Advanced Analytics: Transforming Telecommunications

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“If you can build something, I can build something six months later. If you can buy it, I can buy it. What you do with your information is absolutely what differentiates you from your competitors …”
Stephen Zander, McKesson

Abstract

The Telco domain is ripe with information about what people are doing, with what device, where they are doing it, for how long and how often. Google, like other innovative new entrants to the telco space, recognise the possibilities and power they might accumulate from access to such prime data. But what are Telcos doing with all this information? Advanced analytics is transforming the world of telecommunications as real time analytics, predictive analytics, and complex data modelling combine to empower CSPs to explore new possibilities for customer intimacy and revenue growth. CSPs now have the capability to draw insight from seemingly unconnected data, to predict business outcomes and to examine ‘what if’ scenarios based on complex modelling. This paper investigates the applications of advanced analytic techniques as it transforms the Telco industry.

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1. Introduction

The explosive growth in the amount, variety and granularity of information – both structured and unstructured - is presenting many opportunities and challenges. Advances in business process management, business rules management and information management enables organisations to break-away from their peers and achieve better sustainable performance. Not only are organisations generating new and deeper insights into their business activity, but also applying these insights in a consistent and systematic way to grow revenue, to improve the customer experience and to deliver operational efficiency. Business analytics is about the systematic leverage of cross functional business information and the resulting optimisation of both strategic and everyday decisions. IBM has created a new business unit called Business Analytics and Optimisation (BAO) with over $12B in software investments since 2005. IBM is committed with over 6,000 dedicated consultants to addressing some of the key issues affecting operators today:

- 1 in 3 business leaders frequently make critical decisions without the information they need; 53% don’t have access to relevant information, across their organisation, needed to do their jobs, according to recent IBM IBV research.
- Access to customer data buried in the myriad of databases, systems and network components, to help solve critical business problems and discover new business opportunities.
- Steaming the cost of service provision while providing a consistent quality service to customers.

In this paper we will explore the application of analytics for Communication Service Providers (CSPs) as they deal with specific challenges regarding customer retention, cost management, service growth and new business model adaptation. We will explore how other industries are exploiting analytical insight together with mobile technology and innovative marketing to reach out to customers.

2. Advanced Analytics

Advanced analytics draws relevant information from multiple sources, providing an organisation with the capability to answer fundamental and everyday questions about the business, operationally and strategically. More and more CSPs are beginning to recognise the explosive power of advanced analytics in helping them to deliver on business imperatives, such as;

1. Enabling New Business Models
   Developing new business models and partner collaborations by leveraging the continued convergence of telecom, media and Internet to strengthen core businesses, to improve competitive, position and generate new revenues faster.

2. Differentiate the customer experience
   Launching new innovative services quickly, using real-time analytics to gain deep customer insights and personalise offerings. Monetizing customer data and assets, improving security, and modernising customer systems to increase revenue, reduce churn and enhance the overall end user experience.

3. Improve Operational Efficiency
   Achieving operational excellence by optimising infrastructure and reducing process complexity to enable improved profitability and reduced costs. Operators need investment to fund innovation, to enable expansion into new markets, and to support critical network and business transformation initiatives.
In order to achieve these business imperatives, CSPs need to develop analytic capabilities using solutions that perform data mining, descriptive modelling, econometrics, forecasting, operations research, optimisation, predictive modelling, simulation, statistics, and context analytics. Advanced analytics may be classified into three main functions: descriptive, predictive and optimisation;

**Descriptive analytics (data mining and segmentation):** This form of analytics employs the classification (types) and categorisation (grouping) of data which may lead to new insight through development of associations, probability analysis and trending. Descriptive analytics provides information on what has happened, how many, how often and where.

**Predictive analytics:** This involves the application of complex math and statistics, and sometimes visualisation, to detect patterns and anomalies in detailed transactions. Analysts use patterns to create models that can be applied to new transactions to predict behaviour or outcomes (for example, “Based on this customer’s past purchasing history, this credit card transaction has an 85 percent chance of being fraudulent”) (Eckerson, 2008). The goal of predictive models is to understand the causes and relationships in the data in order to make predictions (Raden, 2010). Predictive analysis provides information on what will happen, what could happen and what actions are needed.

**Optimisation analytics:** Directs the best possible outcome by assessment of a number of possible outcomes. Enterprise level optimisation models combine descriptive and predictive models, with probabilistic and stochastic methods like Monte Carlo Simulation or Bayesian models to help determine the best course of action based on various ‘what if’ scenario assessments (Raden, 2010).

The more sophisticated this customer intelligence, the greater the opportunity to generate new revenue from exposed opportunities or to derive greater efficiencies. The key challenge for operators is the ability to extract, align and assess information from multiple sources. By analysing all the various strands of information, nuggets of intelligence are revealed to help differentiate the business.

