mobile operators within a very short span. Churn rate increases pungently in parallel to the growth of prepaid mobile subscribers. Customer churn happens to be the most challenging issue for telecom industry. Customer retention, therefore, is becoming critical. In this regard, it is essential to investigate the basis for switching of the prepaid mobile users in India.

### **Background of Churn Analysis in Telecom**

India has more than 15 mobile operators. It is a highly competitive market, predominantly pre-paid market. Mobile phone users appear to be moving from pricier postpaid platforms to value-rich prepaid plans. The monthly churn rate in India averages approximately 6 per cent (Economic Times, 2018). Churn analysis is an important tool to understand the underlying reason for the churn. There are some other factors describing the use of churn analysis in the telecom sector. First, it is used for ascertaining the level of customer satisfaction about their purchasing decision, corporate image, the performance of mobile operator, customer relationship management process, service quality and price. Second, it helps in estimating customers who are more likely to switch service provider. Third, it helps to know the root cause of why the company is losing its customers. Fourth, it helps to focus on existing customers and lowers the need to find new customers with uncertain level of risk. Finally it helps the company in building relationships by planning and executing successful retention programs. It also increases sales of the company by saving the cost of finding new customers.

### **Literature Review**

In the first subsection, the significant tools and techniques associated with churn analysis are summarized. The second subsection

entails a brief review of field studies from different companies that survey customer behaviour as a basis for churn analyses.

### *Churn Analysis Techniques*

To survive in an increasingly competitive marketplace, many companies are turning to a wide range of methods for churn analysis. The approaches to explore customer churn employed by some studies are presented in Table 1.

### *Field Studies*

Song and Kim (2001) used a simulation to evaluate change in the Korean mobile phone market structure that had resulted from customer churn. Choi, Lee, and Chung (2001) analyzed the impact of business strategies on customer loyalty at the five dominant mobile service providers in Korea. Their analysis revealed that higher customer welfare and better competitiveness require overall and complete deregulation of the Korean mobile industry. The factors that customers consider

while selecting a mobile telephone operator were studied by Kim and Kwon (2003). Their research showed the impact factors like inter-network call discounts and quality of a connection have on the choice of a customers' mobile phone operator. Apart from it, Kim and Yoon (2004) also surveyed 973 users of Korea's five main mobile telephony operators and identified determinants of both churn and loyalty. Their study revealed that the probability that a customer will switch operators depends on his or her level of satisfaction with various attributes of the service operator like call quality, tariff plans and flexibility, handsets and brand image among others along with income levels and subscription duration. Loyalty turned out to be a direct function of factors like call quality, handset type and brand value wherein loyalty means the degree to which a user would recommend his service operator to other users. Although subscription duration bears a negative relationship with churn probability, it

is insignificant for loyal customers, who recommend their mobile operators to others. Hence, among non-loyal subscribers, a lock-in effect is observed where switching costs play a huge role.

Research on the German mobile communications market was conducted using data from a sample of 684

**Table 1: Approaches to Explore Customer Churn**

Method	Reference
Balanced random forests	Xie, Li, Ngai, & Ying, 2009
Customer lifetime value; Neural networks	Gladly, Baesens, & Croux, 2009; Tsai & Lu, 2009
Decision tree analysis	Chu, Tsai, & Ho, 2007
Regression techniques	Lariviere & Van den Poel, 2005
Support vector machine; Association rules	Xia & Jin, 2008; Tsai & Chen, 2010

residential mobile communications users (Gerpott, Rams, & Schindler, 2001). These results suggested that customer satisfaction, customer loyalty and customer retention are strongly correlated. Also, mobile service cost and perceptions of personal service benefit were found to affect customer retention. The analysis supported a two-stage model where overall customer satisfaction significantly impacts customer loyalty, which in turn influences a customer's intention to terminate (or to continue) their relationship with his or her mobile telephony operator. Mobile service costs, personal perceptions of services and the transfer of phone numbers among operators were identified as supply-related factors with the strongest effects on customer satisfaction.

Previous surveys have focused mainly on finding specific determinants of user churn, such as customer dissatisfaction and loyalty. Such studies were performed in lieu of examining a more comprehensive model that incorporated relationships between alternative constructs like service usage, switching costs, usefulness of services and other customer related variables. Other weaknesses of previous surveys were associated with type of data and samples collected. Consequently, there was often an assumption that the consumers' perceptions of and intentions towards their service experiences remain constant over time. Comparing actual user transactions and billing data does not permit one to describe or estimate customers' actual future decisions.

