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## **Actionable Insights from Data Analytics: Know Your Network and Your Customer**

*A Heavy Reading white paper produced for Ribbon Communications*



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## INTRODUCTION

The telecom industry is in the midst of a major transformation today. This transformation can be split into three broad categories:

- **Customer satisfaction improvements:** Meeting customer expectations for ease of ordering, delivery, and problem resolution. Higher customer satisfaction leads to lower churn and potential market share gains.
- **New service offerings:** Finding new ways to make money beyond basic fixed and mobile connectivity. Many operators have been pursuing the Internet of Things (IoT) opportunity for years. Yet, even for the pioneers, IoT generally represents less than 3% of revenue. The “[new new thing](#)” is network slicing, though the jury is still out on its potential. The other avenues operators are pursuing are content and media. Some of them bundle third-party services such as Netflix, Spotify, and Deezer with their core communications offering. Others have decided to acquire media companies, with mixed success.
- **Cost efficiency:** If you cannot figure out how to increase your top line, you can still boost (or sustain) profitability by cutting costs. This is usually enabled by automation and simplification of the technology and processes used to run the business all the way from the network to marketing.

The key to delivering on these transformation goals is data analytics. Operators need better analytics to figure out if their customers are satisfied – and if not, why not? Is it the ordering process? Is it billing? Is it network related?

Similarly, to understand what new service offerings operators should launch, they need better marketing analytics. And to deliver on the promise of network slicing, they will need a whole new raft of network data analytics functions in their mobile core.

Data analytics is also the starting point for a cost efficiency program. Can you collect information on your processes and use that to identify automation opportunities and implement them? Closed-loop processes require feedback from the system they automate and a brain (analytics) to interpret that feedback.

But a generic data analytics platform on its own is unlikely to yield significant benefits to a telecom operator. To deliver value, the raw analytics capability must be married with industry-specific knowledge and domain expertise. This expertise should exist internally, but it should also exist in the data analytics tools that an operator employs. This paper explores the criticality of domain expertise and provides real world examples of how operators are benefiting from applied analytics.

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## DOMAIN EXPERTISE – THE KEY TO A SUCCESSFUL ANALYTICS PROGRAM

Most large telecom operators have established large, centralized data analytics functions, similar to other industries – from farming to financial services. For example, CenturyLink has set up a Center of Excellence (CoE) for robotic process automation (RPA) and data science, including artificial intelligence (AI). This CoE takes care of analytics infrastructure, governance, testing, and production support. The CoE team includes a business unit lead, who identifies and prioritizes opportunities; a delivery lead, who tracks deliverables; solution engineers; and process consultants. It is then leveraged by federated teams across the business in areas such as IT, finance, network planning, product, pricing, marketing, margin assurance, and HR.

The federation concept is key to the success of the program, according to [Pari Bajpay](#), CenturyLink's vice president of Next Generation Enablement: "Think about it. Where does the business logic sit? It doesn't sit with the IT folks. They need to understand it and then program it in. But as the tools get simpler, now we can get a wider team to participate. In RPA we have nine development teams – only two of these are within IT, the other seven are outside IT. Similarly, we have 250 data scientists of which 200 are outside of IT, and that number is growing."

Similarly, Telefónica has a small group of data scientists that is leveraged by a team of hundreds that apply business intelligence and data visualization tools to operational and commercial use cases across the group. [Juan Manuel Caro Bernat](#), director of Operations and Customer Experience at Telefónica, says his goal is to make these analytical tools available throughout the organization – not just for the elite cadre of data scientists and centralized business analysts. Instead, the aim is to enable data-driven operations across the group.

### The Data Analytics Process

For many operators, their data analytics process looks like this:

- **Create some data repositories.** These could be distributed for processing data at the edge of the network, perhaps only sending summarized information for central analysis.
- **Select the various sources of data.** These could include contact center calls, field technician reports, billing records, energy usage, operation support systems (OSS) like performance and fault management, network telemetry, web browsing content records, etc.
- **Ensure the data is anonymized** to respect local privacy and data protection regulations.
- **Normalize the data** using a standard data model. This might be to make data comparable across different equipment suppliers, across different network domains, or even across different geographic locations.
- **Check data quality** and avoid GIGO. Inventory systems are notoriously erroneous. Data capture/entry processes among field technicians are also rife with mistakes.