3. **Customer Insight**

Obtaining customer insight is no trivial task. Maximising value from customer analytics requires the ability to draw insight from data, to accurately predict customer behaviours and to action appropriately. Yet for every mature organisation that has an impactful and effective customer analytics program, there are dozens, if not hundreds, of organisations that are struggling with just the mere basics according to David Loshin author of “Customer Analytics, Focus on What Truly Adds Value” (Dec, 2009). Indeed Seth Grimes, writes despairingly about the difficulty in obtaining the 360 customer view in his article “The Myth about 360 Views” (Dec 2009). In his experience, as an industry expert in Business Intelligence and Decision Systems, Grimes states that he has “never seen the "360-degree" claim fulfilled. Essentials to obtain a complete 360 view, according to Grimes, are as follows:

- Information from every customer touch point
- Past behaviours, current interactions, and likely future actions
- Information from sources that have only recently come on-line, and
- Larger market views that contextualize information about individuals

For CSPs, there are six key facets pertaining to the 360 view, derived from static and dynamic, structured and unstructured information. By combining different aspects of the customer, the CSP can create customer
profiles to meet specific business objectives. Most CSPs, despite claiming to be customer centric, segment their customer base based on products and offerings (i.e. prepaid or postpaid) not by tastes or preferences of their customers. Customer profiling requires the ability to derive data from behavioural context and individual needs, in addition to transactional, historical and contractual information and therefore, data needs to be garnered from unstructured sources, as well as structured sources.

Social network analysis and advanced analytics enable micro segmentation and predictive profiling of customers. CSPs need to perform micro segmentation in order to understand the long tail of customer tastes. Instead of mobile communications, operators should provide ‘personalised’ communications to facilitate the linking of customers and brands so as to monetize their own long tails and to identify new opportunities for business development.

Social network analysis can identify individuals in a community with the strongest influence within their particular communities and use this information to promote virally new services that can help increase brand loyalty and reduce churn. It is long understood that ‘word of mouth’ remains the strongest marketing tool, and people trust the recommendations of other people, rather than businesses adverts or marketing blurb. The smart operator uses advanced analytics to carefully diffuse contextual advertising and behavioural targeting to segments who behave similarly and to influencers who have credibility within a community.

As more and more decisions are pushed down the organisation, access to real time information and insight is becoming more and more critical as stated in the IBM Analysis Solution book entitled, *New Intelligence for a Smarter Planet, Driving Business Innovation with IBM Analytic Solutions* (Oct 2009). Timely insight is about delivering the right customer insight and performance data to the right business user at the right time, through the right channel and in the right format.

Behavioural economics is fast becoming an area of keen interest with CSPs as they discover new trends and tendencies from how their customers interact. Customers today have unique needs, preferences and priorities. Depending on a customer’s particular circumstances, they are likely to respond to offers and messages in different ways. Closing the gap between various functions in the organisations can greatly impact the success of campaigns and uptake on promotions. By responding appropriately to customer dynamics, CSPs can also
improve customer satisfaction, as well as increasing revenue potential. The capability to act on insight is defined as the ability of the CSP to identify and execute the optimum decision appropriate to the customer’s specific requirements, in a timely manner, based on all available customer criteria and in accordance with the CSP’s business objectives. Used effectively, CSPs can introduce smarter campaigns that foster loyalty, increase profitability, grow revenue and customer satisfaction, all at the same time.

4. Differentiating the Customer Experience

Managing the customer experience involves managing all aspects of customer interaction to ensure that the customer feels engaged and connected with the service provider and is continually satisfied with the service provided. By carefully developing a relationship with the customer, through relevant and appropriate interaction, a feeling of intimacy is likely to generate, which in turn, helps to nurture a sense of loyalty with the customer. Loyalty is key to maintaining the customer base. Understanding what motivates the customer is extremely important to be able to respond appropriately. Keeping customers active and engaged is paramount for customer loyalty and can also lead to increased revenue. Operators today understand that when customers are treated with intimacy, they feel valued, better connected and more informed. Analytics enable the CSP to innovate based on changing customer preferences and to adapt, in anticipation of changing customer needs, turning intangibles, like customer advocacy, into measurable and achievable targets.

In this section we will examine how analytics can help operators overcome business critical issues such as retention, customer experience management, customer engagement, interaction and satisfaction.

4.1. Customer Retention

The one-size-fits-all marketing campaign approach is surprisingly still widespread throughout the telecommunications industry today. There is, however, a realisation that treating each customer equally will not help CSPs increase ARPU nor gain the loyalty of their customers. CSPs are becoming more strategic about how they engage with their most valuable customers. There is recognition now that customers are unique, with individual needs and tastes and respond differently based on their personal preferences. Each and every interaction with the customer is an opportunity to strengthen the relationship and customer loyalty. Smart CSPs are using advanced analytics, real time information, prediction and statistical modelling algorithms with self-learning analytics to provide an unprecedented depth of customer insight in order to grow loyalty and increase customer spend. It is a well known fact that it costs 5 times as much to acquire a new customer as to retain one. Average European churn rate is approximately 30% annually or 2.5% monthly (Analysis Mason, 2009). Advanced analytics can provide astounding insights that help operators to be creative with respect to their retention programmes. By understanding the motivations and desires of its customers, the CSP can respond innovatively, while saving on the cost of retention. Analytics enable the CSP to obtain a complete view of the customer and to segment by tastes and preferences. Analysis of behaviours over time can identify churn triggers, predict propensity to churn in a timely manner and thus enables the CSP to take pre-emptive measures to retain customers with relevant offers.

4.2. Customer Satisfaction

Customer satisfaction is a measure of a customer’s overall assessment of the service received by a CSP. It is based on a number of tangible and intangible aspects of the service offered such as brand perception, brand affiliation, pricing, choice, flexibility, responsiveness, customer care support, devices supported, consistency of
service provided, consistency of service across customer touch points, customer value and appreciation perception and actual service quality.

