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BIG DATA ANALYTICS

Can CSPs handle the complexity?

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Introduction

Big data has a broader meaning than the words suggest. Big data is less about database size and more about managing the huge complexities that exist in the networks and telco business.

Communications service providers (CSPs) are desperate to gain greater control over the big circus that's happening inside their tent. The global, over-the-top internet, broadband and big mobile extravaganza they support truly is the biggest show on earth.

The risks are huge, of course, because the show goes on whether the CSP makes any money or not. So the big data trend is almost a rescue mission to save telecoms from:

- The onslaught of mobile broadband traffic growth
- The explosion of smartphones and apps that have turned troubleshooting upside down
- The relentless margin pressure and revenue encroachment of rivals and over-the-top players.

If the telephone operators of yesteryear knew they were being groomed as ringmasters of such a wild circus, they would have never accepted the job. But they did take the job and the rest is history. Now comes the challenge of profitably orchestrating all the video, voice, data, elephant, tiger, clown and acrobatic acts that operate under the huge communications tent. The circus performers themselves, of course – Google, Facebook, Netflix, Apple and many, many others – are often richly paid while the ringmasters face an uncertain future.

Unfortunately, the network equipment providers are as new to the game of managing huge mobile data volumes as the CSPs themselves. Sales of LTE networks are heating up for sure, but the essential 'How to Profitably Operate and Profit from an LTE

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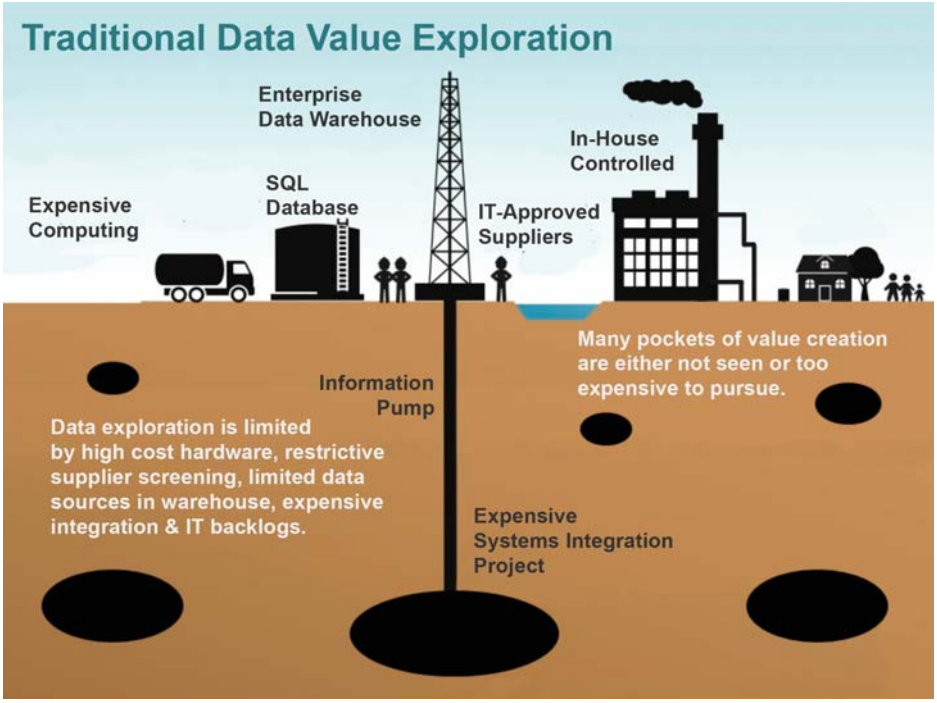


Network' instruction manual is still just a work in progress. That means there's plenty of opportunity for fresh companies to step in and deliver what CSPs need.

A flock of solutions vendors has emerged

To better understand this big data trend, TRI began a full research investigation in mid-2013. I was frankly surprised at how many new players had come in since I wrote a report on the analytics market seven years before. In the end, we interviewed some five dozen carrier and vendor experts, publishing profiles on 41 active players.

Big data is rooted in analytics, of course, but the field has expanded far beyond the churn reduction niche that drove the market a decade ago. Big data basically is a layer of analytics value that rides across all the traditional BSS/OSS transaction systems. In fact, we figure the biggest solution market in big data today is in network and customer experience analytics.

