PwC’s telecom analytics solutions
PwC India’s telecom analytics: An overview

Our telecom analytics solutions can help clients gain a competitive advantage by getting valuable insights about their operations and customers and taking the right decisions at the right time.

Telecom companies are constantly faced with many difficult questions concerning the best course of action. These can include:

• How do we increase the average revenue per user (ARPU)?
• Who are our most valuable customers?
• Whom should we target for the next promotion?
• How do we find the ideal bundle of products?
• How do we enhance customer loyalty?

Churn prediction
Revenue forecasting
Social network analysis
Customer segmentation
Our solutions

- The solutions comprise **predictive** and **prescriptive modelling techniques** which are capable of capturing various decision-influencing factors and their interrelations and of discovering hidden relationships.
- Retail analytics solutions can be offered as **analytics as a service** to clients or as **off-the-shelf products**.
- Our solutions are designed to enable telecom clients to achieve a **low total cost of ownership (TCO)** and **high return on investment (RoI)**.

How our solutions work...
**Advanced next best offer**

**Business challenges**
- To recommend products or services to customers based on their purchasing behaviour

**Analytics solution and results**
- A collaborative filtering model/singular value decomposition (SVD) is used to make automatic predictions about the interests of a customer by collecting preferences information from similar customers.

**Results: Targeted product recommendations to customers**
- Recommendation of products/services to increase customers’ wallet share
- Increased customer loyalty and satisfaction

**Sample snapshots and reports**
1. Identifying product associations
2. Recommending products to customers

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**Affinity analysis**

**Business challenges**
- To analyse products and services which are sold together so that suitable marketing strategies can be developed to cross-sell and upsell
- To improve customer experience by identifying products which are most relevant to customers

**Analytics solution and results**
- An association rule algorithm is run which identifies the items purchased together by customers.
- The Apriori algorithm detects the purchase of products by the same customer across the entire customer population.

**Results:**
- The associated products are incorporated into loyalty programmes and discount plans to boost sales.

**Sample snapshots and reports**
1. Identifying product affinity
2. Inducing cross-selling and upselling in addition to influencing sales promotions
**Profit-based customer segmentation**

**Business challenges**
- To identify profitable customers based on their purchase history to develop suitable marketing strategies to reward them appropriately and at the same time increase their wallet share
- To develop loyalty campaigns to improve the customer profitability of non-loyal but high-potential customers

**Analytics solution and results**
- Customer segments were created using advanced segmentation algorithms on the basis of their purchase behaviour, lifestyle, media consumption and other data.
- The highest-value segments were identified to generate increased revenue from existing customers while attracting new ones.

**Results: Enhanced customer profitability**
- Rewards and loyalty points given to customers act as strong incentives for them to continue their relationship and help ward off competition.
- Increase in the lifetime value of customers

**Sample snapshots and reports**

1. **Identifying customer clusters**

2. **Targeting customers**

<table>
<thead>
<tr>
<th>Customer type</th>
<th>Next best action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best</td>
<td>Provide exclusive deals</td>
</tr>
<tr>
<td>High potential</td>
<td>Suggest premium products</td>
</tr>
<tr>
<td>Fast trackers</td>
<td>Send latest product catalogues</td>
</tr>
<tr>
<td>New</td>
<td>Increase loyalty through long-term offers</td>
</tr>
</tbody>
</table>

**Churn prediction**

**Business challenges**
- High customer churn every month as compared to industry, resulting in loss in revenue and shrinking margins
- To identify which customer behaviours will trigger churn events and predict the likelihood of customer attrition
- To identify the key reasons for customer churn

**Analytics solution and results**
- A survival analysis model was built to predict the time when a particular customer may churn.
- Based on customers’ usage patterns, billing records, etc., the model can identify the probability of churn at the subscriber level.

**Results: Reduce customer churn**
- Appropriate retention incentives can be offered to the customer to retain him/her.
- Business processes that are identified as the reason for customers opting out of services can be modified.