As the CSP’s entire business depends on customer satisfaction it is important that operators can capture and reflect this perceived satisfaction as accurately as possible so it can continuously measure and improve its service. One of the key challenges for operators is in providing a consistent experience across all its marketing channels, aligning the experience to its brand positioning and matching that experience to the image marketed. Most CEOs and executives are assessed based on key customer satisfaction metrics, however it is often difficult to relate these metrics to meaningful activities corresponding to actionable activities to ensure continuous improvement. CSPs use multiple sources to ensure customer satisfaction is accurately reflected in its recorded metrics (ie sentiment analysis, external surveys, customer experience metrics and analysis, etc) with the primary objective of turning customers into advocates. Net Promoter Score (NPS) is also a means of measuring and monitoring over time, customer advocacy.

4.3. Customer Engagement

Customer Engagement nurtures loyalty. By listening more closely to customers, CSPs discover new insights and opportunities for enhancing existing services or developing new ones. According to Gartner, with the emergence of ‘digital’ and ‘word of mouth’ marketing through social media, the balance of power has shifted from the organisations to the consumers. Organisations therefore need to rebalance this shift through customer engagement. Social network analysis provides the means for operators to understand what customers are saying, in what context, and why. By using the same channels (blogs, twitter, social networking sites, etc) to communicate with customers, CSPs can become part of the conversation and thereby engage with their customers. Furthermore, CSPs can facilitate the conversation by enabling people to connect together quickly and cheaply around points of shared interest. Social network analysis also provides the operator with the opportunity to complete the customer 360 view, identify ‘influencers’ within communities and assign a customer ‘social network value’.

The smartphone has helped to enrich the social interactions of people, however, the traditional methods of social network analysis are often inadequate for such behavioural data. Social network analysis involves the ability to derive finer grained observations based on these interactions, and therefore new techniques are required. Operators need to develop profiles based on the long tail of customer tastes to make the whole engagement process more personable.

4.4. Customer Interaction

To retain customers it is necessary to keep them active. CSPs need to manage the customer relationship over the entire customer lifetime cycle. Analytics enable CSPs to optimise and effectively manage customer interactions across multiple channels, balancing the realities of budgets and other constraints. CSPs need to actively respond to customers, treating them as individuals, demonstrating intimacy and familiarity. Each and every interaction with the customer provides an opportunity to further strengthen the relationship. Decision management tools help to ensure that interactions are optimised based on customer priority and lifetime value. Furthermore, analytics can be used to ensure the interaction is relevant, offers are contextualised and introduced at the optimum moment. Cost of engagement with customers can be controlled and managed based on decision management rules, in accordance with set budget targets.

4.5. Customer Experience Management

Each interaction with a customer creates an experience (e.g. using a service, calling customer care, topping up credit) with that customer. A positive experience is created if the customer feels their needs are understood,
then met or exceeded. Increasing customer satisfaction and brand loyalty serves to protect or increase revenue for the CSP. To manage the customer experience, CSPs need to ensure the service quality experience is consistent and seamless, regardless of device used, location, time of day or service type. With the growth of data services, particularly mobile data, managing the customer experience for customers is challenging due to finite bandwidth availability. To manage the customer experience, operators need to ensure the service quality experience is consistent and seamless, regardless of devices, location or service type. In order to provide a quality service, operators must monitor and measure the service quality, from the customer perspective. CSPs no longer rely on perception, calls to customer care or ad hoc customer feedback to understand the customer’s user experience and to obtain factual insight. Key Quality Indicators (KQIs) are key aspects of the service experience, defined from the end user’s perspective to reflect the actual service quality received. KQIs provide the operator with tangible service quality information per service and per subscriber in near real time. Tracked over time, metrics can be identified to ensure a consistent experience for Service Level Agreements (SLAs) and to identify service optimisation targets.

In order to reflect the customer’s perspective, the CSP must be able to accurately reflect the service quality end to end. IP ‘sniffers’ (placed on key interfaces, for example, between gateway and serving data nodes) provide a deep insight into service usage for data services, per service type and per subscriber. The data service experience can be captured by a wealth of KQIs based on latency, connection retain-ability, reliability, speed of download, and so on. Information can be gathered easily and presented within 15 min intervals enabling customer care agents, for example, to provide greater support in dealing with specific service issues. Furthermore, information on service usage can provide a wealth of marketing intelligence on customer service adoption and developing customer dynamics.

The end user experience of signalling based services (i.e. voice and text messaging) cannot be easily captured by IP sniffers. Analytic tools designed to capture and present signalling protocol messages must be used. Experience indicators for these types of services usually consist of measurements that record, for example, time to establish a voice path (call set up time), number of dropped calls, time to send and receive messages and so on. Due to volume of signalling messages, it is impossible to reflect the actual customer experience for all users, and instead, a sample segment of customer experience (random times/segments of service use) is used to represent entire customer base. Alternatively, near real time analysis of Call Data Records (CDRs) can reveal the end user quality of signalling based services for the entire active subscriber base, and can be represented on a per service and per subscriber level.

