A complex network diagram with numerous nodes of varying sizes and colors (blue, grey, white) connected by thin lines, set against a dark blue background. The nodes are distributed across the entire page, with a higher density in the upper and lower sections.

THE END OF BAD DECISIONS

ADVANCED ANALYTICS AND TRANSFORMATIONAL LEADERSHIP—
A WAY FORWARD FOR NETWORK OPERATORS

A compendium of articles from McKinsey & Company and Russell Reynolds Associates

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EXECUTIVE SUMMARY

Disruptive change has a long history of taking the disrupted by surprise. Incumbent companies almost always underestimate both the pace of change and the magnitude. Will network operators be the next to find their business models overturned?

Already, technology players are rushing sleek new devices and services to market that offer connectivity as an add-on, a monthly fee that keeps the stream of books, movies, and data flowing. If that model prevails, network operators will become the back end for consumer-focused companies that engage and delight former telecom customers.

It doesn't have to unfold this way. Advanced analytics and machine learning offer network operators a way to manage and lead with certainty, to draw accurate insights about their customers, their networks, and their employees from the mountains of unstructured data they collect each day.

This compendium contains articles from McKinsey & Company and Russell Reynolds Associates that highlight the potential of advanced analytics as well as the leadership and organizational challenges that network operators would need to overcome in order to realize that potential. Five insights emerge from this collection:

- 1) The technology is transformative. Network operators that want to take advantage of advanced analytics must be willing to upend the status quo. Organizations that are not able to tolerate the level of change required are risking their survival as the industry changes around them.
- 2) The impact is widespread. Advanced analytics doesn't just help the marketing department make better decisions (although it will do that). Powerful algorithms take the guesswork out of decision making in all parts of the organization, from finance to talent management, from network maintenance to managing customer churn.
- 3) The right data is already in place. Network operators generate vast stores of data every day. Yes, it's messy but the algorithms used in advanced analytics are well suited to breaking it down and extracting the value. Companies that insist on perfecting the data first will never get started.
- 4) The leadership profile of telecom executives may be one of the biggest obstacles to change. Research shows that telecom executives are typically more risk averse, more attached to the status quo, and more driven by conformity than transformation leaders from other industries.
- 5) The second big obstacle is everyone else. Transformative change means culture change. New roles will emerge. Budgets will fluctuate. Many in the organization will resist change in both explicit and implicit ways.

THE RIGHT MOMENT FOR ANALYTICS

By Pallav Jain, Gloria Macias-Lizaso, and Guido Frisiani of McKinsey & Company

Although analytics has become the latest buzzword, the field emerged as a scientific discipline in the late 1990s as advances in computing enabled data scientists to build computers capable of self-learning. They could then leverage that ability with algorithms able to tease out predictive patterns from massive data sets, even when the data was imperfect.

These powerful algorithms could comb through massive sets of data, theoretically opening the way for companies to understand and predict customer behavior and to build tools that could make customized product recommendations, optimize networks, and isolate microgroups to be addressed with tailored campaigns and services. It would take another 20 years, however, before the discipline could truly come into its own.

Today, network operators face ever-increasing complexity in their global marketplaces and operations and competition from new quarters, creating an urgent need for advanced analytics. At the same time, three technological factors have converged to put the full power of analytics in reach of organizations able to appreciate and seize this opportunity:

The explosion in the volume of available data. With the rapid increase in sensors, mobile technology, and digitization, almost every action and interaction an individual undertakes generates data, from turning on the lights in the morning to relaxing in front of the television in the evening. Taking the metro or driving through a toll on the morning commute, swiping a credit card at a café, withdrawing cash from an ATM, sending texts, making phone calls, playing online games, or simply downloading GPS-enabled apps—all these contribute to a continuous flow of new data. IDC estimates that from 2013 to 2020, the amount of data in the digital universe will grow by a factor of ten—from 4.4 trillion gigabytes to 44 trillion gigabytes. The volume of data more than doubles every two years. Just as important, organizations now have access to services that enable them to store big unstructured data sets, including e-mails, audio files, and text documents. Most companies, however, use only a small percentage of the data available to them. Take the case of an offshore oilrig equipped with 30,000 sensors for capturing data. Today, less than 1 percent of the data generated by those sensors is being used to make decisions, and that same percentage holds true in other industries. Moreover, of that 1 percent, most is used simply to detect anomalies or for real-time control.

The availability of cheap computer power. That vast trove of big data has been building for years. But now we have the computing horsepower to make use of it. Calculations that would have once required a roomful of servers can now be accomplished on a laptop.

New algorithms. Finally, new algorithms have come onto the market that enable users to take advantage of all that data and all that computing power. Previously, organizations that may have invested billions of dollars in computer technology were still using regression analysis to make sense of their data. While a marvel of their time, regressions were developed more than 200 years ago by German mathematician Carl Gauss, long before the advent of computers or even handheld calculators. Today's algorithms offer several advantages: they can work with larger data sets, even data sets that are incomplete or imperfect, and they can infer missing data by the combination of many other data points.

For businesses, one of the most important aspects of advanced analytics is the so-called machine learning. With advanced analytics, computers can automatically adapt and learn as they encounter variables, without the intervention of data scientists. The more data and the more variables they encounter, the more precise they become. IBM's Watson computer, for example, relied on a self-generated scoring system to differentiate among hundreds of potential answers when it crushed the world's best *Jeopardy!* players in 2011. The more Watson played, the better it became.

ADVANCED ANALYTICS WILL DISRUPT BUSINESS MODELS—WHETHER NETWORK OPERATORS ARE READY OR NOT

By Pallav Jain, Gloria Macias-Lizaso, and Guido Frisiani of McKinsey & Company



The age of advanced analytics will bring with it dramatic paradigm shifts for network operators, who will need to fundamentally rethink how they manage their organizations. Indeed, the industry will see more change in the next 5 years than in the previous 15. Processes and functions will become dynamic rather than static. Instead of actions governed by complex sets of fixed rules that must be periodically updated, algorithms will continuously search for and update the optimal course of action in any given situation. The more they update, the more precise the algorithms will become. With the ability to analyze large and disparate data sets instantaneously, the network operators of the near future will have the tools to become leaner and more agile, able to make complex decisions quickly and for optimal outcomes.

REIMAGINING THE CUSTOMER RELATIONSHIP

Advanced analytics has the potential to fundamentally alter the customer relationship. Network operators have long been multichannel, operating on all platforms, including digital. They can now take that one step further. With advanced analytics, the network operator of the near future will be able to interact with a mass market on an almost one-to-one basis. With the ability to unlock data that was previously too massive, too unstructured, and too difficult to collect, network operators will be able to identify those most likely to become customers with a high degree of certainty.