All kinds of solution vendors are involved today: deep packet inspection specialist firms like Allot Communications, systems integrators like HP, service assurance firms like Nexus Telecom, and firms who grew up in the business assurance space like cVidya.

We think plenty more players are going to jump in and acquire some of the startups – the major service assurance and billing vendors for example. Companies like Amdocs, TEOCO, JDSU, SAP and Comptel have already taken the acquisition leap.

And as time goes on, it will become harder and harder to distinguish the new from the old solutions as analytics players are acquired and the markets melt into one another.

Big data's fourth V

While big complexity is the greatest challenge, big data is certainly about managing huge data volumes too. In many ways, telecoms with their massive networks practically invented big data. And plenty of telco use cases fit the so-called three Vs of big data: large **Volume, Velocity** (speed of analysis), and **Variety** (of technologies).

But there's a fourth V in the big data equation, and to miss that fourth V – **Value** – is to miss a lot because big data drags with it a more open and entrepreneurial way for telecoms to work with solution providers and create value.

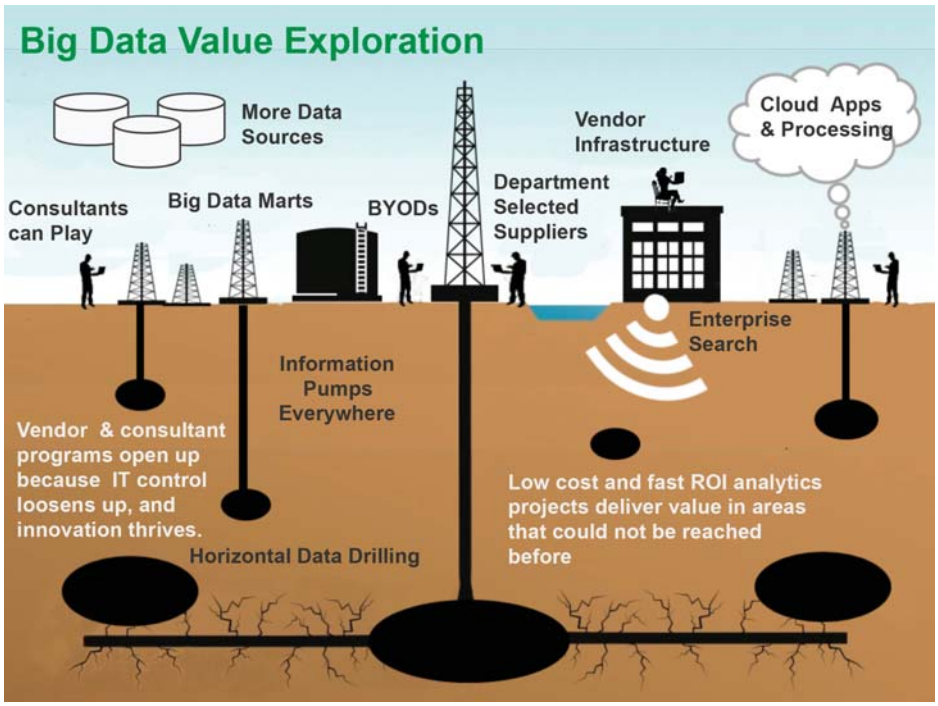
In fact, the confluence of cloud, commodity hardware, BYOD and outsourcing is creating a new and highly organic marketplace where value is king. The long term impact is clear: the results achieved become more important than how big a software supplier you are, what computing technology you use, and whether or not the IT department sprinkled fairy dust on your contract bid.

The key question becomes: how best to add value at low cost and deliver an ROI? Analytics and big data provide the answer because these solutions can be inserted at relatively low cost and with minimal impact on current operations. In most cases, they require little hand-holding by the IT department.

In fact, the biggest customers of analytics are the business units themselves or standalone departments like network operations.

Dining in Manhattan

I live two hours' drive from New York City. Manhattan Island is not just the home of Wall Street: it's also a diner's delight. There are about 3,500 restaurants in Manhattan and every cuisine is



represented: Indonesian, Ethiopian, Lebanese, Vegetarian, you name it.

Now the contrast between the Fortune 500 firms on Wall Street and all these restaurant entrepreneurs is striking and I think there's a parallel here to what's going on in telecoms software.

Being a big company didn't prevent Wall Street's Lehman Brothers from going bankrupt so are CSPs headed on the same perilous path that many bankers faced in 2008?