As user experience varies greatly between devices, locations, connection type, local cell utilisation and service type for data services – understanding and capturing the service experience for a data service is more challenging and a key concern for operators. Voice and text quality are less exposed to these multiple impacting variables and are generally ‘stable’ services. Nevertheless, analysis of these services can reveal lost revenue opportunities related to handset, coverage, location or connection issues that heretofore, might go undetected by the CSP.

5. Improving operational efficiencies and reducing costs

Understanding the value of the customer, based on spend potential, is key to prioritising marketing and investment spend. CSPs must be clinical in the allocation of funds removing all ‘waste’ and inefficiencies by automating processes and maximising deployed investment. High network costs dictate optimised usage of available bandwidth to ensure a quality experience for all users. Immediate identification of revenue leakage is key to managing costs in a highly competitive environment. This section will investigate ways in which CSPs can use analytics to improve operational efficiencies and reduce cost.
5.1. Enterprise Performance Management

Performance is at the heart of all organisations, however, measuring and monitoring it is made difficult by the many systems that must be looked at simultaneously in order to provide the information needed. Dashboards take the information from these various systems and give users a single glance of performance. Scorecards and dashboards are not the same. A scorecard is more than a highly formatted dashboard or report. Scorecards allow an organisation to monitor key performance indicators, understand what is affecting business objectives, and to define actions that remedy poor performance. Scorecarding enables the CSP executive to have ‘to hand’ (on his iPad or similar device) key information on the operational performance of the company. Metrics, based on the company’s business priorities are defined, actioned and monitored on an ongoing basis. Clear accountability and consistent communication regarding the organisation’s strategic goals can ensure that targets can be met, modified and adapted as the business dictates.

5.2. Single View of the Customer

The complexity of the operator’s environment poses a number of challenges for operators, not least, the ability to produce a reliable, accurate and complete view of the customer. Trusted information is critical for operators when making strategic decisions – mis-representation of information or conflicting or inaccurate data can lead to serious revenue loss or missed opportunities for new revenue.

Organisations need to establish accurate, trusted information across its business processes and applications for a single view of the truth - a single view of customers, of products and of revenue. In order to achieve this a “flexible” architecture is required to leverage all existing systems and to consolidate a reliable version of the customers data. Operators must be able to consolidate information from multiple sources to extract a consistent view of customers and to generate accurate customer profiles. In addition, CSPs need to tailor marketing campaigns appropriate to various customer profiles, assess the impacts of promotions and to apportion activity costs and controls per customer.

5.3. Customer Lifetime Value (LTV)

Lifetime value is defined as the expected net profit a customer will contribute to the business over the period of time the customer remains a customer. Advanced analytics provide new insights into the actual costs of selling to and serving each customer. LTV calculations include customer churn propensity, retention cost, past and projected customer spending and the cost to serve and support, weighted over time or contract period. Calculations also include customer advocacy (Net Promotor Score) and social influence value. CSPs need to understand the current value of the customer base, the various segments and individual customers and to calculate the propensity of various segments and customers to take up promotions and tailored offers.

Average revenue per user (ARPU) is coming under pressure and declining in many markets. At the same time, forecasting is becoming much more difficult. More than ever, this is forcing operators to concentrate on provision of value, service differentiation, and the expansion of their profitable customer base. In this context, being able to analyse customer usage, individual profitability and potential value is a key capability for service providers. Due to the long tail of customer tastes, one of the key challenges for an operator is the ability to tailor services to individual customers’ needs and preferences Answers to performance-related questions can be provided in great detail on a daily basis, enabling the operator to analyse its business performance and
customer-usage patterns in great detail and in a timely fashion. Through customer value analysis, the operator can optimise rate programs, proactively prevent attrition, increase customer satisfaction, check product profitability, analyse customer profitability, and perform detailed account segmentation, active financial planning, budgeting, and forecasting.

5.4. Investment Decisions

IBM's paper *Business analytics and optimization for the intelligent enterprise*, (2009) by Steve LaValle, revealed that a 1 in 3 business leaders frequently make critical decisions without the information they need and 53% don't have access to the information across their organisation needed to do their jobs. Financial analysis can be greatly improved through the application of advanced analytics models in the pursuit of transparency. Benefits are measurable and the ROI can be large. Day to day operations can be optimised, strategic planning more informed, alternatives discovered and trade offs examined. A whole new level of sophistication can be applied to financial analysis, enabling operators to manage risk, reduce cost, maximise profitability, increase asset utilisation, shorten delivery cycle time, serve customers with greater flexibility and reduce inventories. Understanding the true cost to serve can reveal a host of opportunities to deliver cost efficiencies and to remove waste within the organisation. Investment decisions can be enriched and made easier with access to critical business intelligence, and the ability to experiment with ‘what if’ scenarios to optimise potential business outcomes and forecast with greater accuracy.

5.5. Network Optimisation and Network Analytics

Faced with a ‘hockey stick’ growth projection for data traffic, CSPs must expand their backhaul in order to ensure some level of quality for services consumed. Long Term Evolution (LTE) networks will reduce the cost per bit for operators and promises to deliver higher data rates through better spectral efficiency. The simplified all IP network and all-IP services will also help reduce cost through standardisation. LTE promises to provide vastly increased throughput with almost imperceptible latency. Most operators recognise, however, that “opening up the flood gates” to data is not a sustaining strategy. Mobile broadband traffic is increasing at such an alarming rate that the planned capacity benefits from LTE are now considered to be insufficient to tackle the traffic problem. “The Intelligent operator will have alternative options defined for traffic management and routing, intelligent throttling, for deploying compression and for moving traffic to partner/alternative networks” according to Desmond O’Connor of T Mobile. Attention is now shifting to the traffic loading problem on the existing 3G networks, utilising alternative approaches to support traffic load such as traffic off-load or network share.