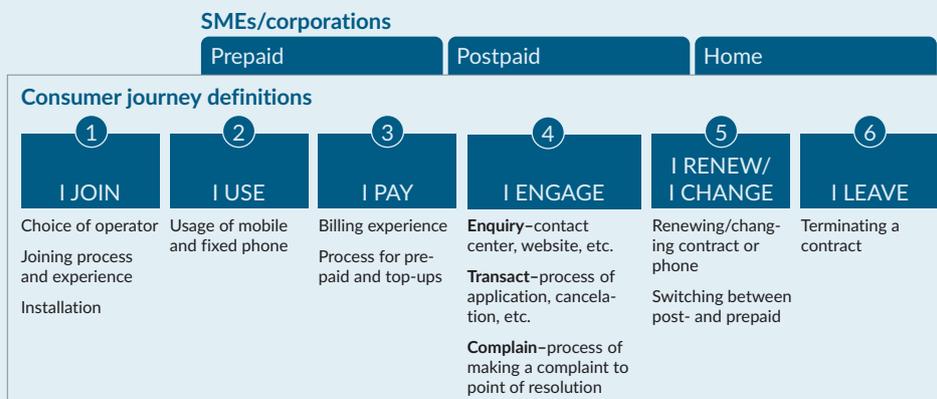
This up-to-the-minute, customer-specific data will enable the company to precisely calibrate promotions, campaigns, and service interventions along the entire customer journey—from joining through usage to termination. At each step, the company will be able to use advanced analytics to maximize outcomes, provide an outstanding customer experience regardless of channel, and deepen the relationship, turning the customer into a brand advocate.

Advanced analytics will have impact at each step of the journey:

- 1) As the customer in the “I join” phase begins to research handsets on the company website, the network operator will deploy algorithms in the background to determine the most suitable product for her specific profile, leveraging internal and external data. Once the customer makes a choice, the company can offer her the option to pick it up at the closest store. The company will then use its advanced analytics to optimize the store experience, perhaps by having a precise view of high-traffic periods and adjusting staffing levels to minimize queuing. When the customer picks up her handset, the company’s algorithms will guide the store in tailoring add-on offers, based on the customer’s personal profile and history.
- 2) Once the customer enters the “I use” phase and starts to use her new phone, the network operator will harness advanced analytics to get a detailed view of her experience and respond appropriately. If she’s about to run out of credit, the network operator will send an on-the-spot promotion. If she experiences

a high level of dropped calls, she might receive a text message apologizing for the glitch and offering the next call free of charge. The company can also use the dropped-call data to optimize its network, decreasing the likelihood of such problems in the future.

- As the customer in the “I pay” phase settles her monthly bill, the network operator will use analytics to enhance the relationship, even through difficult periods. If the customer slips into a pattern of late payments, for example, the company can predict with reasonable accuracy if she is likely to default on the bill or just needs some support as she navigates through a temporary personal issue. Recurring data charges on the monthly bill can alert the network operator to offer a more appropriate plan—before the customer bolts to a different provider.



SOURCE: McKinsey & Company

- In the “I engage” phase, the company may field questions, complaints, or requests for upgrades. The analytics-enabled network operator will field these queries with equal ease online, on the phone, or in the store and will use its analytics capability to optimize the experience. If a customer dials into the call center, for example, algorithms working in the background will comb through the caller’s social media, call history, usage, and other data in milliseconds to produce an instantaneous, detailed portrait of the caller. Based on preferences, interests, and personality type, she will then be matched up with a call representative who shares those interests and traits, based on data gleaned from surveys all representatives will take.

The company can also head off operational problems before they reach crisis proportions. All calls will be recorded and stored in a database that will in turn be connected to other customer databases. Using speech analytics and machine learning, the company will monitor conversations for patterns that could indicate either additional selling opportunities or challenges to address before they result in a loss of business. One network operator using such a technology discovered it was receiving 35,000 calls per month from customers who were unable to reset their voice mail passwords. A quick investigation uncovered a glitch that kept resetting passwords for some customers. The company was able to fix the problem before it had serious impact.

5/6) In the final two phases, “I renew/I change” and “I leave,” analytics can again help ensure an optimal outcome. With its sophisticated algorithms, the network operator will anticipate the customer’s needs and offer a solution before she heads off to another provider. Similarly, the company will know with a high degree of likelihood which customers would be interested in upgrading their service, contracting for additional services, or increasing their data plans, allowing the company to provide relevant offers at the moment the customer is most receptive. When customers do leave, the company can use its advanced analytics to detect patterns that help it uncover network flaws and unmet needs. It can then reinforce its infrastructure or tweak its menu of offerings as needed, reducing customer churn.

CHANGING THE GAME IN OPERATIONS

The implications for the operations side of the enterprise are just as profound. From collections to fraud prevention, network optimization to employee retention, operations across the organization can be rationalized and optimized with advanced analytics and machine learning. Network operators will use both the predictive power of analytics and the ability to break down complex, unstructured data sets into comprehensible patterns to address problems proactively and to deploy resources for the greatest impact.

The predictive power of advanced analytics will transform the way the industry manages resources of all kinds, from human talent to data networks. Managers will have a continuous, real-time view into the performance of new products and campaigns, allowing them to make mid-course corrections at a much earlier stage. An ad budget that may previously have been sliced up among different media based on a few numbers and a lot of intuition will now be allotted based on advanced analytics to achieve maximum impact.

Elsewhere, sophisticated algorithms will sort vast troves of data into patterns that can uncover exactly how customers use their phones and other devices, where they use them, and at what times, allowing operators to design networks that meet those needs as efficiently as possible. Other algorithms will help network operators understand the stresses on the network at a granular level, allowing them to accurately anticipate when parts of the system are likely to fail, prioritize those issues in terms of their value to the network, and efficiently deploy maintenance crews. Similarly, when the field force goes out on its daily rounds to address customer issues, they’ll follow dynamic schedules that line up the next call based on factors from service priority to local weather and traffic conditions, dramatically lowering downtime and providing a better experience for the customer.

Ever-present customer challenges will also undergo dramatic improvement thanks to advanced analytics. Fine patterns in customer behavior will emerge, enabling network operators to uncover misalignments between customer usage and service plan and to

proactively suggest a more appropriate product before dissatisfaction builds, which can dramatically reduce customer churn. Instead of treating all late-paying customers the same, operators will have new insights into what's driving the behavior, allowing them to tailor custom remedies. Other insights will allow network operators to anticipate fraud and put safeguards in place.

Internal functions such as talent recruitment and retention can also be made more effective. The ability to forecast demand with a much greater degree of precision will enable network operators to focus resources on high-value operations, such as technical support, while low-value operations in the back office will be minimized or even automated.

With advanced analytics, network operators will be able to collect data that was once deemed too sprawling and too unstructured to yield valuable insights and use it to improve the customer experience while wringing maximum value out of scarce resources. Guesswork and waste will go down, while precision and impact will go up. In short, advanced analytics will become a core competency that can push companies to new levels of excellence.

NEEDED: BOLD LEADERSHIP

By Nada Usina and James Roome of Russell Reynolds Associates

True organizational change cannot occur without effective leadership, and the transition to an analytics-enabled network operator is no exception. Network operators that aspire to embed advanced analytics deep within the fabric of their organizations will need a new type of leader, someone with the vision to imagine a better future, someone willing and able to embrace change with all the ambiguity that change entails, and someone with the organizational IQ to forge new ways of doing business while maintaining excellence in operations and customer service.

THE TELECOM EXECUTIVE'S LEADERSHIP PROFILE

To develop a detailed picture of the strengths and weaknesses of leadership in the telecom industry, Russell Reynolds compared 200 telecom leaders with a database of more than 5,000 executive leaders worldwide. It also compared the telecom executives to a group of transformation leaders to see how they stacked up against those who have already led successful transformations.