Well, the warning signs are certainly there. One authoritative one is a 2012 report by PricewaterhouseCoopers (PwC) entitled 'We Need to Talk about Capex' which singles out telecoms for poor management of its capex. Putting PwC's conclusions into my own words: network investments are out of control in the CSP world. Nobody can accurately tell whether a particular capex expenditure pays off or loses money, so senior telecoms executives think it's better to err on the side of buying more equipment. Sounds like a glorious plan to make John Chambers and company rich.

This capex issue is fundamental to the CSP business. It cannot be just dusted under the table. Overly restrictive policies and closely held relationships with a few large suppliers are clearly not getting the job done. Marketing and network operations are desperate to take action because everywhere they look there are savvy OTT competitors who seem to enjoy devouring telecoms revenue and traffic streams for lunch.

So these entrepreneur-like analytics firms are delivering exactly what CSPs need to shake up the solutions market and help solve such long-standing problems in capex and elsewhere.

Now, like the restaurant scene on Manhattan: this big data/analytics business is also fiercely competitive and a very risky business: only the fittest vendors can survive long term. The exciting trend here is that telecoms software is now becoming a results-driven marketplace.

And if you're a buyer of analytics, this is a great place to be because you have choices you never had before. This brave new software world will also be massively disruptive for those incumbent suppliers who figure they can sit on their nest eggs.

Market drivers and challenges

The biggest driver of big data is the new-found freedom to allow results to decide which solution providers win and which ones lose, Lots of opportunities emerge when there's a lid put on over-zealous purchasing controls and internal politics.

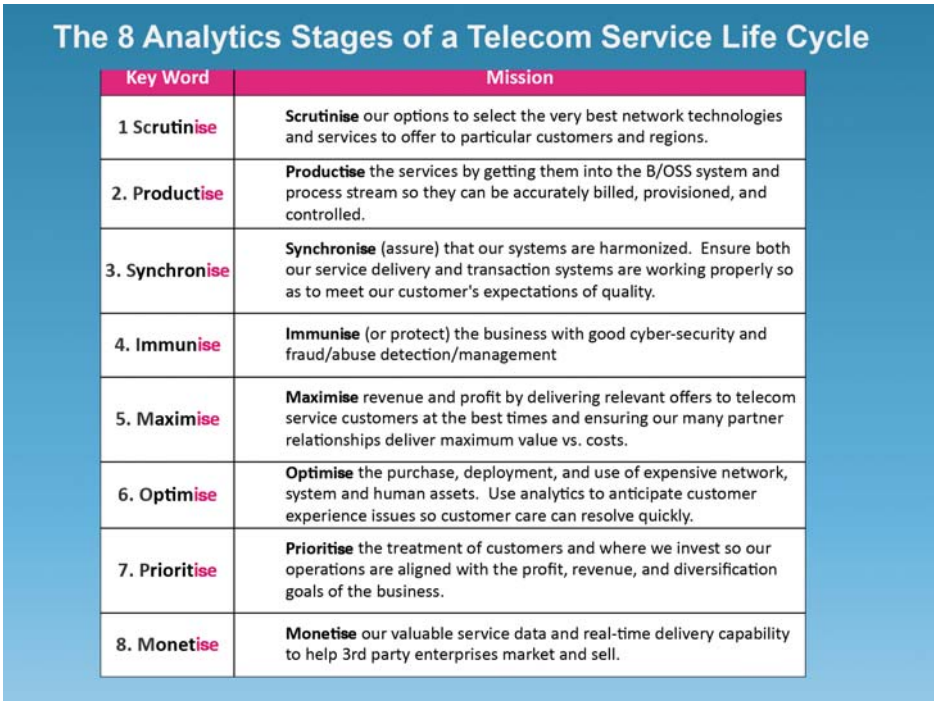
Big data opportunities cut across the entire BSS/OSS stack of applications and at every step in the service delivery process.

There's also no question that commodity hardware, SaaS, storage and open frameworks like Hadoop and MapReduce have lowered the barriers of entry.

Another welcome change is faster speed to analysis. With big data, you can employ the freshest data and not have to wait 30 days to pull results off the warehouse.

Yet another big driver is the ability to access data at a finer grain of detail – and to see the outliers of the data set as well. Analytics used to be a sampling game but today, scanning the details is essential for detecting fraud, monitoring mobile abuse and measuring true customer profitability.