LTE technology brings the concept of Self Organising Networks (SON), which involves the automation of processes improve operating efficiency. Data compression provides another means by which bandwidth can be optimised, based on the type of data service used. According to Cisco, 64% of all data traffic will be video by 2014, however if networks are congested, the user's experience of video will be greatly impacted. Video caching can store the data locally, freeing up valuable bandwidth for users. Indoor data originated usage represents 70-80% of total data traffic and therefore local network offload to femtocells or WiFi to other networks makes a lot of sense, according to Joesph Waring, telecomasia.net (Feb 2010). CSPs are now investigating network share options. “It's an irony particular to the mobile data boom that wireless carriers, for so long motivated by drawing business away from the fixed line, are now scrambling to dump their own traffic back onto it wherever it's available...” Mike Hibberd. Telecoms.com.

Quality of service is the ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow. Quality of service guarantees are important if the network capacity is insufficient, especially for real-time streaming multimedia applications such as voice over IP, online games and IP-TV, since these often require fixed bit rate and are delay sensitive, and in networks
where the capacity is a limited resource. Packet shaping is the mechanism by which packets are delayed before transmission in an output queue to meet a desired output rate. Packet dropping discards an entire packet, flow or classification.

Next-generation network architecture will transport all voice, video and data over a single consolidated network layer. Each new service brings with it new protocols and increasing service lifecycle complexity. These services are often dependent on technology and application sessions that span technology domains both inside and outside the CSP network. In order to apply policy management, operators need technology that is application aware (Analysis Mason, 2010). Deep Packet Inspection (DPI) is a technology for IP-based networks and enhances the capability for granular policy management such as selective (time-based, application-based, subscriber-based) quality of service (QoS).

Network and service analytics of service usage and customer behaviours can identify opportunities to optimise available network resources and provide alternatives to distribute traffic more efficiently. Analysis of service usage reveal insight on individual services, by location, by segment, and by device. Different services have different ‘peak usage times’, which can also vary by location or by user group. The network is dimensioned to support the highest demand of traffic per service (infrastructure costs, operating support costs, license usage costs). Operators need to spread traffic load to encourage ‘off peak’ service usage, thereby optimising deployed and otherwise unutilised network resources. Network usage analysis enables the operator to:

- **Understand individual consumption patterns**: segment profiles based on service consumption, by location and time. This analysis can provide valuable insight to enable marketers to help engage customers.

- **Condition service usage behaviour**: create pricing models to entice customers to use network at “off peak” times to spread overall utilisation and reduce spike in traffic, thereby delaying investment and expansion requirements.

- **Smarter utilisation of available network resource**: by understanding service usage trends and patterns, more informed decisions can be made to off-load or re-route traffic at certain times or locations.

### 5.6. Analytics as a Service

Many CSPs are turning their attention to the concept of Analytics as a Service (AaaS), in an effort to derive execution efficiency, a guaranteed increased revenue output and to reduce their own operational costs. Skilled analysts and data miners are provided with data from the operator. Data is anonymised and analysed and key observations are made based on the analysis of customer activity. Experienced business analysts, based on analysis of the operators own data, provide recommendations on how to improve ARPU, retain customers, upsell services and position targeted campaigns for optimum returns. In order to reap the benefit of Analytics as a Service, CSPs need to identify their key business imperatives ensuring that their marketing strategy is clearly articulated. Furthermore, they need to have a clear understanding of their critical services and segments and have the ability to measure performance metrics to ensure marketing objectives can be continually met and improved.

Typical output from AaaS include campaign design and recommendations, campaign execution support and tracking of results. Predictive models are build by experienced modellers who are skilled to work on any operator’s analytic system. Training on the models employed may be provided to the CSP after the models are created and developed. Models are created specific to a period in time and based on the operator’s particular attributes. The CSP may choose to have AaaS as an ongoing activity. In this regard, the service is provided in
the form of a defined campaign, and is designed, executed and reported with the associated outcomes, based on the models developed on the Customer data. The key business value for AaaS is the ability to produce rapid business results and quick time to market.

6. Enabling New Services and Business Models

In order to survive, CSPs must continually look at ways of developing new services and new business models. The operators have access to valuable data, bubbling with powerful business opportunities, waiting to be discovered and exploited. By analysing customer behaviour and transaction activities, important insights can be derived. These insights are the keys to unlocking future spend potential for the CSP. If promotions, price plans and offerings are modified based on the insights discovered, spend behaviours can be altered to increase revenue.

The customer’s demand for autonomy, control and transparency are placing new demands on CSPs and transforming the communications landscape as we know it today. Over the Top applications, bandwidth availability and the proliferation of smartphones are challenging traditional pricing models. Social networking is changing the balance of power between service providers and recipients as consumers voice trusted opinions and influence others. In this section, we will examine how operators are adapting their business models in response to industry dynamics.