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What is missing from the above is the domain expertise to come up with useful analysis use cases. This domain expertise should be built into the analytics platform from the get go, not bolted on as an afterthought to a generic data analytics platform.

Use cases could be operations related (e.g., infrastructure management, customer experience, customer service delivery, customer care, network performance and usage, internal plant management, etc.) or monetization related (marketing, advertising, churn, subscriber profiling, content categorization, customer relationship management [CRM], etc.).

## Domain Expertise and Data Analytics – Stronger Together

It is true that data scientists have devised useful solutions in [Kaggle](#) competitions without domain expertise. However, according to Bhavani Raskutti, an author and data scientist, these are usually in situations where “the domain experts have already generated the hypothesis by posing the right business question and preparing the data ... and the competitors need only model and test.” As Raskutti explains [here](#), “The proliferation of different analytics disciplines such as social network analysis, digital analytics, bio-informatics and supply chain analytics, lends weight to the argument that **domain expertise definitely matters** [author’s emphasis].”

However, as Raskutti points out, “Google has shown a whole new way of understanding the world without any a priori models or theories with their approach to language learning.” Machine learning (ML) can generate insights without domain knowledge, which can be useful – especially in overcoming domain bias. Where domain expertise can complement raw ML is in the interpretation of insights, particularly those gained using unsupervised learning about complex processes.

As such, the optimal outcome can be achieved by combining domain expertise with robust data analytics. As Paramita Ghosh, data scientist at Bank of America, writes [here](#), “When Domain Experts have ready-made Machine Learning systems at their disposal, they can select any standard domain-specific analytics package available in the market to study the data trends and patterns and gain hidden insights. The Domain Expert’s greatest strength is the ability to identify which questions need to be answered, and the Data Scientist’s role is to maneuver and leverage advanced data technologies to build expert systems to answer those questions.”

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## REAL WORLD EXAMPLES

Two real world examples based on Ribbon Communications case studies illustrate how its data analytics applications are benefiting telecom operators.

### Operations

One of the world's largest mobile network operators needed better service assurance and customer insights on the performance of its Voice over Long-Term Evolution (VoLTE) and Voice over Wi-Fi (VoWiFi) services. To enable these insights, the analytics solution needed to have a deep domain understanding of mobile networks to develop custom key performance indicators (KPIs), identify anomalies, and perform real-time cross-correlation of data feeds.

The mobile network operator chose the Ribbon Analytics solution to capture information (S11, SIP/RTP/RTCP/SDP) from the multi-vendor VoLTE network. The solution currently processes billions of events per day for network and subscriber service assurance.

The network and subscriber information is captured continuously and stored historically and can be reported with various KPI filters. This mobile operator can see historical trends and real-time sessions of every subscriber along with their location (cell, network element, etc.), device or service category (voice, Rich Communication Services [RCS], progressive video, audio, etc.), and the quality associated with those dimensions. As well as running VoLTE and VoWiFi performance monitoring, the solution includes ML-based root cause analysis to identify the source of observed problems. Other network applications that form part of the solution include network usage analytics, RCS analytics, and data abuse analytics (tethering, peer-to-peer [P2P], etc.).

Through this solution, the operator is able to better understand the subscriber's network experience, reduce the time to resolve customer experience problems, and increase successful trouble ticket resolution. By having a holistic view of traffic, signaling and application characterization, the operator is able to improve its capacity planning, service-level agreement (SLA) monitoring, device management, and network operations.

### Marketing and Monetization

A Tier 1 North American operator wanted to compete more effectively in the \$100 billion digital advertising market. While some operators have tried to do this by directly acquiring digital media businesses, with mixed success, this particular operator launched a new type of advertising service based on four key tenets: data, premium content, advanced advertising technology, and distribution to millions of direct-to-consumer relationships across wireless, video, and broadband.

The operator chose the Ribbon Analytics solution to offer in-depth analysis into subscriber usage patterns across both the web and mobile application properties of a publisher. Such contextual insights and categorization of subscriber segmentations empower brands that the operator works with to understand the composition of its current mobile web and application presence. It also uses these results to benchmark against peer brands and fine-tune its programs, campaigns, and product development strategies.

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Together with data from the operator's CRM and third-party data (e.g., Acxiom, Nielsen), a complete 360° view into subscriber behavior can be obtained. The solution includes Ad-ID discovery through which advertising identifiers (e.g., Apple IDFAs, Google ADID) are associated with subscriber sessions to enrich the information gathered. The profile information on subscribers (usage and behavior) is exposed anonymously (via hashing algorithms) to third-party advertisers to comply with data privacy regulation.