As it turns out, the telecom executives have a markedly different leadership and behavioral profile from the overall senior executive population (Exhibit 1). They differ across 25 attributes—making them more different from the overall executive population than most other groups of leaders examined. However, most of the differences are moderate, suggesting that this group is not extreme in their attributes. Rather, they are characterized by subtle but persistent variations from the “average” executive.

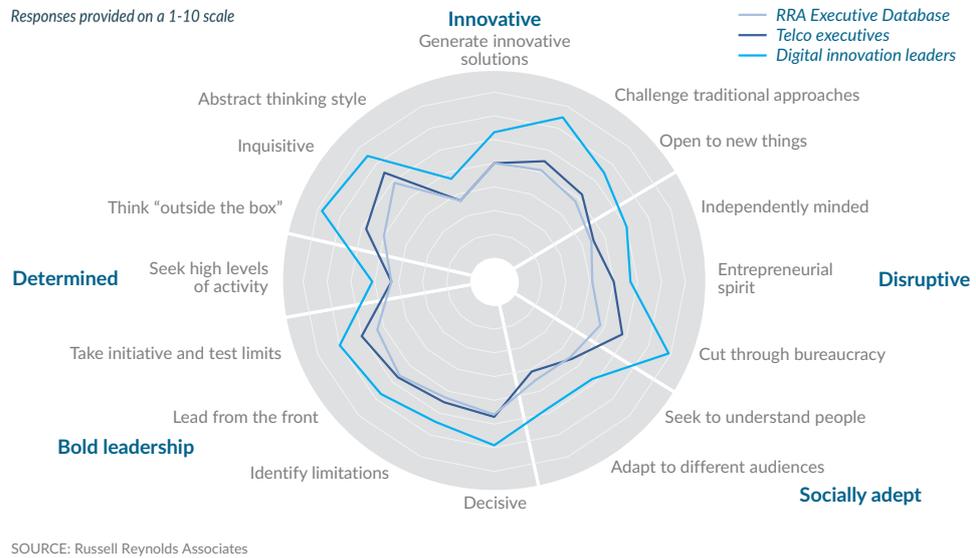
What emerges is a portrait of a leader who is curious, entrepreneurial, and willing to challenge conventional wisdom, up to a point. Telecom leaders bring a competitive spirit and ambitious mindset to challenges and demonstrate resilience through difficulties. They are open to taking risks and pushing the boundaries of the industry's business-as-usual practices, but within the norms of the culture and the industry.

Compared to executives in general, the telecom executive is 22 percent more willing to take calculated risks, indicating an ability to take a long-term view of the business, rather than simply prioritizing predictable, short-term performance. While the telecom executive is optimistic and confident of the future, he or she is realistic, understanding that perfection is not the goal. This willingness to prioritize the good over the perfect helps these executives wade into new territory.

The telecom executive is also more socially visible than other executives, scoring 21 percent higher in building proactive relationships. These executives tend to demonstrate a very open and candid interpersonal style. They enjoy engaging with others and have little hesitation in voicing their concerns. In social settings, they are the visible, vocal networkers who can “work the room,” seeking out opportunities to engage and connect with others.

EXHIBIT 1

Although telco executives think differently than the general executive population, they are more conventional than their digital peers



TRANSFORMATION MEANS DISRUPTION—ARE TELECOM LEADERS READY?

Clearly, network operators benefit from leaders who have some transformational attributes, especially when compared to the general executive population. However, given the volume and pace of change within the industry, these leaders are not well positioned to move their companies as fast or as far as they need to go to thrive.

While company cultures within the industry are superficially open to change, once you scratch beneath the surface, they tend to be highly resistant to anything that threatens the status quo, placing a high premium instead on conformity. It is this overall bias toward conformity—along with other significant gaps between the telecom executives and the transformation leaders—that makes transformational change so difficult in the telecom industry.

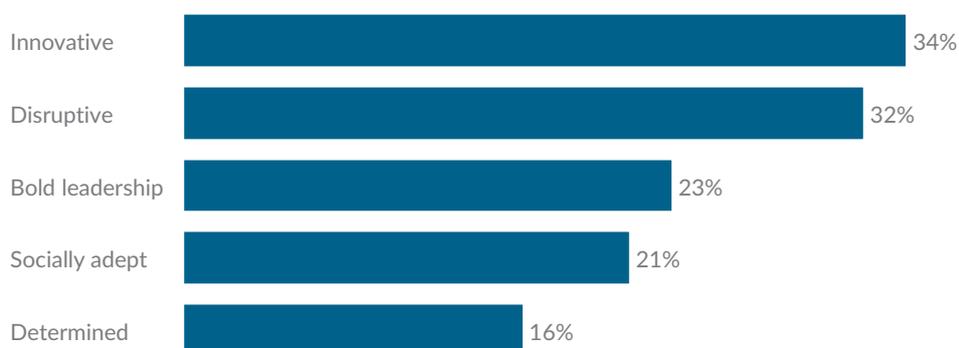
TELECOM EXECUTIVES VERSUS TRANSFORMATION LEADERS

Russell Reynolds defines transformation leaders as senior executives who have successfully led large-scale transformation within an established, complex organization. These leaders have enabled their organizations to achieve substantial progress in responding to the threats and opportunities posed by significant disruption. Russell Reynolds has profiled these leaders to understand their psychometric profiles (Exhibit 2). A comparison of the telecom leadership profile with the profile of the transformation leaders shows that the telecom cohort falls short in several key areas. This is especially important given the new and emerging threats to the traditional telecom business model.

Average of statistical differences in psychometric scale scores



EXHIBIT 2



SOURCE: Russell Reynolds Associates

Key: transformation leaders are significantly different in five key leadership areas. Their unique combination of being both highly innovative and highly disruptive, coupled with the social strength to create and lead transformation results in a unique leadership profile.

Change averse, not change oriented. One of the biggest differences is the glaring bias against change among the telecom leaders. On 16 of 21 measures that get at the issue of change, telecom executives exhibit markedly less of each characteristic than the digital transformation leaders. In some cases the differences were extreme. In fact, the degree of difference between telecom executives and transformation leaders on some attributes was almost double the biggest differences observed between telecom leaders and the general executive baseline. In short, in many attributes, they are closer to an “average” executive than a transformation leader.

Conforming, not transforming. Critically, when compared with transformation leaders, telecom executives do not exhibit a leadership profile that speaks of innovation or boldness. These leaders are decidedly more conventional than the change agents who are leading digital transformations elsewhere. In the face of the rapid product innovation and new competition that are disrupting network operators, innovation and boldness are precisely the leadership hallmarks that are needed now more than ever.

Shaped, not shaping. A closer look at the gaps in the leadership profile suggests that telecom leaders may talk about challenging the status quo in some instances, but when it comes to taking action they are decidedly more beholden to existing processes and bureaucracy. For example, their transformation peers are 45 percent more likely to challenge traditional approaches and 48 percent more willing to cut through bureaucracy than telecom executives. This suggests a hesitancy on the part of telecom leaders that could be the result of cultures that have been shaped both by heavy government regulation and pressure to produce short-term shareholder value.