6.1. Effective Marketing

Almost every interaction with the customer is an opportunity to enhance the relationship or to promote service adoption. A powerful aspect of an inbound marketing program is the capacity to generate increased revenue and profit through the up-selling of offers to existing customers.

Marketers, who can react in real-time to individual customer interactions, often experience double-digit gains in offer acceptances, as compared to untargeted, average customer approaches, according to David Loshin, Industry BI Expert and Analyst. Successful cross-selling of bundles can provide even greater lift to customer value, by simultaneously reducing churn, generating new revenue, and increasing loyalty. Customers who purchase bundles are likely to spend more than other customers. Some operators have even adopted real-time customer profiles, historic and transactional data, and business rules to deliver optimum impact offers at the moment of interaction without the need for manual intervention. ‘Lights out’ marketing involves creating a set of rules for every event that modifies customer data and analysing all interactions with a customer through all channels, automatically. Organisations seeking to improve their decision yield (the value created through each decision) are deploying business processes and software solutions that better manage the tradeoffs between precision, consistency, agility, speed, and cost of decision-making within organisations. Decision Management is different to data mining and analytics because they are combined with business rules to become active — to drive the decision making, according to James Taylor, leading analyst, in his article Decision Management Contrasted (2009). Decision management is focused on the automation of decisions at all times focused on delivering the most precise, most consistent, most agile decision possible. Business Rules also have broad applicability in areas such as data quality, process control, and more.

6.2. Smarter Campaigns

Marketing budgets are continually strained with mounting pressure to improve response rates and revenues from campaigns. Campaign management improves efficiency and execution, and analytics enable marketers
to plan and prioritise outbound customer communications, maximising effectiveness while balancing the
organisation's capacity to deliver.

Data mining for campaign optimisation begins with data about purchasing behaviours for existing customers. Campaign management can be optimised by deriving insight from social reference groups using advanced analytics. CSPs need to provide personalised offers through analysis of customer activities, transaction and interaction.

An automated multi-step marketing solution sits on the single view of the customer and requires a 360 customer view. Segmentation of customers is performed on customer data by applying automatic clustering techniques and/or manual browsing. Recommendation engines provide ‘next best action’ responses based on customer’s unique tastes and preferences.

6.3. Pricing for the Data Age

CSPs must offer compelling content, managed and delivered as an integrated solution, and provide a consistently high quality customer experience. However, they cannot compete on content with the long tail of consumer tastes as easily as Over The Top providers. Quality is a major issue for mobile CSPs as they struggle to keep up with demand from smartphone data usage. Other issues affecting CSPs include services being commoditised, the economic downturn and decreased ARPU. CSPs need to provide quality service as efficiently as possible, using smart deployment of technology to manage spiralling network costs (ie. automated decision and campaign management solutions). They recognise the need to open up their network to provide access to third parties, but in so doing, must negotiate revenue share. Also, they need to invest in systems that help to differentiate on customer relationship.

The deployment of high speed infrastructure, combined with the proliferation of affordable smartphones and ease of application download have combined to fuel the explosion in data traffic. Figures from Informa Telecoms & Media state during 2011, the mobile broadband market will overtake the fixed segment, growing to near 670 million subscribers and a 51.8% market share. Revenue from data is expected to exceed voice revenue by 2011, according to Pyramid Research. According to AT&T’s chief executive, Ralph de la Vega, towards the end of 2009, just 3% of its iPhone users were generating 40% of the traffic load. The introduction of tiered pricing will stem the revenue dilution exposed by flat rat pricing as data volumes begin to soar.

Operators have long recognised their ability to control usage through pricing models. It is also clearly understood that, as Cisco predicts, mobile data traffic will double every year globally, up to 2014, increasing 39 times between 2009 and 2014 and 66% of the world's mobile data traffic will be video by 2014. The need to control service usage is now more critical than ever. In order to manage finite network resources operators need to condition customer service consumption by adjusting their pricing models appropriately. With the advent of video and data streaming, operators can protect and regulate, to a certain degree, service usage by introducing

- Promotions based on network resource availability (time of day, location, by service) - promoting data service usage during non-peak periods (network is dimensioned for peak traffic usage).
- Pay on-demand services (particularly for data streaming applications)
- Tiered pricing based on data service type and quality (rather than data consumption (Mb)). Provide different pricing models based on type of data traffic utilised (i.e. browsing versus...
download service). Deep Packet Inspection, enables the introduction of new pricing premiums for data appropriate to a guaranteed quality of service.

- Revenue share agreements with OTT providers that benefit from flat rate data pricing, to ensure that CSPs can take a slice of the revenue pie.

- More personalised price plans. By examining customer activity using data - services accessed, duration of access, bandwidth used per service etc - operators can create family price plans or lifestyle appropriate packages.

6.4. New Business Models

Traditional telco models are slowly transforming for CSP as new entrants and technologies are changing communication habits. Machine to Machine (M2M) applications are beginning to emerge as a means of driving cost efficiency and improving the customer experience. Analytics in the Cloud also promises to provide great operational efficiencies. Over the Top (OTT) service providers are looming over traditional Telco business models, challenging the CSPs established brand and positioning. According to industry analysts, the infrastructure may not be able to accommodate the explosion of online content by 2012. CSPs need to support integration of communications for consumers to connect anytime, any place on any device. Partnerships, that take advantage of their unique billing capability and customer insight, can ensure a slice of revenue intake. CSPs also have a role in providing security and policy management for consumer (i.e. Children, Fraud).

