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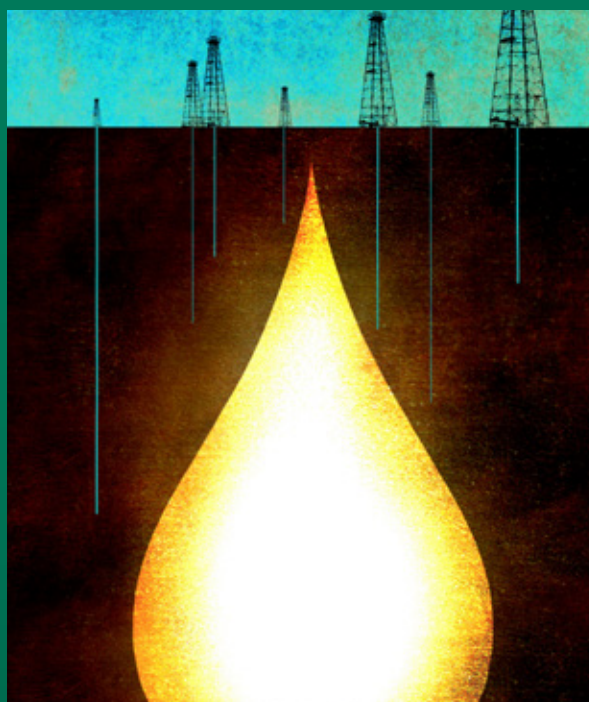
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Drilling for Digital Gold

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DRILLING FOR DIGITAL GOLD

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PREFACE

BIG DATA AND ANALYTICS isn't just a hot area but an increasingly lucrative one. Many companies (think Google and Amazon) use it to drive their business models—and their success. So it seems reasonable to assume that telecom operators, too, are reaping the rewards. Telcos, after all, are sitting on a mother lode of subscriber data—especially location and usage data—that is hard to find elsewhere. So monetization should flow quickly and abundantly. But that's not what's happening.

Why not? It's just the type of question that TeBIT, a benchmarking study jointly developed by ETIS–The Community for Telecom Professionals and The Boston Consulting Group, was created to answer. Last year, TeBIT took a close look at telcos' digital initiatives and found that the huge investments operators were making seemed to be paying off. This year, we took a deep dive into big data and analytics, and our findings were, unexpectedly, quite different. While telcos are making significant investments and building new and often sophisticated capabilities, they are not generating substantial revenues. Indeed, the most successful TeBIT participant still saw less than .05% of its revenues generated by big data and analytics initiatives.

This report helps telcos understand why that may be the case and what they can do about it. It does this the "TeBIT way"—by looking at the spending, performance, and processes of telco IT units in order to better understand the challenges participants face and the levers for tackling them.

TeBIT 2016 finds, for instance, that telcos take privacy and security seriously and that they seem hesitant about collecting and monetizing certain types of information, such as data from social networks. The way forward, then, is to find business models that create value from this data in a manner that complies with privacy standards—and with customers' expectations regarding the use of their personal information.

Such insights are possible for one reason: TeBIT participants have a tradition of sharing data and allowing themselves to be compared with other operators. While this executive report is publicly available, participating telcos can access the full set of benchmark results, along with further trend analysis. They can also discuss their individual results with the TeBIT benchmarking team.

Telco IT units have proven remarkably resilient in the wake of continuing market challenges. But they need to be resourceful in the

wake of opportunities. Big data and analytics represent—perhaps literally—a golden opportunity. It's time to seize it.

Wim De Meyer
ETIS Managing Director

Frank Felden
BCG Senior Partner and Managing Director

EXECUTIVE SUMMARY

WITH BIG DATA AND analytics, telecom operators would seem to have hit on just what they need most: a promising new revenue stream. Telcos possess unique and potentially valuable location and usage data, seemingly setting the stage for lucrative business models. But this year's telco IT benchmarking study (TeBIT)—a survey of European operators' IT spending and performance that was completed in August 2016—reveals that operators have not yet struck gold. While they have been investing in big data capabilities and have deployed sophisticated analytics, monetization has been limited. Why? The survey suggests that telcos may be too conservative when deciding what information to collect and how to use the data they do capture. It doesn't have to be that way.

As a group, TeBIT participants have developed advanced analytics and collect an array of data. Yet they have been hesitant to capture certain types of information that could potentially be valuable. Privacy is a concern, but at the same time, telcos have not fully developed the organizational structures that a successful data and analytics business requires.

- Overall, participating telcos collect 57% of the data types the TeBIT survey asked about. But the breakdown is telling. While many telcos collect location and usage data—often as a byproduct of running their networks—they are far less likely to capture financial data or information from social networks.

- The vast majority of participants—89%—have established privacy policies that they share with customers on their websites. Yet few have created a dedicated data governance body. And just a third have a centralized data and analytics leadership team.

For all the investment telcos have made in developing analytics and a data business infrastructure, they haven't actually seen much revenue. Business models are varied and telcos have yet to identify the optimal approach to monetization. Success will re-

quire greater collaboration between the business side and IT—and the maintenance of consumers' trust.

- In fact, in no case did a TeBIT participant see big data and analytics account for even .05% of its total revenues. While telcos justifiably want to avoid the privacy controversies that have dogged some of the more aggressive internet players, particularly in Europe, a reasonable target for monetization is on the order of 6% to 10% of revenues.

- So far, big data business models have fallen into three main categories. About half of all revenue comes from the sale of data insights directly to third parties; another 34% stems from joint business models with partners; and 17% comes from the sale of geospatial data. While a winning approach has yet to emerge, the greatest potential seems to be the sale of consumer behavior data, provided telcos can do it in a way that meets their subscribers' expectations and approval regarding privacy.

IT spending increased in mature markets, driven largely by a rise in capital expenditures. But the investment focus in 2015 was broader than in recent years, and the highest shares of IT capex went to infrastructure and network-related projects. This suggests that revenue-creating initiatives in digital and big data are competing for funding with previously delayed replacement projects.

- For mature-market participants, revenues declined by an average of 3.2% (after accounting for fluctuations in exchange rates). Yet IT capex increased by 17.4%.

- Participants in emerging markets saw a different pattern, with revenues rising 1.9% on average but IT capex declining by 4.5%.

Telcos continue to employ outsourcing selectively, using it where it matters most—often for reasons other than savings. Indeed, as telcos build a data and analytics business, they may want to consider outsourcing to acquire the necessary skills. It could be faster and more efficient than developing capabilities internally.

- On average, 12.9% of participants' IT spending in 2015 went to outsourcing, down from 15% in 2014 and 26% in 2013.

- While cost reduction remains the number-one reason for outsourcing processes, other criteria are also important, including acquiring new skills and improving time to market.

- In every major process area, from fulfillment to billing, a handful of commercial-off-the-shelf software vendors dominated—reflecting the consolidation seen in the overall business support systems market.

IT operating models are increasing in complexity—little surprise as initiatives in digital and big data require new technologies and

processes. But telcos appear to be managing the added load well, a good sign as they pursue new revenue streams.

- Participants scored an average of 42 on TeBIT's complexity index, an increase over last year's score of 36.

- While overall IT spending increased by 5.4%, the rise was driven by IT investments, not operating expenses. In mature markets, IT opex rose just 0.1%, and in emerging markets, it dropped by an average of 8.2%. As IT complexity rises, telcos seem to be on top of the situation.

SITTING ON—BUT NOT SEIZING—A DATA GOLD MINE

IN THE OIL BUSINESS, striking it rich has always been a two-step process. First you have to find the oil. Then you need to get it out of the ground. For telcos, realizing the potential of big data and analytics—and getting new revenues to flow—is likewise a two-part process. And operators are only halfway there. This year's telco IT benchmarking study found participants preparing their drill sites: capturing data; developing different, and often sophisticated, types of analytics; making investments in the requisite software, hardware, and skills. But no one is shouting "Eureka!" just yet.