**Sample snapshots and reports**

1. **Estimating churn probability**

2. **Retaining customers through incentives**

<table>
<thead>
<tr>
<th>Variable groups for churn analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice call usage</td>
</tr>
<tr>
<td>Customer care details</td>
</tr>
<tr>
<td>SMS usage</td>
</tr>
<tr>
<td>Location</td>
</tr>
<tr>
<td>Data and VAS usage</td>
</tr>
<tr>
<td>Network age</td>
</tr>
<tr>
<td>Recharge pattern</td>
</tr>
</tbody>
</table>
Social network analytics

Business challenges

• To use social network analysis (SNA) to understand customers and their communities better
• To define targeted treatments based on the network roles of an individual to encourage/discourage specific events (churn, acquisition, product adoption)

Analytics solution and results

• The social network helps classify ‘leaders’ who influence subscribers around them.
• Ties between two subscribers can be identified using voice, calls, SMS, MMS, etc.
• SNA provides more targeted upsell opportunities and tracks customers and their social circle and community.

Results: Customising service offerings

• New product adoption can be monitored by studying diffusion within a social network.
• Unusual behaviours (fraud detection) can be identified.

Sample snapshots and reports

1. SNA is focused on relations between subscribers (customers).

   ![Sample snapshot 1](image1.png)

   CDRs (Call Detail Records) are generated for each call:
   
<table>
<thead>
<tr>
<th>Node1</th>
<th>Node 2</th>
<th>Date</th>
<th>Class</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>70546262002</td>
<td>4164146454</td>
<td>1 Dec 07</td>
<td>Voice</td>
<td>00:04:22</td>
</tr>
<tr>
<td>7783884363</td>
<td>6048055682</td>
<td>1 Dec 07</td>
<td>SMS</td>
<td>00:00:12</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

2. Using the billions of call records, social networks of users can be identified.

   ![Sample snapshot 2](image2.png)

Revenue forecasting

Business challenges

• To forecast the cost of services to the subscriber and avoid billing shocks at the end of the month
• Telecom services are data intensive and can inflate the cost for a subscriber, leading to discontent and churn.

Analytics solution and results

• Develop a robust demand forecasting model through aggregation and statistical analysis of data based on a customer’s usage profile, service requirements, value to operator, types of services, network capability, etc.

Results: Improved planning

• Real-time recommendations to subscriber if there is an unexpected spike in his/her usage pattern.
• Forecasting of estimated bills based on current usage pattern can help the subscriber manage his/her services better.

Sample snapshots and reports

1. Identify the key events and causal factors that impact demand.

   ![Sample snapshot 1](image3.png)

2. Develop model-driven scenario analysis to analyse impact on demand.

   ![Sample snapshot 2](image4.png)
**Fraud detection**

**Business challenges**
- To reduce leakage losses through preemptive fraud detection
- To enhance customer trust and increase brand loyalty
- To identify factors which lead to telecom fraud

**Analytics solution and results**
- A predictive analytics model can be built using network event data (mediation devices), billing data (billing system), customer data (CRM) and payments data (accounts receivable) to predict the likelihood of potential fraud in the future.

**Results:**
- The recommendations from the model can not only help protect operators against losses due to fraud but also enhance customer trust and prevent potential damage to brand image arising from revenue leakage incidents.

**Sample snapshots and reports**

1. Types of fraud in telecom

<table>
<thead>
<tr>
<th>Fraud categories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscription fraud</td>
<td>Dealer fraud</td>
</tr>
<tr>
<td>SMS/MMS fraud</td>
<td>Payment fraud</td>
</tr>
<tr>
<td>Call forwarding/diversion fraud</td>
<td>Internal fraud</td>
</tr>
<tr>
<td>Voicemail fraud</td>
<td>Roaming fraud</td>
</tr>
</tbody>
</table>

**Pricing recommendation**

**Business challenges**
- To understand the impact of a given change in price (pricing elasticity) on sales across products as well as the impact on contribution margin
- To ensure a consistent scientific methodology is being applied to pricing decisions across categories/outlets

**Analytics solution and results**
- A pricing model was built to set up an effective pricing structure for the various telecom products/services.
- Pricing was optimised to improve margins and bottom-line profitability.

**Results: Improved planning**
- Data-driven pricing suggestions that promote sales and incremental contribution margin

**Sample snapshots and reports**

1. Establish price elasticity across the product portfolio.

2. Suggest optimal pricing to drive immediate contribution margin.
**Campaign targeting**

**Business challenges**
- To identify which customers should be targeted and how much discount should be offered to them
- To increase ARPU and frequency of customers’ visits

**Analytics solution and results**
- Based on customers’ demographics and purchase behaviour, an analytical model can predict the potential response of a customer—average ticket size, percentage discount availed, etc.