6.5. Advertising

Analytics can turn CSPs into information brokers with companies who are willing to pay a premium to reach a specific audience as a new revenue stream creation. Using analytics, a CSP can aggregate, anonymise and sell access to consumer data to ecosystem partners as a subscription service. Verizon believe, with 40% of new phone purchases now smart phones, the stage is set for mobile advertising. Mobile advertising market will grow from $160 millions in 2008 to $3.1 billions in 2013 Smartphone Mobile Trends, Pointabout, (2009).

In January 2010, Apple acquired Quattro Wireless ($250m -$275m) with the intention to offer an advertising platform to its App Store and iPhone customers. Late in 2009, Google, who clearly recognise the potential revenue stream from mobile advertising, purchased AdMob ($750m) for mobile display ads and in-application ads (Telecoms.com). Non of the new entrants in the value chain hold as much data as the operators” according to Telecoms.com. However, in Barcelona at the World Mobile Congress 2010, Google’s Eric Schmidt predicted that in 5 years time “Google will possess a greater depth on consumers than mobile operators currently enjoy”. Google, according to BusinessInsider.com, is spraying its software all over the place for free, betting on owning the future of the mobile Internet and search advertising for businesses (replicating its success on the web).

6.6. Expansion into Vertical markets

The telco industry is helping to make other industries more efficient using customer insight and analytics to transform healthcare, transport, ticketing, banking, retail, customer services, education, security, insurance, property, entertainment, restaurants, hotel reservations and information services, to name just a few. CSPs
can use BI knowledge and sophisticated billing systems to offer a better service to customers (including targeted advertising, mobile banking/commerce, location based services, enterprise services).

More and more CSPs are investigating Machine 2 Machine (M2M) operating models, in an effort to identify new business streams. The key advantages for CSPs providing M2M support for Utility operators is the re-use of existing capabilities (systems, processes, people). Although ARPU from smart meters is lower than mobile SIMs, the connectivity volumes are higher. Analytics of customer utility consumption behaviour can be performed in a very similar fashion to Telco operator services and is therefore easily transferable. Insight on utility consumption can be provided:

- to offer customers incentives to change their consumption patterns
- to optimise resources and identify energy provision efficiencies
- to identify energy savings for individual consumers;
- to offer pricing models appropriate to individual consumption or to optimise available utility resource (based on time of usage/location)

6.7. Call Centre Optimisation and Self Serve

CSPs can enjoy significant cost saving benefits from customer centre optimisation particularly through improvements in the areas of handle-time reduction, self service completion, customer experience, first contact resolution, transfer time reduction, revenue enhancement and ongoing IT and labour costs.

The emphasis CSPs are putting on their customer self-care portals is continuing to increase as customers demand more autonomy with respect to account and spend management. Many portals were built for a small percentage of the customer base to perform straightforward activities. There is now significant pressure to ensure a high quality experience for a user accessing the portal. Customers expect to have convenient, personalised access and control to their own service accounts. Optimisation of call centres and the introduction of self serve can deliver a differentiated customer experience while providing the business with significant cost savings.

6.8. Self Organising Networks

Managing the spiralling complexity of the CSP network, the growing demands of mobile broadband traffic and the physical constraints of spectrum is no easy task. Furthermore, operators are expected to meet carrier grade service requirements within a wireless IP environment and to continually invest in network expansions in order to provide a consistent end user experience. Self Organising Networks (SON) are defined as part of the LTE standards and can help operators to maximise the return on investment and to exploit efficiencies in their deployed networks by simplified provisioning, self optimisation and automated maintenance of the network. The primary goal of SON is automation. Processes too quick or complex for manual intervention should be automated. CSPs can be significantly reduce operational expenses by, for example, providing automated load balancing, automatic channel selection and/or dynamic resource allocation.

7. Industry Adoption of Telco Analytics

So are businesses benefitting from all the insight gleaned from operators on consumer behaviours and preferences? In this section we will look at some of the innovative new marketing techniques, advertising adaptations and business dynamics, powered by analytics and delivered through mobile technology. As
competition between business continues to offer challenges, organisations strive to differentiate themselves through innovative marketing techniques. Analytics is becoming an essential tool to help companies to broaden their reach to new customers and to strengthen their grip with existing customers.

There is no doubt that smartphones, innovative applications, and the power of advanced analytics, are transforming not only the Telco industry but also the way businesses interact with consumers. Within the Telco industry itself, a major communication shift are taking place, as identified by IBM’s Institute of Business Value, in the paper entitled “Changing Face of Communications” (updated, 2010). A migration from one to one (single conversation) to many-to-many (collaborative conversations) is happening. Paradoxically, marketing is moving in the opposite direction – with a migration from mass to personalised advertising. The ability to access any type of content, purchase on demand, retrieve information, download, connect and interact from any location is heralding a new era of limitless communication.

A recent report by Mobile Marketer, (July 2010) claimed 11% of mobile users have made a mobile purchase in the US, based on a Pew survey carried out between 2009 and 2010. According to Dan Butcher of Mobile Marketer, businesses must provide a mobile web site that acts seamlessly with the company’s web site. Those that do not will be left behind. Due to the proliferation and usability of smartphones, consumer adoption and use of mobile technology to interact, engage, purchase and share information makes it extremely relevant for all businesses. Mobile commerce provides convenience to shoppers, who can complete their transactions instantly, without, for example, having to wait for the PC to boot up.