Revenues from big data and analytics are not enough to cover the running costs.

It's a bit of an odd situation, and perhaps even a frustrating one. As telcos continue to face challenging market conditions, they need new revenue streams. To this end, big data would seem to be particularly promising. Telcos, after all, possess unique information—like location and usage data—that can help other businesses target advertising, leverage footfall patterns in stores, and directly offer products to those most likely to want them. Telcos are utilizing this data, and the analyt-ics they have developed, to improve their own marketing efforts and customer experi-ence. But external monetization, at least so far, is largely elusive. For the majority of par-ticipants, revenues from big data and analyt-ics are not enough to cover even the running costs.

What's going on? A number of things—all of them challenges that telcos must address and overcome before they can truly tap into big data's potentially huge reservoir of digital gold. For one thing, telcos have yet to identify the optimal path to monetization, with data-and-analytics revenues coming from a host of business models and no silver bullet, or even a dominant approach, yet to emerge. Privacy concerns, particularly acute in Europe, are another issue. Telcos often do not use the data they have, or even collect it in the first place, because of uncertainty about how cus-tomers and regulators will respond. Brand awareness has also proved challenging. "Tel-cos are not perceived as outstanding players in this market," says Miguel Angel Diez Rincón, chief of monetization and projects at Telefónica. "Maybe that's because our strength isn't in the hardware or the analytics but in specific types of data." (See the sidebar "Better Business Through Analytics.")

Last year, we saw telcos in a similar situation. They were pursuing digital initiatives and just starting to see a payoff. Indeed, we found that

BETTER BUSINESS THROUGH ANALYTICS:
AN INTERVIEW WITH MIGUEL ANGEL DIEZ RINCÓN
OF TELEFÓNICA

"Telcos need to make some noise in the market, to get the word out that we have unique and valuable data."

For some telcos, the benefits of big data begin at home. While the long-term goal may be external monetization (and plenty of it), markets and methods have yet to be fully developed. In the meantime, advanced analytics are already paying dividends by helping telcos optimize their own business. Telefónica's chief of monetization and projects, Miguel Angel Diez Rincón, discusses the focus and payoff of this inward-looking approach to big data.

With telcos continuing to face a challenging environment—marked by ARPU decline and strong competition—how is Telefónica reacting? And how can IT best contribute?

The starting point is to have the best possible next-generation networks available for our customers. Accordingly, we have been making a lot of big investments in FTTH and 4G technologies. On top of these networks, we can build great services, such as 300 MB broadband and IPTV, and offer them at very competitive prices. It is a strategy that may seem relatively straightforward: give customers great products and great value, and win their loyalty. But it doesn't work without great IT, which supports all of these churn-reducing services and makes sure they are running correctly for our customers.

Speaking of investments, the TeBIT data shows that Telefónica has increased its IT spending, and that this increase has been driven largely by IT capex. What has been the rationale behind the boost in spending?

One reason we're spending is to make our IT systems simpler and more agile. Right now, we have hundreds of different systems and that makes the go-to-market very hard. Reducing complexity makes a lot of sense, but it also requires a large investment in IT. So we are making that investment, via an initiative called Telco 3.0.

Are there any other areas where Telefónica is focusing or prioritizing investment?

With respect to IT, we are also investing in security and in big data facilities—not only in hardware but also in building in-house services like a TV recommender. We are spending money as well in the transformation of processes. Beyond IT, the main focus of investment is always the networks.

According to this year's TeBIT, you're not alone in embracing big data. A number of telcos are looking at it as a way to compensate for ARPU and revenue loss. How does Telefónica view the role—and the potential—of big data?

Right now, the main thrust of our big data strategy is internal. Specifically, we see data analytics as a way to increase the effectiveness of our marketing campaigns. This is important, because if you can make your campaigns more effective, you can increase your ARPU, decrease your churn, and grow your market share. We also see big data as a way to reduce network failures and to optimize the handset stocks in our stores. Of course, we want to tap into new income sources, as well. But for now, we are focusing mainly on trying to optimize our core business.

While telcos posses some unique—and potentially highly valuable—data, they don't tend to be the first companies that come to mind when one thinks about big data. Do you struggle with brand awareness?

Yes, and I think it is something with which the industry in general struggles. You're right that telcos are not perceived as outstanding players in this market. Maybe that's because our strength isn't in the hardware or the analytics but in specific types of data, like location data. This is data that can be very useful to third parties that don't currently have it, but we need to make some noise in the market, to get the word out that we are special, that we have this unique and valuable data—data that companies can use to do things and get levels of performance that have traditionally not been possible for them.

Where do you see the most promising opportunities for monetizing the unique data—like location data—that telcos possess?

We believe that big data makes marketing more effective, and while our focus right now is internal, we realize that the data we capture can also be valuable to third parties, especially when provided in real time. It lets them better reach customers—and potential customers—by knowing where they are and what they are doing, insights that can be generated via location data, weblogs, and other sources unique to telcos. But we think that in Spain at least, the market is not yet mature. So we are taking our first steps but we are not obsessed with trying to monetize data externally. That said, we think that the work we are doing internally lets us build success cases that can show other companies how we can help them.

In most countries, privacy is a huge topic when it comes to big data. How do you deal with customer concerns?

Our philosophy is that the data does not belong to Telefónica, that it is the customers who own it. So they have to know clearly why we want to use the data, and if they don't want us to use it, they can say they don't want us to use it. That means we have to be transparent. Furthermore, when we work with third-party companies, we only use anonymized data—always. And of course, we are always working with our legal department to ensure that everything we do—and every way in which we do it—is compliant with the relevant regulations and policies.

operators that deployed the widest array of efforts suffered the smallest revenue declines—a welcome development. But telcos were embracing digital without a focused, long-term strategy; their efforts were all over the map, which may have been dampening returns.

Data and analytics can also bring telcos good news in a challenging market. But it is critical that operators not only discover new revenue streams but also get as much oil out of the ground as possible. This means zeroing in on the most promising business models, captur-

ing the relevant data, and *using* that data in ways that allay privacy concerns but also get the word out that telcos can be key players in big data and analytics. No easy task, to be sure. But telcos have proven themselves to be adaptable and resourceful in a tough environment. Now is the time to unleash those traits once again.

BIG DATA
CAPABILITIES AND CONCERNS

THIS YEAR'S SURVEY FOUND TeBIT participants laying the groundwork for initiatives in big data and analytics and making significant progress. More than a third of their deployed analytics are highly sophisticated. (See Exhibit 1.) That is especially noteworthy given the dearth of commercial-off-the-shelf software for big data. (See the sidebar "From Business Intelligence to Big Data.") Yet there is still more that

telcos could do to set the stage for successful business models.