Commanding, not leading. Similarly, while the telecom group is much more proactive in building relationships than the executive baseline, they are not as socially attuned, indicating that they may be commanding a room more frequently than they are reading the room. And while they are socially and interpersonally engaging, they do not necessarily have the boldness or vision to rally the troops behind a common cause—a problem in an industry that will continue to see consolidation, disruption, and change.

Some good signals. There is reason for optimism, however. In examining changes in telecom leaders over time, three positive trends emerge. First, the telecom executives' affinity for thinking differently and challenging conventional wisdom has been increasing. So while they are decidedly less innovative and disruptive than the hard-charging transformation leaders, they are moving in the right direction. Second, they are becoming more attuned to the needs of their companies and the industry, and they are starting to take a more organic approach to setting goals and communicating. Rather than leading with a preconceived point of view, they are now more inclined to let the data and the market shape their messages.

Finally, they continue to demonstrate a strong competitive spirit and engaging interpersonal characteristics. If they are able to build on these competencies—and develop new skills where they are lacking—they can better position themselves to lead their organizations in an era that will demand rapid transformation. Doing so is critical. There is no doubt that telecom leaders must be willing to break the rules and reimagine their business models in order to thrive in a disruptive era.

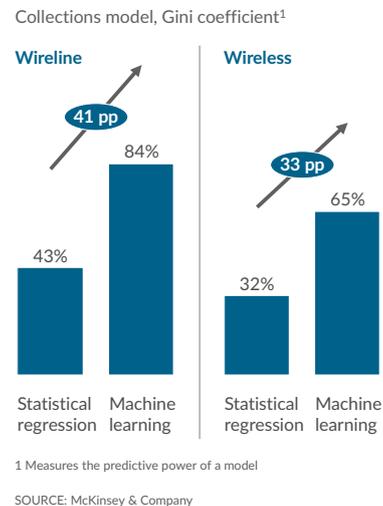
ANALYTICS IN ACTION: CHANGING THE RULES FOR NETWORK OPERATORS

By Pallav Jain, Gloria Macias-Lizaso, and Guido Frisiani of McKinsey & Company

Advanced analytics offers a tool for network operators to fundamentally reshape their organizations. While many people assume the biggest opportunities for a technology with strong predictive powers will be found in the marketing department, in fact, advanced analytics can be used to address challenges across the entire value chain. Some of the biggest opportunities are actually in operations and strategy rather than in areas that are directly focused on the customer. Any function that allocates resources, builds and maintains networks, works with unstructured data sets such as voice and text files, or must anticipate human behavior can benefit.

Carriers can adopt machine learning to increase the predictive power of collections models

EXHIBIT 3



REDUCING CUSTOMER CHURN

Customer churn in general has long been a challenge for network operators. Traditional strategies for addressing the problem tend to be both inefficient and expensive. Recently, though, a few leaders have turned to advanced analytics. One network operator achieved a significant reduction in churn by using algorithms to target interventions for at-risk customers much more precisely (see sidebar “Profile, anticipate, offer—tactics to reduce churn”).

The shift: Instead of reacting after the customer has already decided to leave or blanketing all customers with offers proactively whether they are likely to churn or not, network operators will reach out only to those at greatest risk of dropping the service, even before they have considered doing so, allowing the companies to reduce spending while maximizing impact.

TARGETING MULTICHANNEL MARKETING SPEND

For an attacker brand aspiring to build share in a mature market through aggressive pricing, finding a way to wring maximum impact from its ad spending could make a critical difference. One network operator in such a position was able to increase its profitability by 15 percent by doing just that. Using advanced analytics, it linked the last one or two years of data on its advertising in each channel, including general ads, promotions, paid search, affiliates, display ads, and social media. It then created a forecast simulator and an econometric model that could predict acquisition and retention.

The company gained a richer understanding of its channels—discovering that TV was the single biggest factor in attracting new customers and holding on to them. Along with print, it was responsible for 24 percent of new customers. These traditional channels also turned out to make a strong impression on customers, with a memory effect of

up to a year. Digital, including display, affiliates, and search, also contributed 24 percent to acquisitions, but here the memory effect was almost nil. Social media was most important for the harm it could do: negative posts could sink acquisitions by almost 8 percent (Exhibit 4). The company used these insights to optimize its allocation of paid media, driving the increase in profits.

The shift: Instead of allocating the ad budget based on predefined percentages or sheer gut instinct and ceding the details to an agency, network operators will use advanced analytics to optimize their spend by making their own, optimized decisions.

IMPROVING COLLECTIONS

Every business faces a certain number of customers who fall behind on payments, creating the need for a collection process. But treating all those customers the same results in waste. For some late-paying customers, the problem is temporary and they will resume timely payments on their own. Others will resume after a modest level of company contact. Still others will never resume payments. By taking advantage of advanced analytics and machine learning, both mobile and fixed-line operators can dramatically increase the predictive power of their collections models (Exhibit 3).

One network operator, for example, created an algorithm that sorted its late-paying customers

Profile, anticipate, offer—tactics to reduce churn

A network operator was experiencing a painfully high churn rate of 24 percent per year. The company knew that reaching at-risk customers with a targeted phone message could reduce that rate dramatically, but it had no way of accurately predicting which customers were most likely to drop the service. Simply calling at random would result in reaching only a few thousand at-risk customers—and many thousands more for whom the call would not be relevant.

The company developed an algorithm that weighed a number of scenarios that could indicate a propensity to change service providers. Scenarios included customers who were simply in the wrong plan given their usage, customers whose friends had recently switched networks, and families in which one member had recently upgraded to a smartphone. As a result, the company was able to raise the hit rate in its telephone outreach from 60 to 480 at-risk customers out of every 1,000 calls—and reduce its annual attrition rate from 24 percent to 20 percent. That higher hit rate also meant that it could achieve those results with fewer phone calls, reducing overall costs.

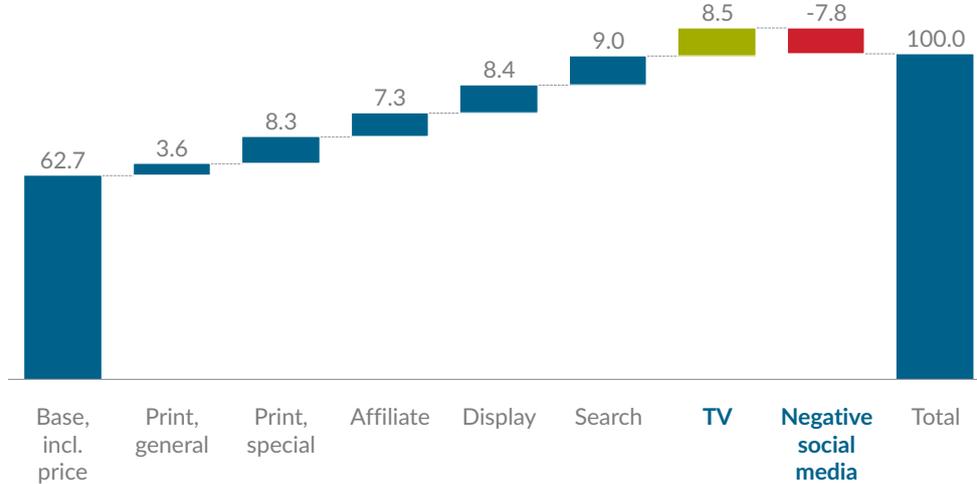
Exactly how the algorithm accomplished this provides a good example of the power of advanced analytics. It divided the customer base into 20 equal segments, based on the patterns it uncovered. The first segment represented 5 percent of all customers, but 64 percent of the predicted total churn over the next two months. The second segment represented 16 percent of the total churn. At the other end of the scale, the bottom 60 percent of customers included only 3 to 4 percent of customers expected to drop the service.

