

Customer Lifetime Value in Telecommunications An Analytics Approach

Arun Kumar, Ramya Ramakrishnan, Narasimhan Balakrishnan

1. INTRODUCTION

Evolution and integration of new technologies consistently challenge the competitiveness of various communication service providers. Service providers' offerings are converging to retain and build on their greatest asset, their customer base.

The industry today confronts the following challenges:

Growing Customer Demand: Mass customization rather than mass marketing by understanding customer preferences and behaviors

Need for Revenue Optimization: Measuring and predicting ROI of Telecom companies to maximize profits and minimize loss

Growing Competition: Globalization of markets and consumers, de-regulation, resulting in competition



Figure 1: Telecom Industry Challenges

We suggest an analytics approach that enables 'Revenue Optimization' while addressing the other two challenges of handling growing customer demand and competition by measuring one of the key performance indicators i.e. Customer Lifetime Value (CLV).

2. CUSTOMER LIFETIME VALUE (CLV)

“Customer Lifetime value (CLV) is usually defined as the total net income that can be obtained from a customer during their time in the system. CLV is a key metric in analyzing customer churn, revenue and managing campaigns.”

- Hoekstra and Huizingh, 1999



SOURCE: GUPTA, HANSENS, HARDIE, KAHN AND LIN, 2006

Figure 2: CLV - Conceptual Model

It is important to note that CLV of future customers is also referred to as Customer Equity (CE) and this value helps in estimating the overall firm value.

Among various techniques and solutions to address the key business challenges in Telecom, we have chosen CLV for the following reasons:

- Tested and validated approach across domains for gaining customer insight
 - CLV is a key performance indicator in all service industries such as Banking, Retail, Insurance for customer understanding
- Analytically sound techniques for implementation
 - The analytics techniques utilized for computation of CLV are well-proven and highly reliable
- One stop solution for addressing key business process outcomes and issues

Why CLV – One Solution for Key Business Process Outcomes and Issues

- **Acquisition:** Better spend analysis and planning to acquire customers.
- **Targeting:** Identification of customer segment with maximum profitability for focused campaigns.
- **Return on investment (ROI):** Realistic estimation of firm value.

- **Customer retention:** Identification and retention of high-value customers.

3. SATYAM’S TELECOM ANALYTICS SOLUTION

“Analytics leverage data in a particular functional process (or application) to enable context-specific insight that is actionable” (Gartner Report).

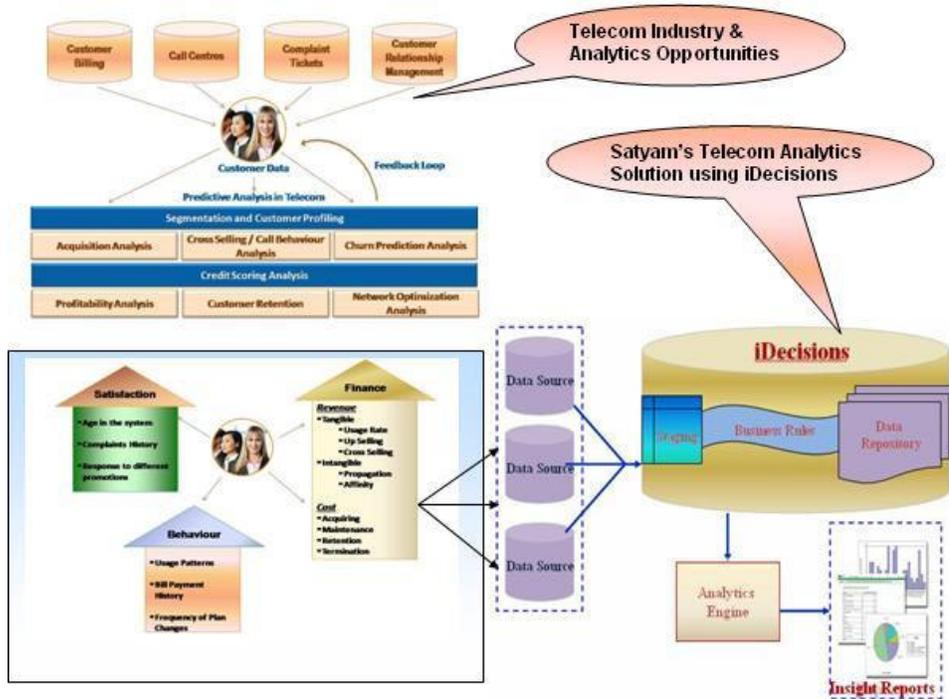


Figure 3: Satyam’s Telecom Analytics Solution

We have harnessed the power of iDecisions™ framework (Satyam’s IP) to build the centralized repository of telecom customer and usage data. Data from diverse data sources are integrated and initial intelligence reports are derived using the pre-built report templates.