For weeks, a tier one US CSP experienced a big unexplained spike in traffic every business day from 9am to 5pm in one of its



The 8 Analytics Stages of a Telecom Service Life Cycle

Key Word	Mission
1 Scrutinise	**Scrutinise** our options to select the very best network technologies and services to offer to particular customers and regions.
2. Productise	**Productise** the services by getting them into the B/OSS system and process stream so they can be accurately billed, provisioned, and controlled.
3. Synchronise	**Synchronise** (assure) that our systems are harmonized. Ensure both our service delivery and transaction systems are working properly so as to meet our customer's expectations of quality.
4. Immunise	**Immunise** (or protect) the business with good cyber-security and fraud/abuse detection/management
5. Maximise	**Maximise** revenue and profit by delivering relevant offers to telecom service customers at the best times and ensuring our many partner relationships deliver maximum value vs. costs.
6. Optimise	**Optimise** the purchase, deployment, and use of expensive network, system and human assets. Use analytics to anticipate customer experience issues so customer care can resolve quickly.
7. Prioritise	**Prioritise** the treatment of customers and where we invest so our operations are aligned with the profit, revenue, and diversification goals of the business.
8. Monetise	**Monetise** our valuable service data and real-time delivery capability to help 3rd party enterprises market and sell.

largest cities. Employing a big data solution, they isolated the trouble to a single taxi company who was abusing an all-you-can-eat plan intended only for credit card authorisations. The taxi company's drivers were using the circuit to pump free videos to customers sitting in the backseats of taxis throughout the city.

By living in the outliers – the data to the far left or right of the bell curve – the taxi fraudsters escaped notice. Sampling could not detect them. And that's precisely the value of big data – to make visible countless details of the business where so many fraud control and optimisation opportunities live.

The big data market is not all rosy for suppliers. First and foremost, the large flock of analytics firms out there puts pressure on price, and that's a very good trend for service providers.

Big data vendors are also taking lessons from the previous generation of analytics software which quietly went fallow in the last decade. Continuous and sustainable analytics programmes are the key and here, firms are getting creative by marrying software with in-shop marketing consulting, managed services, and risk/reward compensation programmes.

A cheaper and better way to extract value

Big data is all about exploring and exploiting a CSP's existing transaction data to discover and extract value. I think we can draw an analogy between telecoms data exploration and oil exploration by energy firms.

In the previous IT era – the Before diagram, expensive systems integration programmes were the order of the day. The idea was to transform the CSP enterprise through large-scale programmes architected and managed by the CIO/CTO offices. Yet there were troubles with this approach: 1) high cost; 2) the long time it takes to create value; 3) the risk of a programme failing to deliver sufficient value; and 4) the many known pockets (or reservoirs) of value became too expensive to pursue because of limitations around approved suppliers, authorised database and computing technologies, data sources in the data warehouse, and IT staffing to support new systems.

But in the big data era – the "After" diagram, opportunities open up. Rather than relying on expensive, monolithic transformation programmes alone, the operator can also fund many smaller programmes to pursue pockets of value across the business. The margins are there to support analytics firms teaming with small groups of industry experts to tackle niche operating problems.

Like oil fracking techniques, analytics programmes developed for one programme can be redirected to horizontally explore pockets of value beyond that of the original project mission. Thus, greater reuse of the analytics asset is achieved.

Rather than be restricted by IT's narrow support windows and authorised suppliers, the business units and individual departments work directly with big data suppliers, often using the vendor's infrastructure or a SaaS cloud.

Data sources expand beyond the data sets maintained in the data warehouse. There's an expanded use of deep packet inspection (DPI), radio access network (RAN) data and many other third party resources including location data, marketing data and social media.

And just as oil exploration benefited from advanced seismograph technology to locate oil wells underground, the lower cost of analytics programmes allows more testing and

trials. Thus, low cost data exploration projects are funded and the ratio of oil strikes to dry wells improves.

The high demand for network analytics

The key dilemma for telecoms today is not service delivery. Skype can do that in voice. Apple does that with iMessage. CSPs and cable operators face a much bigger task: deliver the service with sufficient quality or download speed to earn a premium. Network analytics and optimisation is therefore essential to keep telecoms a sustainable and profitable business.

Now just because CSPs own terabytes of data doesn't mean they know how to manage them well.