Next the algorithm broke down the 64 percent in the first segment who were expected to churn in greater detail. The company discovered, for example, that half would not call their network operator before churning, leaving no opportunity to dissuade them. But the algorithm was also able to divide the 64 percent into microsegments, enabling the company to develop tailored campaigns for reaching out to customers before the thought of leaving even occurred to them. For example, a group called “backpackers” making up just 1 percent of total customers had a churn rate of 29 percent. With an average age of 27, they had already run through an average of 14 contracts. The problem? These were individuals who traveled a lot, were heavy phone and text users, and tended to get hit hard with roaming charges. Instead of waiting for them to rebel after getting surprised with a high bill, the network operator reached out to them proactively to offer a more appropriate data plan.

EXHIBIT 4

Negative social media buzz can impact acquisition as much as TV ads

Breakdown of drivers of customer acquisitions
By marketing activity, percent



SOURCE: McKinsey & Company

into three groups. This enabled the company to identify those who were likely to self-cure, and it gave them time to do so. It targeted the middle group with messaging, returning most to timely payment patterns. For the most egregious nonpayers, the algorithm enabled the company to put in more aggressive measures up front. For example, the company could stop service sooner, reducing the amount of debt outstanding. When necessary, it could sell accounts sooner, allowing it to realize more value than if it held them through a protracted collection process. Customers responded to the changes; the churn rate among those who went through the collection process dropped by 90 percent.

The shift: The approach to collections will shift from reactive to proactive by using analytics to figure out early which customers are likely to default and to optimize the outreach to ensure a good experience through difficult times for those the network operator wishes to retain.

FIGHTING FRAUD

As network operators shift to a model of financing handsets for customers, their vulnerability to fraud will rise, making sophisticated fraud detection increasingly relevant. Automotive insurers have long faced such challenges. Recently, one insurer was experiencing accident claims four times higher than normal for policies in force for 90 days or less, making it clear that some customers were taking out policies and fraudulently collecting for accidents that had already occurred.

The insurer had no way of knowing which claims were legitimate or which customers were most likely to file a false claim. By developing an algorithm that could tease out patterns, it was able to raise rates for the riskiest clients, encouraging them to choose another insurer, and to send out inspectors to examine whether the cars actually had the damage

described for those at moderate risk of committing fraud. By segmenting customers and developing a tailored approach for each, the insurer was able to reduce its loss ratio and lower prices while maintaining profitability and gaining market share. Network operators could use a similar approach in combatting handset fraud or pay-TV fraud.

The shift: Network operators will not have to wait for fraud to happen before taking action. Instead, algorithms will help them identify the most likely offenders and allocate resources accordingly.

IMPROVING NETWORK DESIGN

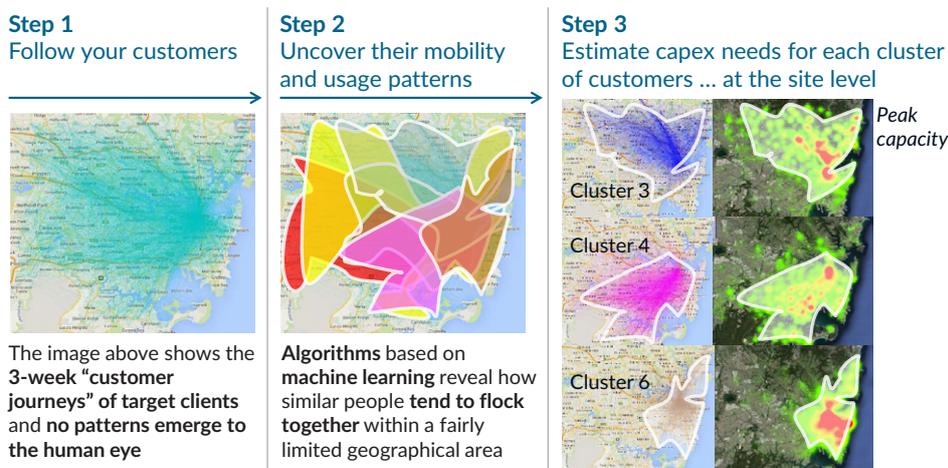
Network operators need to be especially vigilant in maintaining best-in-class service for their most valuable customers. One company wanted a deeper understanding of how those customers actually used its service so it could provide seamless, consistent connectivity. Since it knew where their residences clustered, it could easily provide service in those neighborhoods. But mobile users don't just call or text from home. They also need their devices to work as they commute to jobs, shop, and take their kids to school.

By developing an algorithm to analyze usage, the network operator was able to discern not just where those customers lived, but the micropatterns formed by their travel habits. The algorithm worked with data that showed where each customer traveled during a three-week period. A simple diagram of that travel looks like an undifferentiated blur. But the algorithm was able to drill down and uncover patterns among microclusters. It uncovered six such clusters, along with data on the travel patterns, peak usage times, and network usage for customers within each cluster and the overall value of the cluster.

For example, one high-value business and professional group tended to flock around the business district. Another student segment concentrated around the university and still

Using machine learning to estimate capex needs for each customer cluster

EXHIBIT 5



SOURCE: McKinsey & Company, Google Maps data

another around a university and residential suburb. Armed with this granular detail and an understanding of each cluster's value, the company was able to optimize its investment decisions and expand the network where it would add the most value (Exhibit 5). Using this approach, network operators have been able to increase the ROI of network deployment by 10 percentage points and reduce capital spending by 38 percent.

The shift: With the ability to cluster customers who follow similar travel patterns during the day, network operators will be able to move from broad geographical network optimization that provides uneven service for many customers to one of finer micropatterns that optimizes both customer service and investment impact.

DRIVING EFFICIENCY IN NETWORK MAINTENANCE

For network operators, a network failure can represent an enormous loss of revenue as well as customer goodwill. As a result, most network operators invest heavily in preventive maintenance, servicing all base stations of each type on a regular schedule. However, different base stations—even among those of the same type—are used differently and have a different value to the overall network. Servicing, for example, all urban stations at the level required for the most stressed station results in unnecessary and costly procedures.

By employing advanced analytics, one company was able to achieve savings of 20 percent in network maintenance costs without any compromise in performance. To deliver this improvement, it switched from a static maintenance schedule to a dynamic one—identifying which stations were in greatest danger of failure at any given time and prioritizing them based on their value. Rather than employing a crew to rotate from station to station on a fixed schedule, the crew was kept on call, ready to respond to events or triggers that indicated a failure was likely in the next two to three days and to do so in order of the station's importance.

The shift: By using analytics to accurately predict mechanical failure, operators can move to a dynamic maintenance model, allowing greater efficiency by prioritizing servicing needs while maintaining network integrity.