Data Integration using iDecisions™ Telco

Data model of iDecisions™ Telco conforms to Customer Lifecycle Management requirements.

iDecisions™ Telco comprises four analytical areas that include Customer Intelligence, Usage Intelligence, Network Intelligence, and Revenue Intelligence.

The underlying data for these analytical areas are directly or indirectly used in computing the CLV. Calculation engine takes data from this centralized repository and CLV of customers is calculated as explained below.

4. ESTIMATION OF CLV

CLV is typically estimated at an individual customer or segment level. This allows for differentiation between customers / segments that are more profitable than others rather than examining average profitability.

CLV is determined using mathematical / statistical models (Berger and Nasr, 1998) in the following two ways:

1. $CLV_{i(\text{At Present})}$, Customer Lifetime Value (CLV) at present (**Model 1**)
2. $CLV_{i(\text{Entire Life})}$, Customer Lifetime Value (CLV) in entire life span (**Model 2**)

Model 1: Calculating CLV at present

This model deals with the computation of CLV of an existing customer based on his/her Revenue and Costs.

The revenue generated by a customer could be from tangible and intangible sources. The tangible sources of revenue include the amount paid at the time of joining of the service, revenues due to cross selling, up selling and usage revenue. The intangible sources of revenue include, the number of customers introduced to the service and the affinity factor i.e. the network created by a customer with other customers by means of the frequency of calls made, messages sent, etc (affinity and propagation).

- **Revenue from tangible and intangible sources**
 - **Tangible:** Installation, Activation, Deposits, Usage, Up selling, Cross selling.
 - **Intangible:** Affinity factors, Propagation of services.
- **Cost at customer & organizational levels**
 - **Customer level:** Acquisition, Service offering & operating expenditure, Network deployment.
 - **Organization level:** License & regulatory, Technology, Administration.

**CLV (at present) for a customer =
Revenue generated by customer – Cost incurred by organization on customer (*)**

* Please refer the Appendix for the computations.

Model 2: CLV for duration of time in system

The techniques considered for predicting “lifetime in system” in this model are:

- **Survival Analysis**
 - Aims at characterizing the distribution of survival time
 - Describes the customer survival status during tenure of observation (Smith and Smith, 2001)
- **Cox Proportional Hazards**
 - Quantifies the instantaneous risk that churn will happen at time t, given that the customer already survived till time t
 - Predicts the time interval for the occurrence of customer churn with acceptable levels of accuracy

Predicted CLV (in entire lifespan) α “Survival Time Interval in the system” with acceptable levels of accuracy (*)

* Please refer the Appendix for the computations.

Outcomes of CLV Models

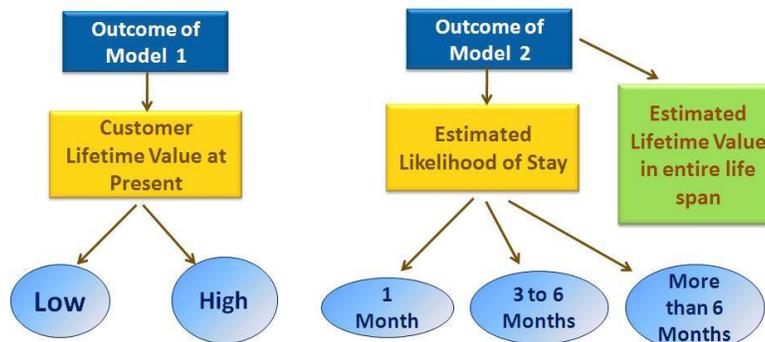


Figure 4: CLV Model Outcomes

In the first model, customers were ranked using a CLV index of 1 to 5 with 5 being the index for a customer with highest lifetime In the second model, the time interval within which the customer would leave the system after time t (in months) with the confidence limits were derived that would help manage churn proactively.

