Modeling Customer Lifetime Value in the Telecom Industry

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A Master’s Thesis by Petter Flordal and Joakim Friberg, Lund University, Faculty of Engineering. The project was made in cooperation with and help from Ericsson.

In order for mobile carriers to increase profits, focus should be on retaining existing customers rather than acquiring new ones. From statistical modeling of customer satisfaction, it can be derived what drives the retention rate, and ultimately how the Customer Lifetime Value of smartphone customers can be increased.

As a consequence of the intense competition in the telecom industry, mobile carriers spend vast amounts of money on marketing campaigns and subsidies of handsets in order to attract new customers. But to increase profits, carriers’ efforts should be more focused on retaining the existing customer base. This way they can increase the Customer Lifetime Value, defined as the profits than can be generated over the lifetime of a customer, discounted to present monetary value.

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<th>Thesis in Figures</th>
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<td>- 6 target markets; Sweden, UK, USA, Japan, Indonesia and Brazil</td>
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<td>- 22 segments</td>
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<td>- 8 factors, of which Network Performance and Value for Money proved most important</td>
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<td>- 1000-2000 survey recipients in each market</td>
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<td>- Result are based on 110 million performed simulations in MATLAB</td>
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The Markov Chain Model

The Customer Lifetime Value was modeled with a Markov Chain Model, which aspires to model the dynamics of the customer-company relationship. Each state in the model $S_1, ..., S_k$, $k \to \infty$ represents one month as a customer, and $p_k$ represents the month-specific probabilities that a customer retains to the next month:

![Markov Chain Model Diagram]

Figure: Markov Chain Model

The input in the model was retention probability, profit for each month and...
discount rate. The two latter was estimated using industry data. The retention probability was estimated using a set of customer survey data, collected by Ericsson Consumer Lab. 1000-2000 recipients were interviewed in each country, and the sample was chosen to give a fair representation of the market characteristics. An ordered probit regression was performed on the survey data, in order to measure the influence of each factor on the retention probability. Knowing these impacts, Customer Lifetime Value improvements followed by increased satisfaction levels could be estimated.

**Network Performance has greatest impact on Customer Lifetime Value**

Running a large number of fictitious customer-company relationships using computer software, known as Monte Carlo simulations, it could be measured what the Customer Lifetime Value would be if operators invested to increase satisfaction levels for a given factor. The satisfaction level was increased with an arbitrarily chosen number of 10 %. The results show that the overall most potential lies in investing in improved Network Performance, followed by Value for Money.

The results, however, proved to be very different across the target markets. The Network Performance factor is most prominent in Brazil, Indonesia and USA, while other factors dominate in other markets. For example, Value for Money shows the highest potential in Sweden, and Loyalty Rewards likewise in Japan. Billing/Account Management and Price Plans/Communication have overall very low potential impacts on the Customer Lifetime Value.

**Segmentation leads to further conclusions**

By dividing the target markets into segments, it could be investigated how customers’ preferences differ between customer characteristics. In United Kingdom, high spending customers have
significantly higher demands on Customer Service. In USA, low spending customers greatly value the Purchasing Process. And in Indonesia, it is much more important for low spending customers to be satisfied with Value for Money, compared with high spending customers.

The results give indications to mobile operators on what will be most profitable to invest in for each target market. This is also valuable insights for Ericsson; understanding the end user of their products is crucial in building relationships with the operators.

**Retention is non-constant over time, but how about profits?**

As a part of the analysis, the behavior of retention probability and profits over the lifetime of a customer were investigated. In accordance with the hypothesis, the retention proved to be non-constant over time. Although high deviations over the first two years, there was a general trend that the retention probability was lower around 24 months – likely explained by binding periods running out - followed by increasingly high probabilities as the customer remained with an operator for more than a few years.

![Retention Score over Time](image)

*Figure: Retention Rate over Time*

also show a time dependent behavior. However, this couldn’t be statistically proved. To further investigate this relationship, the behavior of the operators’ cost structure over time should be assessed.

**What investment increases satisfaction?**

The analysis is based on the assumption that there exists an investment for each factor that increases that satisfaction level with 10%. The question arises, what would such an investment be? And more importantly, how much would it cost? To get the actual monetary return on investment for the Customer Lifetime Value improvements, the costs of increasing satisfaction levels need to be determined. In fact, Ericsson is currently planning a project to evaluate this. That assessment, together with the results in this thesis, will give more direct insights to Ericsson and the operators.

*Presentation of the Master’s Thesis will take place in M-huset, 2013-06-03, 14:30. Please contact Petter or Joakim for further details.*