Guavus found a way to analyse big data before it's transported to a warehouse. Now that's a clever idea. Ontology, HP, and Splunk, meanwhile are using Google-style search engines to skirt around APIs and deliver applications that don't require expensive systems integration – they don't even require accessing a database.

Analytics also brings great value to service assurance. For instance, comparing the best performing cells against the worst performing cells is a great way for mobile operators to isolate problems or sort out which of the 60 devices in the network is causing an issue. When it comes to optimising IP networks, off-line analytics can actually deliver greater value than waiting for alarms to trigger in the NOC. So analytics becomes the new service assurance paradigm and will steadily replace previous generation software, at least in the non-real-time segment.

In fact, with the rise of 4G, LTE and smartphones, the telecoms network becomes more and more a data network, and with the rate of growth in wireless traffic and devices, engineers need all the help they can get from outside suppliers to understand capacity issues as firms like Subex, SAS and others are stepping up to provide.

Certainly one of the biggest stories is the race to analyse data from the radio access network, where TEOCO and Amdocs recently made big investments, and Tektronix Communications and InfoVista are also key contenders.

Consider this: probably 80% of the QoS issues in the mobile network live in the RAN. This is why RAN data is so crucial. In the years ahead, radio spectrum that's become scarcer and scarcer is likely to become even more precious as regulators force operators to share their spectrum in real-time.

Finally, the geo-location capabilities of the RAN are invaluable to real-time data monetisation, basically sharing intelligence with partners in retail and other industries, a practice that China Mobile is pioneering with the analytics help from AsiaInfo Linkage.

Still another area of development is coupling analytics with deep research. Firms like Ericsson are doing that to understand the behaviour of advanced telecoms networks, which frankly behave much like complex organic systems like the weather. The benefit? Greater customer satisfaction, faster trouble resolution, and lower call centre costs.

Market analytics

One of the largest segments in telecoms analytics is marketing analytics, which is the effort to deliver real-time offers or on-going campaigns to entice subscribers to spend more money, renew their new contracts, upgrade their services, and buy content and other services on demand.

Several models are now vying for attention as best approaches. Predictive Segment Analysis basically groups subscribers by demographics or behaviour characteristics to receive a particular marketing treatment. This approach has stood the test of time plus key vendors like SAS and IBM support it. Meanwhile, companies like SAP and Alteryx are improving the model by automating model creation and democratising the analysis to business users, not just data scientists.

Another approach is Social Network Analysis looks at the network of people a subscriber is connected to via phone and determines who the key influencers are in the group and puts special emphasis on treating those people as a way of dragging in their loyal followers.

Contextual marketing is yet another methodology on the rise. The idea behind contextual marketing is to make offers to individual users based on the context of that individual's situation. Contextual marketing got its start primarily in the prepaid sector of developing markets, where user loyalty is often very low and the CSP has less intelligence on who the user is. It has certainly been enabled by big data because it would be very hard to manage offers to individuals without low-cost processing power.

A related hot area is data monetisation – basically delivering real-time or brand intelligence to third party businesses, often based on mobile location and actions triggered by some behaviour or preference of the mobile user.

Look at the retail industry and you begin to appreciate how valuable mobile data is. Retailers can use bar code data to find out what a customer bought in the past, but they lack the means to send a timely offer when the customer is traveling near a store, or even when she's in the store, to direct the customer to a particular product or merchandise section. The personal mobile device is the answer.

We figure data monetisation is the next generation equivalent of Yellow Pages for operators. Remember that as recently as 1999, the Yellow Pages directory business represented 10% of revenue for large U.S. LECs (local exchange carriers) like BellSouth, and it was a hugely profitable business. Yet data monetisation may be a far more compelling offer to enterprises than Yellow Pages ever was because of the immediacy of the informaiton. Plus data monetisation is already proving itself in China where China Mobile monetises relationships with store owners in malls and websites, offering discount coupons for restaurant meals via the mobile phone.

Greater efficiency and lower costs in customer care

Sales and customer care is a hot analytics market and that's a bit of a pleasant surprise.

Here, analytics can drive business through real-time analysis of customers. Back end databases, such as those supplied by Neustar, can significantly improve the order uptake of customers and prospects calling into a call centre, visiting a website, or using IVR.