For one thing, there is the data itself. Already, telcos are collecting and storing a significant amount of information. Yet we found that they are treading lightly when it comes to certain kinds of data. As part of the survey, we provided each participant with a list of 26 different data types spanning such categories

EXHIBIT 1 | Telcos Already Deploy Many Highly Sophisticated Analytics

ANALYTICS MATURITY LEVELS

5 Geographic and social analytics
• Location-based insights and marketing offers; social network analytics

4 Market segmentation
• Marketing metrics (campaign tracking, attribution modeling); segmentation for campaign management

3 Predictive analysis
• Predictive modeling; predictive analytics; churn prediction

2 Enhanced reporting and compliance
• Behavioral metrics; optimization analytics; faults impact analysis; fraud detection

1 Customer analysis
• Basic metrics (visits, page views, demographics); behavioral analytics; churn statistics

DISTRIBUTION OF DEPLOYED ANALYTICS

Level	%
5	16
4	18
3	15
2	28
1	24

(scale: 0, 10, 20, 30 %)
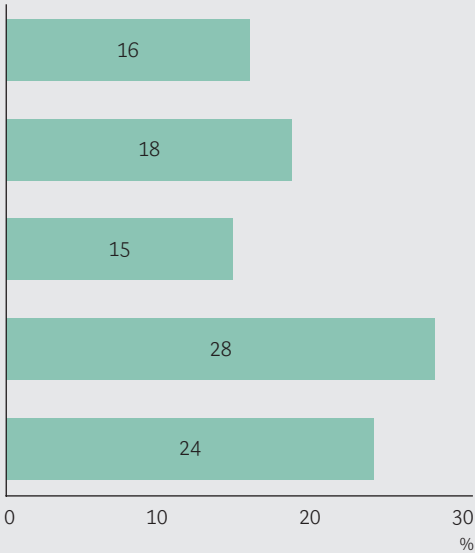
Sources: TeBIT 2016; BCG analysis.
Note: Percentages do not add up to 100 because of rounding.

FROM BUSINESS INTELLIGENCE TO BIG DATA

Business intelligence software has been around, in one form or another, for the past half century. But the rise of big data—sparked by new ways of capturing, storing, and analyzing information—has dramatically broadened its application. And its power. An entirely different level of insight is now possible. But the processes are different, too, and many vendors and users have yet to embrace them .

With traditional business intelligence solutions, the problem to be addressed is defined at the start. There is always a specific reason for extracting the data. A telco might want to know, for instance, what products a customer has bought in the past. The data itself is stored in a database with fixed schema. In other words, there is a specific structure to the data; the database, in effect, "knows" what it is storing (names, addresses, telephone numbers, product names, and so on). The system is rigid: data has to be structured ahead of time to fit the schema, and data that is not so structured cannot be used.

Traditional solutions also have high up-front costs, because they typically require proprietary platforms or high-powered servers and dedicated storage. Changing the structure is costly and time consuming. But at the same time, these systems have the advantage of being relatively easy to use. Once implemented, they require little in the way of special skills.

Big data solutions can work with both structured and unstructured data, which opens the door to working with a host of data types: data from sensors and social media platforms, user-generated content

like video and images, e-mail and GPS data—the list goes on. Just as important, since it is no longer necessary for information to be prepared or "shaped" in a predefined way, data can be stored as is. This greatly increases speed and flexibility while dramatically reducing costs. Infrastructure investments are relatively low, too, since these solutions can utilize commodity hardware and open-source software. It's not all upside, however. To make optimal use of big data solutions, many different—and not always easily found—skills will be required.

But perhaps the biggest differentiator between big data solutions and traditional business intelligence is what can be learned from the data. With big data solutions, users don't need to start with a specific problem in mind. Instead, they can look for patterns in the data and then determine what those patterns mean. For example, a telco can now look for patterns in customers' purchasing history—patterns that suggest their interests and the kinds of products that might resonate with them. These insights could lead to tailored offers and advertising.

Pattern search and machine learning are not new capabilities. But by applying them to vast arrays of data, almost in real time, big data solutions turbocharge and even revolutionize them. That's powerful stuff and its promise is already being realized. Instead of seeing what happened in the past, one can now see what is likely in the future—and what to do about it.

as basic customer data, location and usage data, online behavior, financial data, and "social environment" information (which includes data from social networking sites, among other things). Overall, telcos are collecting 57% of these data types. But the distribution isn't equal among categories. (See Exhibit 2.)

Location and usage data, for example, is widely collected—not surprising, since this information is for the most part a byproduct

EXHIBIT 2 | Some Types of Data Are Not Widely Collected

Data category	Data gathered from customer transactions / use of a product	Data developed from research and other sources	Data not collected	Description
Basic customer data	82.2	6.7	11.1	Name; age; gender; zip code; e-mail address; date of birth
Location/usage data	77.8	11.1	11.1	User's current location; list of dialed phone numbers
Customer satisfaction/ channel preference	28.8	26.9	44.2	Satisfaction with products; brand preferences; interests
Online behavior	5.2 / 39.7	6.9	48.3	Surfing history; products viewed online; products purchased online
Financial data	19.2	19.2	61.5	Bank account information; credit card data; tax filing information
Social environment information	11.5	23.1	65.4	Social network information; data about spouse and children

Legend:
- Data gathered from customer transactions
- Data gathered from use of a product
- Data developed from research and other sources
- Data not collected

Sources: TeBIT 2016; BCG analysis.
Note: Because of rounding, not all percentages add up to 100.

of running a fixed or mobile network. By contrast, financial data and social environment information, which tend to have a high potential for revenue generation, are far less likely to be captured.

Why the hesitancy? Privacy concerns—or more accurately, concerns about how customers will respond to the collection and use of data—seem to be the explanation. To be sure, telcos take the matter seriously: 89% of participants have established privacy policies that they share with customers on their websites (and, less often, via direct communications). But at the same time, participants believe that just 55% of their customers, on average, are aware of the privacy policy and that less than half—49%—are aware of how data is used. This suggests that there remains considerable uncertainty about which data to collect and what to do with it.
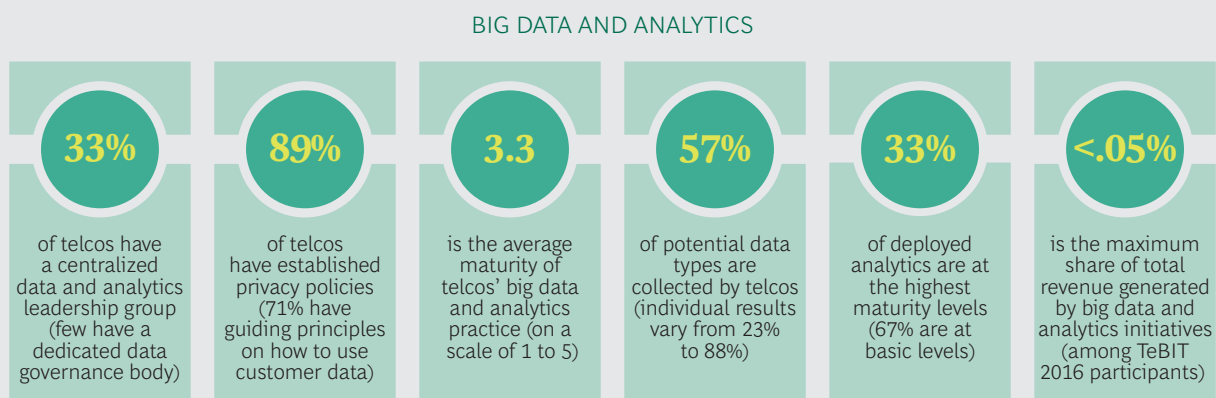
For some data categories, particularly online behavior (sites visited, products viewed and purchased, and so on), telcos seem to be staking out a middle ground, capturing roughly half the data types we asked about. While this may be the "safe" move, it may hinder telcos from realizing the full potential of big data and analytics business models. The collection of more data—specifically,

more *valuable* data—doesn't have to be avoided. But telcos need to do more to ensure, and to spread the word, that their practices meet all standards and expectations on privacy.

It is also worth noting that we saw great variation among participants regarding data collection. Individually, they are capturing between 23% and 88% of the data types. While this gap can be explained in part by regulations and legislation that differ somewhat among countries in the European Union, telcos clearly have very different views on what they should collect.