5. BUSINESS STRATEGIES BASED ON CLV MODEL

- Effective Churn Management - Identifying and retaining the most valuable customers.
- Enhanced Product Management - Offering customized service depending upon the customer segment (segmented based on lifetime value).
- Effective campaign management - Designing offers to maximize value of specific segments



Figure 5: Business Strategy based on CLV

6. CONCLUSION

We present a practical and usable solution to calculate CLV. With the presented analytics approach, telecom companies could utilize the huge transactional data to compute the CLV at present and for the entire life span for customer segments. This approach would help them develop, nurture, retain and maintain their valuable customer relationships. The accurate computation of CLV is dependent on completeness and accuracy of the underlying data as well as a robust model / calculation engine for computing the cost components.

7. CLV MODEL – ADJUSTED FOR RISK

The CLV model is being enhanced further by adjusting CLV for risk. The risk of serving fraudulent customers would be detected and mitigated early on. This would give a more accurate scoring model and additionally help in leveraging the model in the area of Fraud.

8. APPENDIX

Model 1: Calculating CLV at present

Revenue generated by the customer

O_i - Amount paid for availing the service
 CR_{it} - Revenues due to cross selling upto time 't'
 UR_{it} - Revenues due to up selling upto time 't'
 AR_{it} - Usage Revenue upto time 't'
 GR_{it} - Gross Revenue upto time 't'
 d - Discount rate appropriate for the Marketing Investments
 D_i - Weight given for introduction of a new customer

$$\begin{aligned}
 RV_{it} &= O_i + \sum_{t=1}^T (AR_{it} + UR_{it} + CR_{it}) / (1 + d)^t + \\
 &\sum_{j=1}^N (O_j + \sum_{t=1}^T (AR_{jt} + UR_{jt} + CR_{jt}) / (1 + d)^t) * (D_i + AC_{it}) \dots (1)
 \end{aligned}$$

Where $i = 1, 2, 3$ and $j = 1, 2, 3, 4$

Total cost incurred by the company towards customer

The cost components incurred by the company towards a customer C_i are:

SC_{it} - the Serving Cost for a time period 't'
 MC_{it} - the Marketing Cost for a time period 't'
 AC_i, AS_i - the Acquiring costs of customer C_i .

The cost incurred by Company on Customer ' C_i ' till time 't' is:

$$NC_{it} = AC_i + \sum_{t=1}^T (SC_{it} + MC_{it}) / (1 + d)^t \dots (2)$$

From (1) and (2)

The $CLV_{i(At\ Present)}$, CLV of a Customer at present, is given by the following equation (Hans and Maik, 2005):

$$CLV_{i(At\ Present)} = RV_{ii} - NC_{ii}$$

Where:

RV_{ii} = Revenue generated by a customer C_i .

NC_{ii} = Cost incurred by the company on a customer C_i

Model 2: CLV in Entire Life span of customer

$$CLV_i = -AC_i + \left\{ \begin{aligned} & Q_i + \sum_t^{(T+t_m)} (AR_{it} + UR_{it} + CR_{it}) / (1 + d)^t + \\ & \sum_{x=1}^n \left(Q_i + \sum_t^{(T+t_m)} (AR_{it} + UR_{it} + CR_{it}) / (1 + d)^t \right) * (D_i + AC_{ii} + AS_{ii}) \\ & + GR_{it} * (AC_{ii} + AS_{ii}) \end{aligned} \right\} - \left\{ \begin{aligned} & \sum_t^{(T+t_m)} (SG_{it} + MG_{it}) / (1 + d)^t \end{aligned} \right\} \quad \text{where } m = 1,2,3,4. \quad \dots(3)$$

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ABOUT THE AUTHORS

Arun Kumar (Kumar_Arun@Satyam.com) is Associate Consultant with Satyam Computer Services Limited, India in the area of predictive analytics in Business Intelligence group.

Ramya Ramakrishnan (Ramya_Ramakrishnan@Satyam.com) is Associate Consultant with Satyam Computer Services Limited, India in the area of predictive analytics in Business Intelligence group.

Narasimhan Balakrishnan (Narasimhan_Balakrishnan@Satyam.com) is Practice Head, Analytics with Satyam Computer Services Limited, India.