Advanced analytics can help companies identify various target groups and to advertise appropriately, engaging on a personal level. For example, luxury brand Chanel is promoting its newest collection via mobile (Mobile Marketer, March 2010). Chanel are not alone - a targeted advertising strategy to high end iPhone users has been widely adopted by luxury brands such as, Donna Karan, Ralph Lauren, Fendi, Hugo Boss, Lacoste, and Dolce & Gabbana. These luxury brands all recognise the importance of having a presence on both mobile sites and iPhone applications and are using the appeal of the iPhone as an effective marketing channel. According to Nielsen (2009), 94 percent of all smartphone users are 18 and over, with a whopping 83 percent over the age of 24, and still 56 percent over 34. iPhone-specific numbers are representative of the general smartphone uptake, underlining the demographic skew towards spending power, according to Giselle Tsirulnik of Mobile Marketer.

Location based advertising is proving effective at driving traffic and attendance in-store, brand awareness, user engagement and customer loyalty. Furthermore, mobile web usage is growing beyond traditional boundaries. According to figures published by Nielsen, unique mobile web users increased 34 percent from 42.5 million in July 2008 to 56.9 million in July 2009. Mobile marketing is moving beyond perceived niche targets and the connectivity of people to mobile web and applications (not only iPhone apps), is highlighting the fact that access to the critical mass has arrived. And with it a whole new marketing channel to create awareness, to entice trial, to persuade purchase and to win loyalty. It is up to businesses to optimise this channel as part of its multichannel strategy to grow brand affinity and drive sales.

It is long recognised within the mobile industry that users like control. Self-serve, in addition to providing the business with an opportunity for cost reduction, gives the consumer a sense of freedom. Control, combined with convenience, simplicity and value-for-money go along way in support of customer satisfaction. It is not surprising therefore, to see a number of industries adopting of mobile technology and advanced analytics to help retain customer loyalty and to grow business. For example, airline companies such as Continental Airlines, Alaska Airlines and American Airlines have all integrated mobile into their loyalty programme strategy. The advantages of a personalised service to consumers, present a another channel for the airline companies to reach out to their customers,
Analytics can go a step further in generating business for airlines. According to Rimma Kats, of Mobile Marketer (April 2010), Continental Airlines and mobile advertising network, Jumptap, ran a campaign to generate brand awareness and to drive traffic to the airline’s mobile site. According to Mobile Marketer, Continental launched a targeted campaign to mobile internet savvy smartphone audience between the ages of 25-54, with household income levels $100K+, who had travelled for business reasons within the previous three months. As a result of the campaign, purchase intent increased by 22.3 percent and mobile airline ticket purchase intent went up by 22.2 percent.

Indeed the airline industry is awash with mobile applications and the airlines are exploiting this technology to get closer to their customers, in an attempt to meet their specific needs. American Airlines have an iPhone app that lets you check flight status, get a mobile boarding pass, book tickets, check in, create flight notifications and do so many other things, including games of Sudoku. British Airways have an iPhone app to allow Executive Club members to download mobile boarding passes. Southwest Airlines iPhone app allows customers to change reservations, check in through it’s RapidRewards account, buy an "EarlyBird" check-in for a flight, among other enhancements. All these apps are designed to facilitate customers and to generate loyalty, providing a host of offers and services in realtime.

The Food industry have also realised that mobile has to be an integral part of their marketing mix. Taco Bell in the US sees marketing to mobile devices an essential way for the brand to communicate with its consumers as they move from the couch to the car, according to Dan Butcher of Mobile Marketer. “All the TV advertising is great, but if you can’t get them into the store, then it’s all for nothing and you may lose them to a competitor” according to a Taco Bell executive. “The mobile device is very personal, so marketing in that channel is more challenging than any other medium, but it can also be more rewarding if done right.” The applications of mobile marketing to industries, not only the food industry, appear limitless and creative campaigns are reinvigorating and revitalising traditional marketing models in new and exciting ways.

8. Conclusion

Many industries are recognising the evolutionary marketing potential of mobile consumer analytics. Using personalised and innovative communication to individual devices, companies can use analytics to drive revenues. Analytics enable timely and targeted offers, triggered by consumer profiles, real-time interaction and current location. The relevancy of offers is greatly increased and so too, the uptake and revenue potential.

But what are telcos themselves doing to capitalise on their valuable customer insight? Although, the industry is realising the potential of analytics, the rate of change appears sluggish in comparison to other areas. The biggest challenge operators have today, is not retrieving insight - rather acting on and deciding what to do with the insight. CSPs need to maximise the returns on their analytic systems and tools investment, by developing the capability (or indeed outsourcing their capability) to deliver results through the valuable insight gleaned. It is time for operators to get creative, to innovate and to try new business approaches. If indeed CSPs wish to detach themselves from all associations to the ‘dumb pipe’, they must start capitalising on customer insight to increase their own revenue streams as well as enhancing other vertical markets. The race is on – Google, Apple and others are forming strategies that trespass on the operator’s traditional territory. Operators must reinvent themselves and adapt with some urgency to the industry, before these new entrants encroach on their most valuable asset – customer data.
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