Gaining a quick diagnosis of problems is another critical area where big data is helping. If a CSP has 75 active smartphones in use in a region, imagine if a customer calls in to complain about QoS and the care representative has no way of knowing whether or not there's a problem with a particular handset.

But comScore's analytics system runs a defective handset analysis on a regular basis so when the customer calls in, the care representative knows immediately whether the handset is the likely issue. This can save a few minutes in average handling

time which translates to hundreds of thousands of dollars in decreased care costs.

Business assurance and enterprise search

Business assurance is an analytics sector concerned with lowering costs and plugging revenue leaks due to operational errors, fraud and detected ill-conceived partnerships with interconnect and content partners that are either not profitable or not generating business value.

One area with huge potential in business assurance is margin or profitability assurance. At a macro level, the finance department can measure costs going out and revenues coming in but the real challenge is getting a view of profitability at a very granular level.

At face value, a mobile user paying a premium price with lots of data usage sounds like a VIP, but on closer examination, you are paying out huge interconnect fees to support that customer. Meanwhile, the light user of mobile may be highly profitable given the low costs he incurs.

The search capabilities of Google, Baidu and Bing are powering the modern world, but today that same power comes in a shrink-wrapped version, namely the enterprise search engines from companies like Splunk, HP and Ontology.

What enterprise search basically allows a CSP to do is skirt around APIs and other data access issues and perform either ad hoc analytics queries or build a full-blown application using logs and other machine data.

Conclusion

I've spent time scanning a software market that's exceedingly broad and deep – but that's the nature of the big data beast. Its rise is an extraordinary opportunity for CSPs to bring innovation back into the business through hundreds of low cost, quick ROI programmes delivered by solution vendors, large and small.

About Technology Research Institute

Technology Research Institute (TRI) is a boutique market research firm that has been tracking telecoms BSS/OSS developments since 1994. In 1996, TRI published the first-ever syndicated research reports on fixed and mobile billing systems. In recent years, TRI has focused on business assurance and analytics. In 2013, TRI published a sweeping 40-vendor, 515 page report on the market for 'Telecoms Analytics and Big Data Solutions'. Dan Baker, TRI's research director, is a regular contributor to VanillaPlus

www.technology-research.com

COMPANY PROFILE

Company summary

SAP is using its big data, cloud and mobile expertise to both sell to and partner with CSPs. The company offers a full enterprise analytics suite bolstered by its flagship SAP BusinessObjects and Crystal Reports assets. Recently, SAP has added advanced drag-and-drop data visualisation with a product called SAP Lumira and rapid predictive analytics capabilities through its KXEN acquisition.

Big data analytics credentials

SAP's CSP go-to-market strategy is built on three key pillars:

Customer engagement – Here, better and more consistent marketing and selling across contact channels is achieved with the hybris solution, which, in concert with SAP's CRM, billing and analytics suite also enables CSPs to more efficiently manage campaigns and send more relevant, customer centric offers. SAP Mobile Commerce delivers mobile wallet and micro-banking solutions as well, especially for CSPs that operate in countries where the handset is the primary internet access point.

Operational efficiency – Building on its ERP platform, which helps over 4,500 CSPs globally to run their businesses better, SAP offers its entire Business Suite in the cloud, providing flexible deployment options for CSPs. In addition, recent acquisitions such as SuccessFactors in human capital management and Ariba for cloud-based procurement help CSPs maintain costs and quickly innovate in these areas.

New revenue generation – SAP partners with leading global CSPs to help them generate revenue from new, non-traditional, services. Services such as enterprise-class cloud services, mobile commerce, data monetisation, machine-to-machine and managed mobility services. CSPs can monetise its traditional data and services with SAP Mobile as managed service as evidenced by existing partnerships with major CSPs worldwide.

Key differention

Predictive Analytics based on KXEN technology and combined with it's own innovation in trusted data discovery, is key to SAP's bid to gain a time-to-model and time-to-insight advantage over competitors such as SAS and IBM SPSS.

Competitive pressures

SAP enables business analysts and marketing specialists to rapidly create and maintain – on their own – hundreds to thousands of predictive analytics models that micro-segment subscribers. This task normally requires enormous manual work by statisticians or data scientists which are in short supply. Likewise, SAP quickly figures out which campaign offers are working and which are not. Combining its speed on the predictive side with the company's larger IT infrastructure and cloud strengths and its real-time, big data, and in-memory database capabilities, SAP is in a good position to grow in telecoms analytics.