Another area for improvement: the organizational structures for a thriving big data and analytics business. Only a few participants have a dedicated data governance body (in most cases, telcos leave oversight to their legal and compliance departments). And just a third have a centralized data and analytics leadership team, with responsibility for coordinating projects. (See Exhibit 3.) Creating mechanisms for easy and effective partnering is another item for the to-do list, as these could help spur and carry out promising business models. Telcos are building their capabilities in big data and analytics. Now they have to build their teams.

EXHIBIT 3 | There Is Room For Improvement When It Comes to Big Data and Analytics Initiatives

BIG DATA AND ANALYTICS

33%

of telcos have a centralized data and analytics leadership group (few have a dedicated data governance body)

89%

of telcos have established privacy policies (71% have guiding principles on how to use customer data)

3.3

is the average maturity of telcos' big data and analytics practice (on a scale of 1 to 5)

57%

of potential data types are collected by telcos (individual results vary from 23% to 88%)

33%

of deployed analytics are at the highest maturity levels (67% are at basic levels)

<.05%

is the maximum share of total revenue generated by big data and analytics initiatives (among TeBIT 2016 participants)

Sources: TeBIT 2016; BCG analysis.

KICK IT UP A GEAR
DATA MONETIZATION NEEDS MORE MOMENTUM

ALREADY, TELCOS POSSESS THE raw materials for realizing revenues via big data and analytics. They capture unique data like location information. They have developed sophisticated analytics. So it might come as more than a small surprise that monetization has been limited and far less than it could be.

In fact, in no case did a TeBIT participant see big data and analytics account for even .05% of total revenues. To put that in perspective, many internet players can trace 60% to 70% of their revenues to the monetization of customer data. Of course, that's not a figure likely to be seen, or even aimed for, at telcos, where there is a strong desire to avoid the controversy that some of those internet companies have stirred up with their data practices, particularly in Europe. As the TeBIT data reveals, participants as a group remain very cautious when deciding what data to collect. But surely telcos could tap more of big data's potential while still meeting high standards on privacy. Our analysis suggests that a reasonable target for monetization is on the order of 6% to 10% of revenues.
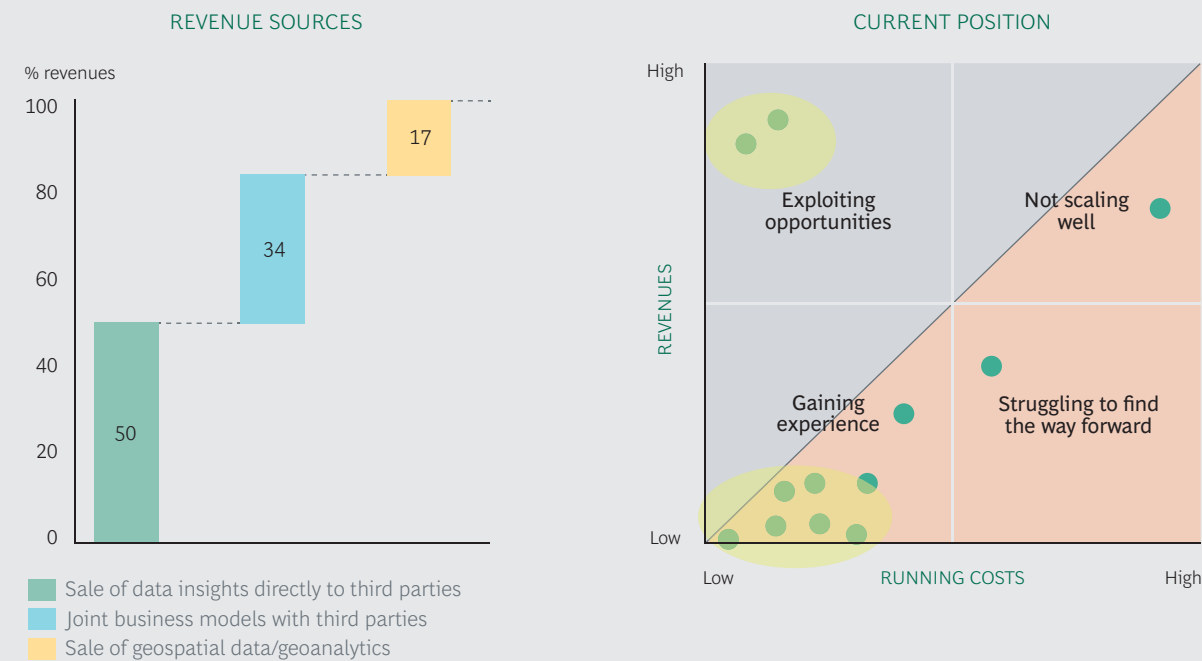
So how do telcos get there? The TeBIT survey suggests that participants are taking a "build it big first" approach to creating their data and analytics infrastructure: investing in a full-blown platform and realizing value only once that is complete, perhaps several years down the road. But maybe a more successful approach would be to invest only to the extent needed for initial monetization and then use that revenue to self-fund further initiatives. While there is little evidence that this alternative route works better, that may be because telcos aren't taking it. Perhaps it is an option to consider.

Then there is the matter of identifying and pursuing the most promising business models. Here telcos are clearly in the early stages. To date, much of participants' data and analytics activities have been internal: utilizing data, for instance, to optimize their own marketing campaigns and customer service.

External monetization initiatives have been more tentative and relatively scattered, falling into three main categories. About half of participants' data and analytics revenue comes from the sale of data insights directly to third parties. This would include, for instance, the sale of footfall information to retailers. Another 34% stems from joint business models with third parties. For example, a telco might partner with advertising companies to deliver targeted ads, or work with insurance companies to offer on-the-spot coverage based on a subscriber's current location (travel insurance, say, for someone crossing a border). Another 17% of revenues can be traced to the sale of geospatial data, such as information on fiber routes or network coverage information. (See Exhibit 4.)

EXHIBIT 4 | Telcos Are Trying Out Different Approaches to Monetizing Big Data and Analytics

REVENUE SOURCES

CURRENT POSITION

% revenues

- Sale of data insights directly to third parties
- Joint business models with third parties
- Sale of geospatial data/geoanalytics

Bars: 50, 34, 17

Current position quadrants: Exploiting opportunities, Not scaling well, Gaining experience, Struggling to find the way forward. Axes: REVENUES (Low to High) vs RUNNING COSTS (Low to High).

Sources: TeBIT 2016; BCG analysis.
Note: Data points have been added or removed to ensure the confidentiality of participants. Percentages do not add up to 100 because of rounding.

Given this breakdown, it seems that telcos are trying out different approaches, looking for what works well and where they should focus. The TeBIT data suggests that the sale of consumer behavior data—an area where others are now active but where telcos possess unique location and usage information—holds the most promise. Indeed, some telcos appear to be reaching the same conclusion. "It will probably be in partnerships revolving around geolocation data or footfall analytics," says Marijo Volarevic, director of the Business Development and Innovation Centre at Hrvatski Telekom. (See the sidebar "Mining Data but Not Yet Striking Gold.") But great care must be taken with this business model. From a privacy perspective, selling data is a riskier endeavor than using it to promote one's own products. Will customers accept such use of their data?

Trust is a key asset for telcos and one that they want to maintain. It has to be a top consideration in everything they do to build a prosperous data and analytics business. Consider the goal of building brand awareness. Telcos are relative newcomers to the field and not known as the go-to players. But actively marketing data carries the risk of damaging trust, as some of the big-name internet companies have discovered. Is a better strategy, perhaps, to partner with more established players in big data and analytics, instead of trying to compete with them? Either way, it is crucial to have a deep understanding of what usage of their data customers will accept. Telcos can more aggressively monetize data, but at the same time they need to know where the limits are: how much is too much (from both the customer and the legal perspective). Telcos should also be sure to provide customers with something in return for sharing data, whether it is added convenience or new—and even free—services. How well telcos do all of this will determine how much of big data's potential they realize.