**Results: Enhanced response to campaigns**
- Targeted campaigns lead to more effective response and reduced cost.
- Customised promotion offers for different clusters of customers increase their satisfaction.

**Sample snapshots and reports**
1. Determining the likelihood of a customer responding to campaigns
   - Age
   - Income
   - Location
   - Previous billing history
   - Previous campaign response
2. Sending coupons, SMS to the selected set of customers

**Marketing mix modelling**

**Business challenges**
- To understand consumer behaviour with respect to exposure to advertising
- To calculate the RoI of various marketing initiatives

**Analytics solution and results**
- A linear regression model showing the impact of various marketing campaigns on sales was developed.
- Media effectiveness and RoI were evaluated to simulate what-if scenarios.

**Results: Media channel effectiveness**
- Prioritising of advertising and promotion spend in favour of channels that provide better RoI
- Reduction in overall ad and promo spend

**Sample snapshots and reports**
1. Identify channels, campaigns and causal factors that impact sales.
2. Develop model-driven scenario analysis to analyse impact on sales.

**Market mix model**
- Parse out seasonality
- Create baseline
- Analyse drivers
- Identify lift from activity

**Assumptions and business constraints**
- Market spend data
- Historical data
- Macroeconomic factors

**Input**
- Media spending

**Output**
**Customer lifetime value**

**Business challenges**
- To calculate the revenue expected from the customer over the lifetime of his/her association with the company
- To allocate marketing costs on the basis of relative value of customers

**Analytics solution and results**
- A survival model is used to estimate the lifespan of a customer.
- A regression model is used to estimate the lifetime value of a customer.

**Results: Customise marketing strategy**
- The solution not only analyses the value of a customer based on the purchases done in the past but also estimates his future value.
- The marketing spend can be optimised according to customer value.

**Sample snapshots and reports**
1. Calculate customer lifetime value (CLV).

![Sample snapshots](image)

2. Use CLV results to optimise marketing spends.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Before CLV calculation</th>
<th>After CLV calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium</td>
<td>500 USD 15 USD</td>
<td>500 USD 50 USD</td>
</tr>
<tr>
<td>Medium</td>
<td>200 USD 10 USD</td>
<td>200 USD 15 USD</td>
</tr>
<tr>
<td>Low value</td>
<td>80 USD 5 USD</td>
<td>800 USD 8 USD</td>
</tr>
</tbody>
</table>

**Sentiment analysis**

**Business challenges**
- To capture customer feedback across various social media platforms and derive meaningful conclusions from it which can be sent to relevant functions within the organisation
- To improve brand strength and engage customers in a meaningful way

**Analytics solution and results**
- Web crawlers can capture the unstructured data across various social media platforms.
- A text mining model parses the conversations into positive, neutral and negative buckets.

**Results: Instant customer feedback**
- Sentiment analysis can help to track consumer behaviour in real time across channels, monitor the **brand’s health** online and uncover the levers that can have a significant business impact.

**Sample snapshots and reports**
1. Capture customer conversation on social media platforms.

![Sample snapshots](image)

2. Develop sentiment analysis for business insights.
PwC’s approach involves a well-defined process of using analytics to identify opportunities for value creation, demonstrate quick wins and scale solutions to meet the needs of the business.

**Identify**
- Explore
- Apply business insights

**Prove**
- Develop model
- Refine model
- Define challenge and develop hypothesis.
- Perform ‘hard’ and ‘soft’ analytics to verify opportunities.

**Scale**
- Provide actionable recommendations.
- Target quick hits and pilot tests.
- Build automated processes to offer analytics recommendations to frontline users.
- Establish sustainable analytics processes.

**Repeat**
- Repeat successful initiatives in new markets and/or territories.
About PwC

At PwC, our purpose is to build trust in society and solve important problems. We’re a network of firms in 157 countries with more than 223,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more and tell us what matters to you by visiting us at www.pwc.com

In India, PwC has offices in these cities: Ahmedabad, Bengaluru, Chennai, Delhi NCR, Hyderabad, Kolkata, Mumbai and Pune. For more information about PwC India’s service offerings, visit www.pwc.com/in

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