FIELD FORCE OPTIMIZATION

In a competitive industry, the ability to out-manage on resources can bring an important advantage, yet often a high degree of waste seems unavoidable. One European network operator was determined to cut the waste inherent in field force management. It used advanced analytics to reduce the number of field reps needed by more than 20 percent and increase the average effective time for field force members from 4.1 hours per day to 6.5, all while cutting the percentage of missed appointments from 3.5 percent to 1.8 percent.

To achieve these results, the company harnessed analytics to add more precision in arranging service calls. Scheduling such calls has always been an inexact science, thanks

to a multitude of variables. The amount of time required for each service call varies in ways that are hard to calculate ahead of time. Traffic conditions can change throughout the day. The geography of the calls may make it difficult to route workers efficiently. All of this meant that the network operator was supporting a field force that spent a lot of time behind the wheel or simply idling in a parking lot rather than providing service. By using advanced algorithms the network operator was able to switch from a static system that planned a series of calls for each field technician each day to a dynamic system that used GPS and other data to dynamically dispatch team members based on actual minute-to-minute needs and conditions.

The shift: Operators will use analytics to react to events in the field as they happen, maximizing the time field techs actually spend solving problems. The result: lower costs and higher customer satisfaction.

STRENGTHENING TALENT MANAGEMENT

Organizations have already started to apply the power of analytics to their most significant talent challenges. One network operator with a large B2B sales force, for example, was able to address its troubling employee turnover rate, which had reached 30 percent per year, despite costly investments in retention bonuses. The problem was hard to analyze using traditional methods as data on turnover came from multiple internal sources, in multiple formats. But by developing an algorithm that could integrate all of the data, it was able to quantify the flight risk for each employee and to segment high-risk employees into clusters, each with its own organizational attrition factors. It created an intervention plan that could be used proactively—before employees gave notice—which helped it to cut its attrition rate from 30 percent to 15 percent. In addition, the company discovered that the retention bonus plan, which was costing \$20 million per year, actually had no impact on turnover, freeing the company to scrap the plan in favor of more effective strategies.

The shift: Each employee is different. By figuring out which ones are most likely to leave, operators will be able to intervene proactively instead of waiting until high-potential employees hand in their notice.

UNLOCKING THE VALUE

By Pallav Jain, Gloria Macias-Lizaso, and Guido Frisiani of McKinsey & Company



Although the technology is now in place to take full advantage of big data, many organizations that try to do so will continue to struggle. To become the network operator of the near future, companies will need to approach data challenges in a new, more strategic way, acquire new kinds of talent, and spread analytics thinking deep within the organization.

Transforming the organization by making advanced analytics part of the culture requires a process. Here are six steps that can help organizations get started.

- 1) **Start with the right question.** Identify challenges that can be addressed with advanced analytics and rank them in order of priority. Calculate the size of the opportunity for each.
- 2) **Use the data on hand.** The data doesn't have to be structured or complete—in fact, most companies can do much more with the data they already have. In this case, quality is less important than relevance.
- 3) **Build an algorithm.** Build an algorithm, adapt one from the academic community, or combine several that can answer the question identified in step 1. Then test to make sure the results are statistically significant and reliable.
- 4) **Develop a technology strategy.** Companies will need tools for data storage and analysis. Resist the urge to outsource as technology changes quickly. It's better to remain technology agnostic and keep essential functions within the enterprise.
- 5) **Reorganize for analytics.** Decide which new skills and new roles are needed, both at the enterprise level and at the business unit level. Work out reporting structures between the analytics team and the CIO and the CEO. Decide which capabilities require outside partners.
- 6) **Embed the change.** Create an efficient, replicable process to ensure timely delivery of analytics insights. Include a feedback loop to make sure the insights result in action. Be clear about which functions occur at the business unit level and which belong at the central hub level. Understand and address cultural issues that may be blocking progress.

ASK THE RIGHT QUESTIONS

Getting the greatest value from the investment in analytics requires a renewed focus on strategy. Rather than starting with the data and studying it for potential insights, companies should start by identifying knowledge gaps or challenges in their organization and calculating the value of addressing them. They need to be extremely clear and extremely precise in formulating the right question to address. Take the issue of customer churn. Simply asking “Which of my customers are likely to drop my service?” is not good enough, for example, if the network operator requires customers to give notice several billing cycles in advance. In that case the right question is “Which of my customers is likely to drop my service *in the next three months?*” They should also figure out how much

value they could realize if they were able to persuade those customers to stay. That's a completely new prediction model, designed to give the network operator time to intervene and retain the customer.

Once the question is formulated, the company must identify the best data on hand for filling the knowledge gap. The organization can then invest in an algorithm that sifts through the data for predictive patterns that shed light on the question. Many organizations that are convinced that the poor quality of their data is preventing them from realizing full value are simply asking the wrong questions.

For one network operator the question was "How can I increase the effectiveness of my call center and other upselling initiatives?" The answer was to create an algorithm similar to that used by Amazon, the company that pioneered the use of computer-generated recommendations. The algorithm is based on the insight that similar customers buy similar products. After clustering like customers together, the engine sorts products by those most frequently bought by similar clients; rarely bought by similar clients; frequently bought by different clients; and rarely bought by different clients.

That segmentation enabled the company to focus efforts primarily on the first group of products, somewhat on the second and third groups, and rarely on the fourth group. The algorithm considers extremely granular data and can reflect larger commercial trends. It uses that data to automatically generate specific product leads and below-the-line campaigns at the customer level, not just the segment level. The result was a 30 to 100 percent higher conversion rate on outbound text messages and a 50 to 100 percent higher conversion rate on outbound phone calls.

USE THE DATA ON HAND AND BUILD AN ALGORITHM

Many companies assume the best route to advanced analytics is to first upgrade from small data to big data while continuing to use their traditional algorithms, in the mistaken belief that the move to advanced algorithms should only happen once they perfect the data. In fact, companies are better off going to a small data, advanced algorithm model. This is because data is dynamic, not static. There is always more pouring in, and much of it will be messy. Pursuing perfect data can become an end in itself—and an obstacle to gaining insight.

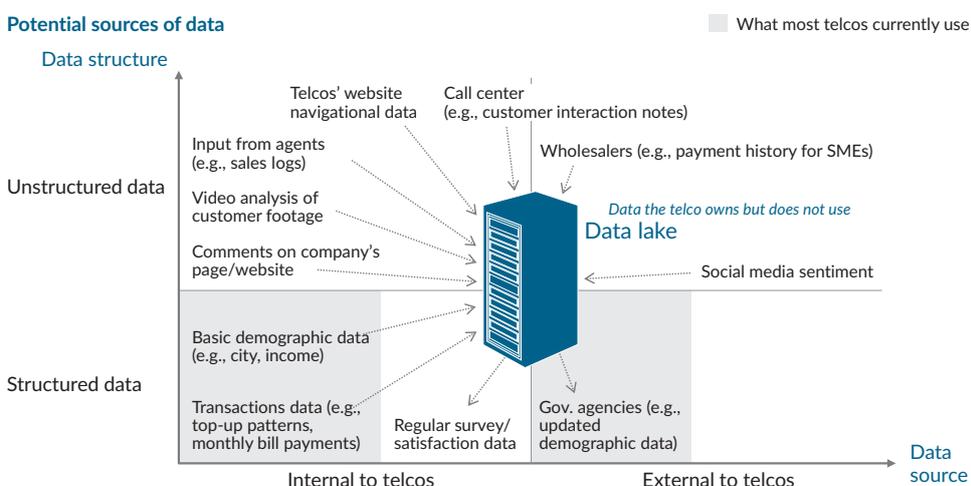
Instead of getting hung up on the data, companies should focus on generating the greatest value possible. Most will find that they can make faster progress by using whatever data is readily accessible, and investing in the best possible algorithm with which to analyze it. This will enable them to gain experience and prove the concept. Along with internally generated data, there are numerous external sources, such as government tax records and demographic data, payment data from wholesalers and utilities, and social media sentiment (Exhibit 6). Advanced analytics is the enabler of value. Without it, the best data is of only limited use. With it, even imperfect data can yield important insights.