To that end, telcos must foster greater collaboration between business and IT in their data and analytics initiatives. Only the business side will have the customer understanding needed to pinpoint acceptable data uses. Right now, this close relationship is largely absent. Overall, participants rated the coordination between their business and analytics teams at just 2.9 on a scale from 1

MINING DATA BUT NOT YET STRIKING GOLD:
AN INTERVIEW WITH MARIJO VOLAREVIC
OF HRVATSKI TELEKOM

"It is very tough to make a detailed business case for a big data project. It's hard to make estimations or calculate the revenue impact for the next five years—everything is open to interpretation, the market is transforming dramatically, and it requires a leap of faith. Telcos are not always willing to take that leap."

For telcos, it is early days for big data, and operators are still trying to find their rhythm: what data—and what business models—are most ripe for monetization. But one thing is certain: telcos possess unique data, which can bring them some unique opportunities. To understand how one operator is working to identify and realize the potential, BCG and ETIS spoke with Marijo Volarevic, director of the Business Development and Innovation Centre at Hrvatski Telekom (Croatian Telecom).

Some telcos are looking at big data as an additional revenue source, one that can help compensate for APRU and revenue loss. How does Hrvatski Telekom view big data?

It is true that many telcos do see big data as a source of additional revenue. And it is true that big data is where the industry is going and we have to be there, as well. But right now, it is still not a significant source of revenue; at least, not directly. Where we see big data's greatest current impact is in the way it lets us optimize our core telco business and improve the customer experience. The idea is to use advanced analytics from the perspective of the customer journey: how can we gain insights that help us create greater experiences—and greater loyalty?

What do you see as the main challenges of growing revenues directly from big data?

When it comes to data that you can provide to others, there are a number of questions that aren't simple to answer. How will others use the data? Do they understand what they will be getting? How can we charge for it? What is the public perception impact? These are the challenges. Going forward, we do have an ambition to move further into big data and develop a number of use cases both inside and outside of the company. To support and steer these efforts for all of its national companies, our parent organization, Deutsche Telekom, will have a big data service center. It is intended to be a key resource in helping us achieve our business plans.

Looking ahead, where do you think your focus will be in terms of big data business models? Where do you see the greatest potential for generating revenues?

It will probably be in partnerships revolving around geolocation data or footfall analytics. This would seem to be where telcos can have the biggest impact in the short term, as this data—even in anonymized form—is something that no one has on the scale that we do. Not even Google. This is what we think is closest to monetization, and it will be monetized in various forms. There are a lot of stakeholders in massive movement analytics: travel and retail players, governments and emergency services. But telcos are rarely capable of doing the required R&D in advanced analytics. So we need partners. Our task, then, is to build a cooperation platform for these partners. We need to have clear and quickly implementable terms and conditions, and let our partners do their job in preparing the aggregated data for its intended use. At the same time, we also have a responsibility to protect the privacy of our subscribers via various techniques of aggregation and anonymization.

Do you already have such a platform?

Yes, we do. We have a trust center where we not only provide tech support but also can simultaneously stream different sets of data in any predefined format. The data processing is all in-memory. It's the task of the platform to specify the output, anonymize the data on the fly, and enable delivery in the appropriate format to the target solution.

Of course, in order to get the right insights from data you have to collect the right data. How do you develop your big data initiatives in terms of the data you want to collect—and the data you are allowed to collect? And how do ensure that you are doing it all within a proper framework of data privacy?

At Hrvatski Telekom—and I believe at every European telco—there is a data privacy officer. So whenever you have a big data initiative in mind, or any initiative that has anything to do with personal data, you have to run it by this function and make sure you are working within the appropriate rules and policies for data privacy. That means you look very carefully at the type of data you want to use, how you plan to process it, and the intended use. You may have to modify your data set, your processing, or your intended use in order to find a suitable balance between business goals and subscriber protection.

Looking a bit deeper at data privacy, how exactly do you inform and reassure customers about potential data uses?

Our approach is full transparency. This means that whenever we have a new initiative, we will devote a substantial portion of the press release and market communications to data privacy and what we are doing to ensure it. Trust is one of the biggest advantages a telco can have over other providers, and it is crucial to maintain it. This is why having a data privacy function is so important, to do the upfront analysis and tell you exactly what you can and cannot do with every piece of data. Clear communications are also essential. There are use cases where you will need explicit consent, or where you will need to make sure customers know that they have the ability to opt out—and know how to do so.

On the subject of consent, how do you get it from customers? Do you circulate e-mails or send out letters?

The first thing to note is that you can't choose whether consent is implicit or explicit. You have to do the minimum that is required by law, and when we talk, for example, about location data, no implicit consent is allowed. Our approach is to ask for consent mostly at the time of contract signing or renewal, or when a new service is purchased. If you download an app or visit us on the web, we may ask for consent then, but for the most part, we do it as part of the contract signoff procedure.

Is there any topic around big data that you feels warrants particular attention from the telco industry?

What we are missing in big data are proven products, commercial off-the-shelf solutions that a telco can simply buy and implement. For the moment, at least, what we are working with are still semifinished products. We don't have industry benchmarks either, or really proven strategies. So

it's very tough to make a detailed business case for a big data project. It's hard to make estimations or calculate the revenue impact for the next five years—everything is open to interpretation, the market is transforming dramatically, and it requires a leap of faith. Telcos are not always willing to take that leap.

What about advertising services? That's another area where big data would seem to facilitate new business models.

We are doing some work in mobile advertising, working with ad servers, for example, to more precisely target ads. The idea is to provide individuals with more-relevant advertising, serving up ads based on their own surfing history. This is an area that many telcos have been pursuing lately to monetize their internet browsing traffic data. But so far, no one is really making that much money from the endeavor. It's still a work in progress. For our part, we are exploring what is the best way to do it, how to generate sustainable revenues.

(lowest) to 5 (highest). A joint market approach can help telcos jump-start their big data and analytics revenue streams—and move monetization efforts from opening act to headlining performer.

IT INVESTMENT
A PIE WITH TOO MANY PIECES?

AT FIRST GLANCE, THE picture of telco IT investments seems to be fairly straightforward. On average, participants increased their IT capex by 11.9% between 2014 and 2015 (after adjusting for exchange rate fluctuations). Combined with an overall drop in revenues, this would seem to show telcos re-embracing the "spend money to make money" strategy they pursued in earlier periods of revenue decline (last year, by contrast, participants invested less in the wake of weakening revenues). But a closer look at the TeBIT data reveals that things are more complicated.

For one thing, we saw markedly different patterns for telcos in mature and emerging markets. In emerging markets, where revenues, on average, actually rose slightly, IT capex declined by 4.5%. (See the sidebar "The Business Environment.") Mature-market participants, on the other hand, showed a significant 17.4% increase in IT capex, even as their combined revenues decreased. In mature markets, IT capex was equivalent to 3.6% of revenues—compared with 2.5% for operators in emerging markets. (See Exhibit 5.)

On the surface, it makes sense that the investment emphasis was greater in mature markets. After all, that is where the revenue decline is, and a time-tested way to boost the bottom line is to innovate with products and services that spur new revenue streams. Case

in point: telcos' digital initiatives. Innovation, of course, requires investment. But again, a closer look at the TeBIT data shows that things are more complicated. If telcos were stressing revenue-creating investments, we'd expect their IT capex to be relatively focused, centered largely on a few key areas, like digital and big data, that look particularly promising from an income-generating standpoint. That's not what we saw.

The highest share of IT capex went not to digital initiatives but to infrastructure projects.