Based on the literature review, authors have developed the hypothesis on two major parameters: location and quality of customer service.

*H1: Location affects churn rate.*

Customers nowadays have more choices to select network service. The service and signal quality of operators vary from location to location; hence moment-customer moves from one location to another, interacts with locals and make decision for switching the operator.

*H2: Quality of customer service affects churn rate.*

This is the most common criteria for customer churn. Quality of service includes signal quality, signal strength, after sale services etc.

## **Research Methodology**

### *Data Collection*

Survey method is employed using structured questionnaire as mentioned. The questionnaire was floated between the age group of 20-27 years. The survey was floated both in the online and offline mode to gather responses. The secondary data is gathered from the literature reports and telecommunication reports from TRAI, international journals and news articles having substantial source material apart from various websites. Primary data was collected from September 1, 2018, to December 1, 2018, and secondary data is gathered from 2010 onwards.

Convenience sampling technique to collect data is employed for the study. We received 150 responses. Collection of data is made by interacting with existing customers of network operators in Delhi-NCR region.

#### *Data Analysis*

Customer churn occurs when customers or subscribers stop doing business with a company or service, hence firms try to minimize the same. Customer churn impedes growth, so companies should have a defined method for calculating customer churn in a given period of time. Survival analysis as a tool predicts such customer churn. Churn analysis has been done for three factors: customer service, location and budget. The three major factors for customer churn comes out from the analysis are: a) Network connectivity issues; b) Tariff and c) Customer Service.

#### **Results**

##### *Location-wise Churn Rate*

The results of the survival analysis are

**Table 2: Churn Rate of Consumers in Rural/Urban/Sub Urban Areas**

Time (in days)	Churn Rate - Rural Area (in percentage)	Churn Rate - Urban Area (in percentage)	Churn Rate - Sub Urban Area (in percentage)
0	0	0	0
20	0	10	9
40	0	70	30
60	35	82	65
80	82	82	90
100	82	85	100
120	100	100	100

**Table 3: Survival Rate of Consumers in Rural/Urban/Sub Urban Areas**

Time (in days)	Survival Rate - Rural Area (in percentage)	Survival Rate - Urban Area (in percentage)	Survival Rate - Sub Urban Area (in percentage)
0	100	100	100
20	100	90	91
40	100	30	70
60	65	18	35
80	18	18	10
100	18	15	0
120	0	0	0

presented here. The churn rate in rural areas are bit stable than urban and suburban areas (Table 2). From Table 2 it can be easily interpreted that churn in rural areas usually begins after 50 days of taking connection

while in urban areas it starts after 10 days only and 12 days for sub urban area. For a firm, it can be said that rural area people are more loyal and can be focused on for better revenue generation. In the same way Table 3 explains the survival of consumers with respect to timeline.

From the above results it is evident that churn rate is swift in suburban location. 50 per cent of churn in urban area happens between 0-30 days while rural area has the lowest churn rate as it takes almost 80 days to attain the churn of 50 per cent.

**Reasons for Churn**

Table 4 and 5 shows the results for the reasons for churn. Poor network comes out as the primary reason of customer leaving the services of network provider followed by call tariff, relocation and customer service.

From the above table we can infer that the reason for churn is predominantly due to customer services. The test of the model has been done by log rank and Kaplan-

**Table 4: Survival Reasons of Consumers in Rural/Urban/Sub Urban Areas**

Time (in days)	Survival Rate - Network (in percentage)	Survival Rate - Call Tariff (in percentage)	Survival Rate - Customer Service (in percentage)	Survival Rate - Relocation (in percentage)
0	100	100	100	100
20	85	82	100	80
40	50	30	70	70
60	30	30	0	25
80	25	18	0	10
100	18	18	0	10
120	0	0	0	0

**Table 5: Churn Reasons of Consumers in Rural/Urban/Sub Urban Areas**

Time (in days)	Churn Rate - Network (in percentage)	Churn Rate - Call Tariff (in percentage)	Churn Rate - Customer Service (in percentage)	Churn Rate - Relocation (in percentage)
0	0	0	0	0
20	15	18	0	20
40	50	70	30	30
60	70	70	100	75
80	75	82	100	90
100	82	82	100	90
120	100	100	100	100

**Table 6: Summary of Results**

Hypothesis	Result
Hypothesis 1: Location affects churn rate.	Accepted
Hypothesis 2: Quality of customer service affects churn rate.	Accepted

Meier test. The curves are significant and the model fit is good. Based on the analysis, the conclusion related to the two hypothesis is presented in Table 6.