DEVELOP A TECHNOLOGY STRATEGY

Once the concept has been proved and the organization is ready to move to the next level, it will need to take an inventory of new technology requirements. For example, it may need new tools for gathering data as well as data storage and analysis. It may also need new tools for actually pushing the insights through the organization to the front line. Understanding these requirements is critical to architecting, building, and adapting technology platforms to support the advanced analytics effort.

Data lake technologies enable type-agnostic, virtually limitless data storage

EXHIBIT 6



SOURCE: Client interviews, expert interviews, McKinsey & Company

REORGANIZE FOR ANALYTICS AND EMBED THE CHANGE

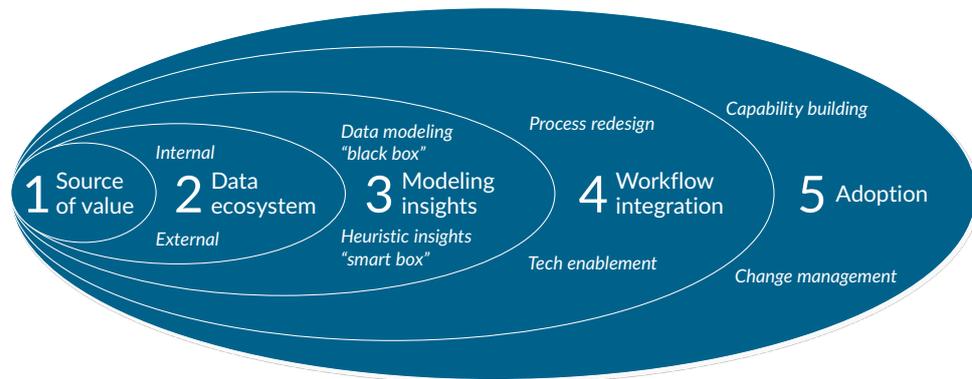
Even network operators that have assembled the right tools and technology and identified high-value challenges will fail to realize the full potential of advanced analytics without making some fundamental shifts in their culture and organizational structure. They need to overcome entrenched organizational barriers that might be hard to see, but which could doom the analytics effort. For example, the shift to making decisions based on computer-generated insights will inevitably redistribute power within the organization and will therefore be perceived as a threat by some. Functions that stand to gain in efficiency—for example, network maintenance or the field force—could fear having their budgets cut or headcount reduced. Account managers may fear losing their jobs to an algorithm. Marketers may genuinely believe that their years of experience and gut instinct are superior to a computer readout. Others may believe that computer analysis belongs in the IT department and may withhold data or refuse to engage.

Overcoming this organizational resistance requires commitment from the C suite. Senior leaders need to describe a bold vision for how analytics will unlock an end-to-end transformation of their company (Exhibit 7). The top officers must be engaged

both in formulating the problems to be solved and in applying the insights. In addition, it's critical that advanced analytics not be siloed within the IT department. It must be embedded throughout the organization, becoming a competitive advantage. To make sure this happens, the analytics effort must be supported with an efficient, replicable process for delivering insights as well as a process for ensuring that they are acted on and value is realized. As the potential of advanced analytics becomes more widely understood, it will become a part of the culture and the processes will be self-reinforcing.

EXHIBIT 7

Analytics is part of an end-to-end vision



SOURCE: McKinsey & Company

As the culture of analytics thinking takes hold in the organization, new functions will arise to take full advantage of the opportunities. Indeed, McKinsey's Digital Quotient research—covering hundreds of companies worldwide—shows that companies with collaborative cultures that encourage experimentation are likely to outperform their peers by a wide margin.

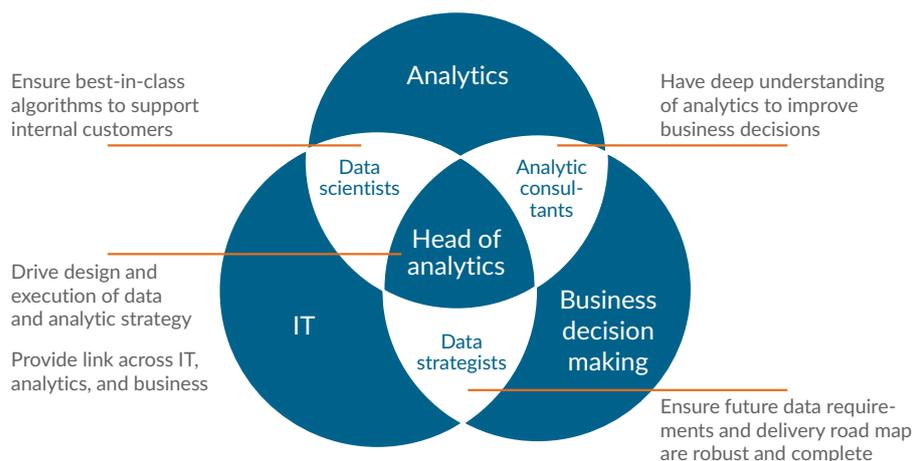
Reorganizing to ensure a robust data capability is essential. Most organizations today have only a limited governance structure for big data and analytics. The capabilities are fragmented and uncoordinated across various business units. Data is shared inconsistently and the analytics strategy becomes part of the CIO's job.

A few best-in-class companies, however, have moved to a hub-and-spoke structure. In the hub, a chief data analytics officer, who reports to the CEO, manages a small, agile and innovative enterprise data and analytics team. The hub is responsible for data governance, key strategic analytical issues, providing support to the business units, and managing the company's databases and strategic analytics. At the same time, each line of business has its own small analytics team to provide support to the unit's decision makers. These spokes collaborate with the hub, communicate the unit's support needs, and work on data mining and reporting but are not involved in actually developing the algorithms. In this model, IT's role is to provide tools and infrastructure to enable both the hub and the spoke activities.

Some organizations may find they need to add “translators” at the hub level who can act as liaisons between the business units and the data specialists in the hub who are building the algorithm (Exhibit 8). The translators will ensure, on the one hand, that the data specialists understand the problem to be solved and, on the other, that the patterns and insights they generate are taken back to the business unit and acted on.