Instead, the investment focus was broader than it has been in the past. On average, participants spent 17.7% of their IT capex on their top three initiatives. Last year, the top three projects accounted for some 25% of telco investment budgets (the year before that, the figure was approximately 29%). Instead of zeroing in on a few key and presumably revenue-creating investments, telcos' spending was fragmented. What telcos were investing in was also quite revealing. The highest share of IT capex went not to digital or big data initiatives but to infrastructure projects. The second-largest share went to network-related IT projects.

THE BUSINESS ENVIRONMENT

These remain challenging times for telecom operators. In the markets where TeBIT participants do business, telcos as a group are struggling, with revenues down an average of 5.3%. And while most participants saw their revenues develop in line with, or even better than, their home markets, almost all lost market share between 2014 and 2015. Competition, particularly from players outside the traditional telecom realm, continues to hinder and vex hopes for growth.

As in the past, we saw that changes in average revenue per user strongly affected revenue development. And like last year, we saw significant differences between mature and emerging markets. TeBIT participants in mature markets experienced an average ARPU decline of 4.3%. Yet operators in emerging markets actually increased ARPU by an average of 2.6%. Revenues followed course: down 3.2% for mature-market operators but up 1.9% in emerging markets (to account for fluctuations in exchange rates, all comparisons between 2014 and 2015 were based on ARPU and revenue in a telco's local currency).

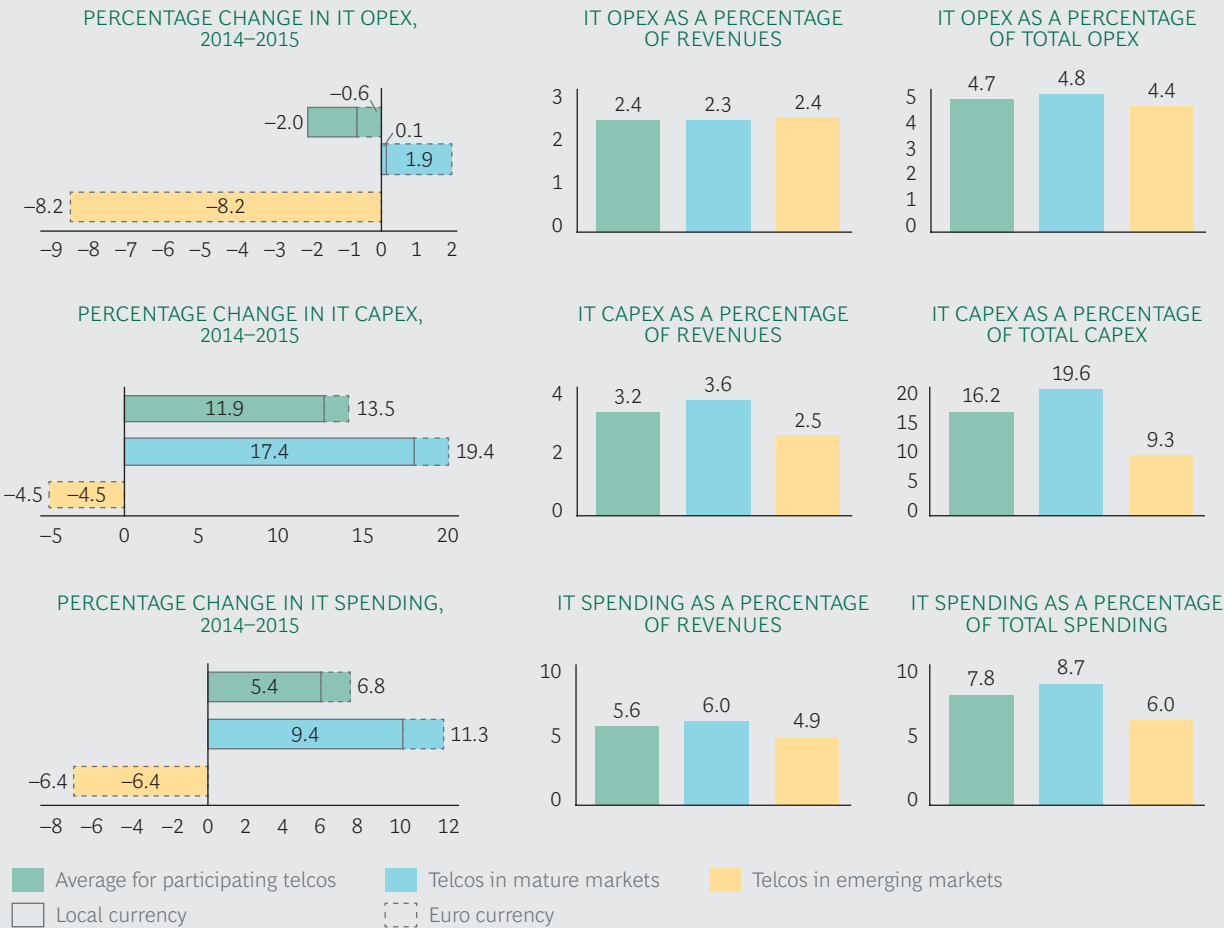Where the tables turned a bit was in subscriber numbers. Operators in mature markets saw their fixed users increase by an average of 4%, while operators in emerging markets saw a 1.9% drop. By contrast, mobile subscribers declined—on average, by 1.1%—for participants in mature markets but increased by 2.6% for emerging-market telcos.

In areas outside traditional fixed and mobile services, overall subscriber numbers were down this year: as a group, participants saw a 1.7% drop. At first glance, that might seem particularly noteworthy since these "other" revenue streams (which could include content and IT services) were a rare bright spot in previous years. But a closer look shows that this category is still increasing in emerging markets (where subscriber numbers rose by 5%) and that the average for mature markets (a 3.1% decline) was affected by a single outlier. Still, it demonstrates that no matter how promising and necessary growth in new areas may be, it will not come without the right efforts and strategies. And with telcos, particularly established incumbents, facing an increasingly challenging, hypercompetitive marketplace, time is of the essence.

What this suggests is that the telcos that are boosting their investment spending may be doing so, at least in part, because they can no longer delay projects that had been put off. That many of the top three initiatives participants listed are infrastructure or replacement projects reinforces this notion. Other investments appear to be targeted not so much at generating revenues as at controlling costs through projects such as data center consolidation. We've seen telcos mix the two kinds of investments before and have noted that in such cases, it's crucial to get the balance right. And perhaps now more than ever, it is vital to place one's bets—and finite capex—wisely. Today's telcos continue to face market challenges, but at the same time, new opportunities beckon. They can't turn their back on either.

PERCENTAGE CHANGE IN IT OPEX, 2014–2015

−0.6
−2.0
0.1
1.9
−8.2
−8.2

IT OPEX AS A PERCENTAGE OF REVENUES

2.4　2.3　2.4

IT OPEX AS A PERCENTAGE OF TOTAL OPEX

4.7　4.8　4.4

PERCENTAGE CHANGE IN IT CAPEX, 2014–2015

11.9　13.5
17.4　19.4
−4.5　−4.5

IT CAPEX AS A PERCENTAGE OF REVENUES

3.2　3.6　2.5

IT CAPEX AS A PERCENTAGE OF TOTAL CAPEX

16.2　19.6　9.3

PERCENTAGE CHANGE IN IT SPENDING, 2014–2015

5.4　6.8
9.4　11.3
−6.4　−6.4

IT SPENDING AS A PERCENTAGE OF REVENUES

5.6　6.0　4.9

IT SPENDING AS A PERCENTAGE OF TOTAL SPENDING

7.8　8.7　6.0

■ Average for participating telcos　　■ Telcos in mature markets　　■ Telcos in emerging markets
▢ Local currency　　▢ Euro currency

Source: TeBIT 2016.

OUTSOURCING

THE FASTER ROUTE TO BUILDING A DATA BUSINESS?