### Conclusion

Telecom companies should come up with attractive packages at competitive rates for urban market. Suburban customers tend to attain 50 per cent churn post 50 days; then rapidly attains 100 per cent post 80 days. So in this timeframe, attractive packages need to be provided. Customer service is impacting more than any other factor. So customer service should be the priority for any service provider. A longtime strategy will provide better connectivity and relocation plans to retain customers.

### References

Berson, A., Smith, S., & Thearling, K. (2000). *Building Data Mining Applications for CRM*. New York, NY: McGraw-Hill.

Choi, S. K., Lee, M. H., & Chung, G. H. (2001). Competition in Korean mobile telecommunications market: business strategy and regulatory environment. *Telecommunications Policy*, 25(1-2), 125-138.

Chu, B-H, Tsai, M-S & Ho, C-S. (2007). Toward a Hybrid Data Mining Model for Customer Retention. *Knowledge-Based Systems*, Vol. 20 (8), pp. 703–18.

Coussement, K. & Van Den Poel, D. (2008). Improving Customer Attrition Prediction by Integrating Emotions from Client/Company Interaction Emails and Evaluating Multiple Classifiers, Working Papers of Faculty of Economics and Business Administration, Ghent University, Belgium 08/527, Ghent University, Faculty of Economics and Business Administration.

Economic Times (2018). Postpaid Mobile Users Switch to Prepaid on Value Quotient, <https://economictimes.indiatimes.com/news/company/corporate-trends/postpaid-mobile-users-switch-to-prepaid-on-value-quotient/articleshow/62345913.cms>, accessed on 30 December 2018.

Gerpott, T. J., Rams, W., & Schindler, A. (2001). Customer retention, loyalty, and satisfaction in the German mobile cellular telecommunications market. *Telecommunications policy*, 25(4), 249-269.

Glady, N., Baesens, B. & Croux, C. (2009). Modeling Churn using Customer Lifetime Value, *European Journal of Operational Research*, Vol. 197 (1), pp. 402–411.

Kim, H. S., & Kwon, N. (2003). The advantage of network size in acquiring new subscribers: a conditional logit analysis of the Korean mobile telephony market. *Information Economics and Policy*, 15(1), 17-33.

Kim, H. S., & Yoon, C. H. (2004). Determinants of subscriber churn and customer loyalty in the Korean mobile telephony market. *Telecommunications policy*, 28(9-10), 751-765.

Larivière, B. & Van den Poel, D. (2005). Predicting Customer Retention and Profitability by Using Random Forests and Regression Forests Techniques. *Expert Systems with Applications*, Vol. 29 (2), pp. 472–484.

Song, J. D., & Kim, J. C. (2001). Is five too many? Simulation analysis of profitability and cost structure in the Korean mobile telephone industry. *Telecommunications Policy*, 25(1-2), 101-123.

Tsai, C. F., & Chen, M. Y. (2010). Variable selection by

association rules for customer churn prediction of multimedia on demand. *Expert Systems with Applications*, 37(3).

Tsai, C.-F. & Lu, Y.-H. (2009). Customer Churn Prediction by Hybrid Neural Networks, *Expert Systems with Applications*, Vol. 36, pp. 12547-12553.

Van den Poel, D. & Larivière, B. (2004). Customer Attrition Analysis for Financial Services using Proportional Hazard Models, *European Journal of Operational Research*, Vol. 157 (1), pp. 196-217.

Xia, G.E. & Jin, W.D. (2008). Model of Customer Churn Prediction on Support Vector Machine, *Systems Engineering—Theory & Practice*, Vol. 28, pp. 71-77.

Xie, Y., Li, X., Ngai, E.W.T. & Ying, W. (2009). Customer Churn Prediction using Improved Balanced Random Forests, *Expert Systems with Applications*, Vol. 7(3), pp. 5445-5449.