As well as enabling targeted advertising, the Ribbon Analytics solution enables the operator's marketing, product, and pricing teams to fine-tune service plans and offerings to increase retention and customer lifetime value. The analytics platform tracks subscriber profiles, evaluates campaign effectiveness (based on click-through rates), and even includes network analytics and customer care use case capabilities.

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## CONCLUSIONS

There are as many applications of analytics in telecom as there are roles and processes to analyze. Analytics can be used to identify network abuse, optimize pricing plans, enhance advertising offers, reduce churn, predict network usage growth, and much more. However, operators need more than just a Big Data platform and pretty visualizations to harness the benefits of analytics. They need configurable, out-of-the-box applications with built-in domain expertise to accelerate deployments and provide a quick return on investment.

The broad business objectives that analytics support are generally related to improving customer satisfaction, introducing new service offerings, and increasing cost efficiency. But we cannot just plug our OSS/business support system (BSS) into a ML system and hope that a solution appears automagically. Instead, we must apply a rigorous, scientific method to analytics that starts with clearly defined problems, moves on to a testable hypothesis, and then designs experiments to test that hypothesis. To come up with a hypothesis in the first place, we need industry-specific knowledge. As stated in this paper, “domain expertise definitely matters” whether we are analyzing social networks, supply chains, or telecom marketing operations.

## ABOUT RIBBON COMMUNICATIONS

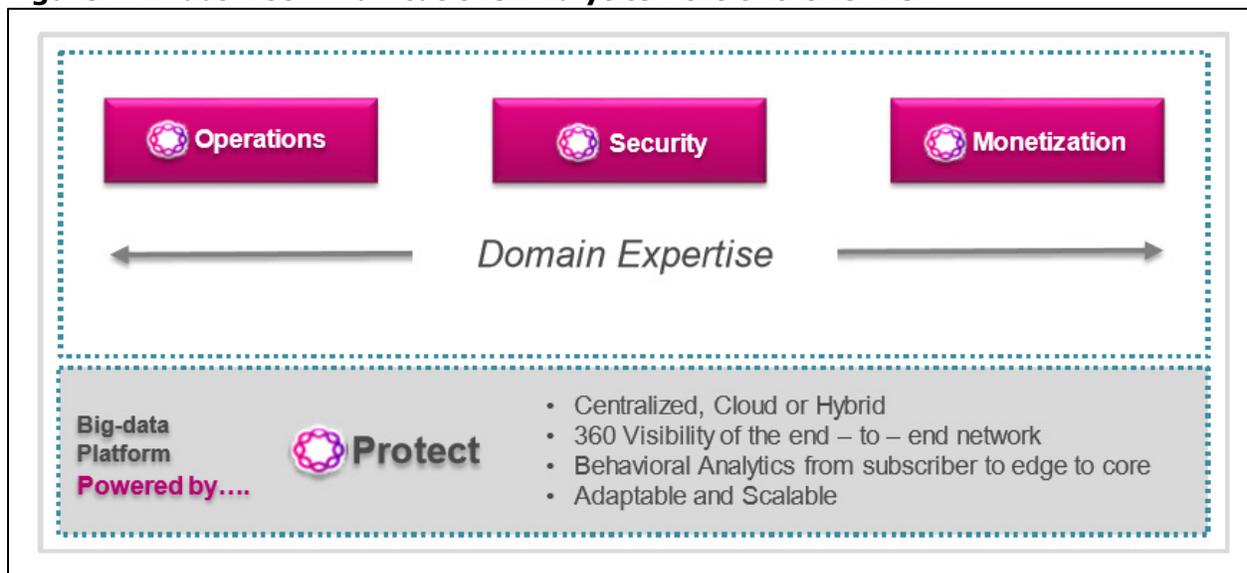
*This section was written by Ribbon Communications.*

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With locations in more than 25 countries and on six continents, Ribbon's innovative, market-leading portfolio empowers service providers and enterprises with carrier-grade real-time communications solutions, along with a new level of security that runs in their network infrastructure, data centers and private cloud, or in the public cloud.

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**Figure 1: Ribbon Communications Analytics Portfolio Overview**



Source: Ribbon Communications