“Translators” facilitate full analytics integration by bridging different functional areas

EXHIBIT 8



SOURCE: McKinsey & Company

The role of the translator is particularly critical in the final prescription stage. It is the translator who ensures that the business unit actually acts on the new insights and captures the full value. For example, when a network operator was concerned about its ability to retain customers in its retail business, it built an algorithm to comb the data for patterns. It identified one group of at-risk customers who changed their viewing patterns to heavier consumption of video on demand. Translators made sure the business unit studied the patterns to develop and test hypotheses for what was driving the customer behavior. The company discovered a microgroup of users, whose family situations had changed and who no longer qualified for their past plans. Rather than let this segment opt out or slide into default, the company used the new insights to proactively offer these customers new plans that better fit their circumstances. Other microsegments likely to churn were also detected and a strategy for intervening was developed.

LEADING THE ANALYTICS TRANSFORMATION

By Nada Usina, James Roome, and Diana Horn of Russell Reynolds Associates



Organizations can create structure, invest in technology, and have meaningful data-driven goals—and still fail to achieve meaningful change. When that happens, it is usually because they lack the final and perhaps most essential ingredient: a strong leader willing to disrupt timeworn structures and processes. Complicating the matter even more, the mix of skills required in the leader changes over the course of a digital transformation, including the transformation to an analytics-enabled organization. Russell Reynolds has found that such transformations tend to follow a process that closely resembles the four steps of human cognitive development.

In the first stage, called **sensorimotor**, the organization simply responds piecemeal whenever an individual manager sees a need for data-driven decisions. The data is scoped out and mined by individuals who detect an opportunity. The process is organic, unmanaged, episodic, and largely unstructured. These early experiments with analytics are usually led by “data intrapreneurs” or individuals who see the potential of analytics, are influential with their peers, and are comfortable enough with ambiguity to give the new technology a try.

In the second or **preoperational** stage, there is now company-wide recognition of the value of analytics but it has not become a part of the culture. Instead, whatever capabilities exist are sequestered away in the company’s data center. At this stage, the efforts are led by analytical data scientists who are charged with improving the usability of data. It is a period of experimenting with both the data processes and its application to business challenges. The most important task at this stage is to address the relevance and usability of data. This stage requires a scientifically minded leader who can pose the right questions. The leader must help guide less experienced colleagues while managing the tension between creativity and commercial risk.

Once the basic issues of data acquisition and warehousing are resolved, the analytics capability becomes **concrete operational**. Analytics is still governed from the center, but now individual business units are making their own data-driven decisions. The organization is capable of better and faster innovation and has begun to recognize and institutionalize best practices. At this point, the ideal leader is someone who both recognizes the value of a systematized approach and is able to persuade the organization to embrace the full potential of advanced analytics. This leader must be collaborative and able to delegate. He or she must be both a theoretical thinker and someone inclined to evangelize the power of analytics.

As the organization matures in its understanding and use of analytics, it enters the **formal operational** stage. The belief in the value of analytics is widespread throughout the organization and each business unit feels empowered to make its own decisions. Analytics has become fundamental to their strategy and decision making. There is a high level of data fluency and, as a result, a high level of experimentation throughout the organization. The need now is for a systems leader, someone who can see the bigger picture and is able to bring organization and rigor to the various analytics initiatives taking place in order to maximize the efficiency and quality of those efforts. This leader spreads the learning throughout, and further spurs innovation that will drive value for the organization.

DECODING THE TRANSLATOR

In discussions with senior leaders, Russell Reynolds built up a profile of the skills and experience organizations in the midst of transformation most need in a translator.

Translator roles speak two languages. They are able to speak with the business, in commercial terms to understand the needs and articulate the benefits. Their other language is with the data-literate community, able to take what are often high-level and poorly quantified needs and iteratively create the value and the insight the business is craving. What emerges is a picture of someone with a depth of experience and the hard and soft skills to overcome the two biggest hurdles holding back organizations today: organizational resistance, closely followed by inadequate technologies.

Given the deep complexities of harnessing data, this translator needs to be the bridge between commercial decision making at the highest level and the technology and data fabric and infrastructure that enables insight. Senior executives see the following attributes as key:

Curiosity. When organizations can harness the data they have, they are often faced with truths that are confusing or counter to the experience of the executives within the functions. The skill is to ask more questions and translate data into insights. The translator is the person who explores the data within the organization to deliver insight, and will trust that insight, rather than finding data that supports specific scenarios.

Comfortable with intellectual confrontation. Data within organizations brings both a version of the truth and conflict. Occasionally, organizations are presented with data that may not fully support assumptions about the current business model or product. The role of the translator is to use this data with teams and functions to ask hard questions about the data, and to consider the need for more data to better test conclusions. Ultimately, the translator must advocate for changes to test the validity of the data. This can be counter to both culture and current leadership.

Self-regeneration. Individuals who are able to articulate the value of data and analytics at a senior level will have had experience in leadership previously. They bring a core leadership skill set that is deemed “table stakes” in roles like this. They are able to influence people across the organization. They are comfortable with ambiguity and able to navigate a path through it. They can galvanize teams without the need for direct control. We see this as a core skill set for this new leader in data and analytics.

Calculated risk taking. The risk of doing nothing is greater than the risk of putting faith in a new approach. The translators need to be able to lead and communicate the potential benefits of change, even when they are not fully confident of the outcomes. They must equally be tolerant of failure—but only when the organization learns from the experience. They see a big difference between failure and failure to learn.

As organizations shift to take advantage of analytics to drive their business, they need to recognize both the journey their organization design will go on and the skills needed of the genuine translator. It is this combination of conscious decisions around structure and power within the organization, and finding the right leader to translate and ultimately transform.

THE PLATFORM IS ALREADY BURNING

By Pallav Jain, Gloria Macias-Lizaso, and Guido Frisiani of McKinsey & Company

The telecom industry is in the very early stages of the advanced analytics revolution. Unfortunately, much of the digital world is way ahead. Players from other industries are making inroads that could severely compromise the competitive position of network operators, rendering them little more than back-end suppliers of commodity connectivity. The biggest names in digital are rapidly building their own deep relationships with telecom customers. Customers are already or soon will be buying connectivity for their tablets or phones through the name brand companies that are selling them a new generation of devices. Other digital players are working on new kinds of services that will route calls through whichever network operator can provide the best service at that moment. Customers will have little reason to care which network operator is actually providing connectivity in any of these scenarios. If these services and relationships become firmly established, the companies that actually provide the networks will become little more than back offices, losing customers and revenue to more nimble competitors.

Network operators that are able to make the leap to a more digital, analytics-driven business model will be in a better position to retain their customer relationships and their current stature. Making that leap, however, will require new ways of thinking, new kinds of leadership, and deep cultural change. It is with these issues that many companies struggle. In a recent McKinsey survey, covering some of the world's leading network operators and technology companies, 90 percent of respondents said they had some form of centralized advanced-analytics capability in place—but only a quarter of respondents reported an increase in revenues, a decrease in costs, or other impact as a result of this analytics activity, suggesting that analytics thinking had failed to take root at a cultural level.

Advanced analytics offers the promise of a deep new understanding of customer behavior as well as rapid insights on networks and procedures of all sorts that once would have required prohibitive levels of human labor to achieve. The challenge in fully realizing that promise is no longer primarily technological; it is cultural and behavioral. The network operators of the near future that succeed will be those that can adapt their organizations in order to generate and act on these newly attainable insights.

ABOUT RUSSELL REYNOLDS ASSOCIATES AND MCKINSEY ANALYTICS

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