TELCOS MAY BE INVESTING in an infrastructure for big data and analytics, but the TeBIT results suggest that, on the whole, the necessary skills have not yet been fully developed. This raises a crucial question: Should telcos build these capabilities internally or through outsourcing? Building skills in-house would give operators more control over them, but the process can be lengthy and even painful. Outsourcing could potentially deliver the same skills more quickly and efficiently.

Indeed, speed and efficiency have become important criteria when deciding whether or not to use external providers. As in previous years, cost reduction was participants' number-one reason for outsourcing. But it is not their only rationale; acquiring new skills and improving time to market were also cited, as were strategic reasons. Notably, the TeBIT data shows that the weight given to different criteria varies from one process area to another. Telcos, it seems, are looking at outsourcing on a granular level, zeroing in on where it works best. (See the sidebar "Simpler, Faster, Better: Rethinking—and Remaking—Telco IT.")

This selective approach to outsourcing—steering some tasks to providers while performing others themselves—was a trend we saw last year. And it was one that telcos appeared to be leveraging to good effect, using outsourcing where it mattered most. This

year found participants more selective than ever in their use of external providers. On average, 12.9% of participants' total IT spending was earmarked for outsourcing in 2015, down from 15% in 2014 and 26% in 2013.

Cost reduction was participants' number-one reason for outsourcing.

Once again, the focal points were well chosen. Application maintenance and application development, the process areas with the greatest degree of outsourcing, are areas where telcos often lack the required capabilities—or sufficient capacity—in-house. Similarly, IT infrastructure, which saw the least outsourcing, is an area that many telcos can easily handle themselves; indeed, they often provide the same services to their own customers.

Looking at commercial-off-the-shelf software (COTS), we saw that, like last year, telcos are generally happy with these packages. We asked participants to report their satisfaction with COTS for each main process area: fulfillment, billing and revenue management, enterprise resource management, and so on. Only 6.5% of responses indicated a need for

SIMPLER, FASTER, BETTER: RETHINKING—AND REMAKING—TELCO IT: AN INTERVIEW WITH CHARLOTTE HERSDORF AND JAN ULLERUP OF TDC

"Consolidating IT requires investment. Sometimes you have to build an all-new system to replace multiple existing systems."

While looking for and capturing new revenue streams makes a lot of sense in a challenging market, it is not the only strategy telcos are pursuing. There is also that old standby that has served them well in recent years: lowering costs. In an interview with BCG and ETIS, Charlotte Hersdorf, the CIO of TDC, and Jan Ullerup, the company's head of enterprise architecture, discuss this two-pronged approach, outlining the telco's plans for IT consolidation—and its hopes for big data.

What are the main areas in which TDC is investing?

We have several big initiatives that fall under the umbrella of consolidation. The goal is to have fewer tools and systems for the business to worry about, and fewer support and maintenance agreements for us to spend money on. Meanwhile, if you reduce the number of systems you have, you automatically get a healthier integration architecture and it becomes easier and less expensive to develop new functionality in the future. There is less integration to deal with. There is a shorter time to market. But consolidating IT requires investment. We've found that sometimes you have to build an all-new system to replace multiple existing systems. For example, we are implementing a whole new service order management and provisioning system, more or less from scratch. We're creating a single, updated dispatch system to replace the various ones we traditionally used. The idea is to invest today in order to reduce costs in the long run.

The TeBIT data shows that TDC has a comparably low opex and therefore high EBITDA. How does IT contribute to low opex?

IT contributes in a number of ways. Having a high degree of automation helps to lower the overall opex. Keeping your IT simple—by eliminating redundancies—also contributes. If you reduce the number of tools a customer service agent has to use, you spend less on training, you process more calls per hour. There are a host of metrics that start looking better. You're reducing costs while also providing more-effective IT.

In contrast to some of the other telcos we have looked at, TDC's cost structure shows a high degree of outsourcing. What has been your approach and experience with outsourcing?

There are different flavors of outsourcing. Part of our strategy is cost containment, so we have moved some work to India and other lower-salary areas. But we also outsource in areas where we need special competencies, such as application development and application maintenance. In the last year, however, we have started to hire more people because we saw that we had a little bit of an imbalance between our in-house knowledge and our outsourced knowledge.

So your outsourcing strategy is still evolving?

We're still outsourcing a large degree of capacity, but we're retaining more control over the work. So it's a move from a model that was very focused on managed service to a model that is more focused on capacity. We don't ask the vendor to take as much end-to-end responsibility as we would have a few years ago; now we're taking that responsibility ourselves. We will have our own project managers, our own architects, our own test managers, and so on. Then we'll just leverage our outsourcing partner's strength in numbers and cheaper hour costs for the nuts and bolts of the project.

Another area we see evolving within telcos is big data. Some operators now consider it an additional revenue source—one that can compensate for ARPU and revenue loss. How does TDC view big data? Are you exploring the topic or even seeing significant revenues from it?

We are indeed exploring big data and have launched a number of initiatives and pilots. Much of the focus is on providing a better customer experience—building recommendation engines, for example. This internal usage is where most of the revenue from big data comes, even if indirectly. If you improve the customer experience, you increase satisfaction, you reduce churn, and you can sell more services.

What about external uses of big data? Are you pursuing any monetization opportunities by selling data or insights from data to third parties? If so, what business models have you established?

Some of the pilots we are running are centered on location-based services. But we are selling these only to our own customers—specifically, our business customers. We are not selling to third parties who would then sell to their own customers. For example, we will give stadium owners insights on traffic patterns within their facilities. Similarly, we are looking at, and testing, how we can support retailers by showing them how people are moving around in their stores.

And who is driving these initiatives: IT or the business side?

The initiatives are driven by the business side. It might be worth noting that we actually have our big data analysts and model developers placed within the business, outside IT. So while IT will have something to say about big data in a strategic sense and will operate the systems, help provide the data, and do some of the architecture, the business side has a lot of leeway to do their own thing. In effect, we've made big data and data warehousing a business function.

So it would be the business side that is deciding what data to collect? In the TeBIT survey, we asked participants about the different types of data they collect, and TDC actually collects a broad array.

The business side will give us its requirements and we will then work together to create the appropriate data sets and ensure the accuracy and quality of the data.
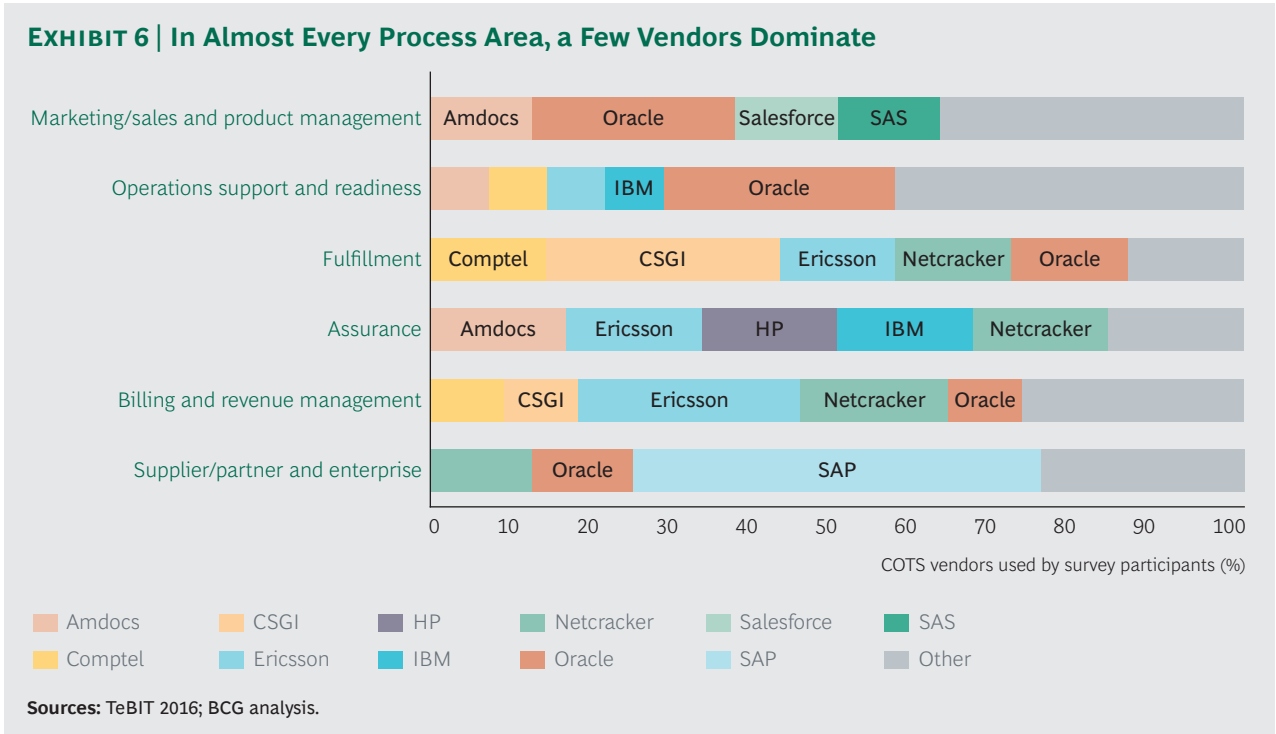
And how do you ensure that data privacy issues and concerns are accounted for properly?

We just follow the rules. If it is data that has a privacy "stamp" on it, so to speak, then it can't be traced back to the customer. You can have data or insights from that data, but you can't say who is behind it. And as the law and regulations continue to develop in this area, we will continuously develop in this area, as well.

improvement. That said, a disproportionate number of those responses related to fulfillment software—not really a surprise, as this is a particularly complex function. It's also worth noting that at the moment, COTS for big data is still a market. Most of the available packages are more traditional business intelligence solutions. This could boost the case for utilizing outsourcing to help build a data and analytics business.

Another interesting, even ominous, finding was the increasing dominance of a few key COTS vendors. In almost every one of the

process areas we looked at, the top three players enjoyed a combined penetration rate of 50% or more. (See Exhibit 6.) This coincides with the consolidation seen in the business support systems market, as marquee-name vendors continue to purchase niche players. While these acquisitions may result in richer and more robust products, they can also burnish the market position of some already strong players. That could mean higher prices and maintenance fees and make it even more important for telcos to run their IT departments as efficiently and cost effectively as possible.

EXHIBIT 6 | In Almost Every Process Area, a Few Vendors Dominate

COTS vendors used by survey participants (%)

Legend: Amdocs, CSGI, HP, Netcracker, Salesforce, SAS, Comptel, Ericsson, IBM, Oracle, SAP, Other

Sources: TeBIT 2016; BCG analysis.

BIG DATA ADDS TO IT COMPLEXITY, BUT TELCOS MANAGE THE LOAD

As telcos pursue new routes to revenue, their IT operating models are bound to become more complex, at least in the short term. To support new initiatives, additional technologies and processes will be required, joining those that already exist (yet aren't quite ready for elimination or replacement). Initiatives in big data and digital—among the most promising areas for growth—call for particularly specialized tools and skills, and even all-new cooperation models.

In general, complexity in the operating model did seem to drive IT costs.

So it makes sense that the average score of 42 that participants garnered on TeBIT's complexity index marked an increase over last year's average of 36. The bigger issue is how well telcos are managing the added complexity. This is a crucial question because inefficiency in running their operating models could decrease, perhaps significantly, any expected benefits.

Fortunately, it appears that telcos are on top of the situation. While overall IT spending increased by 5.4%, that rise was driven by IT investments, not operating expenses. On average, IT capex rose 11.9% while IT opex actually decreased 2%. Even in mature markets, where operators saw total IT spending up a sizeable 9.4%, IT opex remained essentially stable, rising just 0.1% (emerging-market operators saw an 8.2% drop). Overall, most operators managed their IT opex according to—or even better than—their change in revenue.

Like last year, we saw that the relationship between IT complexity and costs is nuanced. In general, complexity in the operating model did seem to drive IT costs, but different levers influenced spending in different ways. (See Exhibit 7.) External head count (a complexity lever, because the more freelancers a telco uses, the more complicated it is to manage them) did slightly drive IT spending, as did the degree of outsourcing. Telcos that adopted a decidedly mixed (and complex) approach—using outsourcing for roughly half their processes—tended to have the highest IT spending. But when it came to COTS, which has long been viewed as a way to lower complexity, no clear pattern emerged.

In the past, COTS usage was found to actually drive IT costs (probably because of customization costs and maintenance fees). This year, we saw no correlation between the degree of COTS usage and IT spending. While this is a welcome finding, it is too early to say if COTS is improving on cost effectiveness. Indeed,

IT spending as a percentage of revenues

Complexity score (indexed)
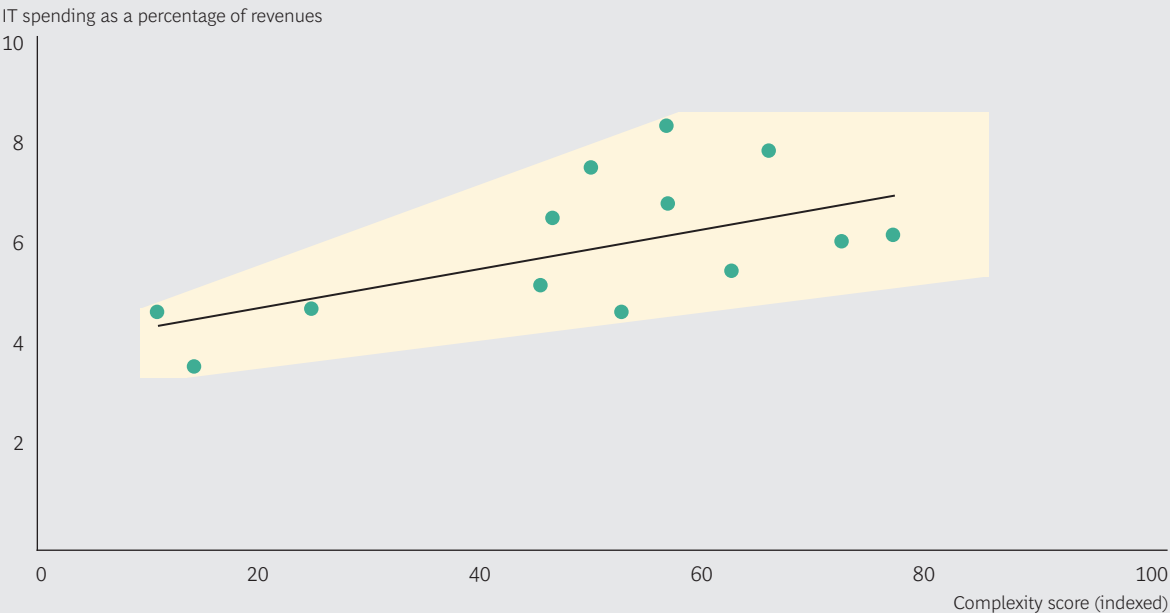
Sources: TeBIT 2016; BCG analysis.
Note: Data points have been added or removed to ensure the confidentiality of participants.

consolidation in the COTS marketplace suggests that, if anything, higher prices and maintenance fees are looming.

By contrast, a finding that is safe to call a trend is the variance in IT cost levels among participants. Like last year, the gap was significant. Total IT spending—the sum of IT opex and IT capex—ranged from 3.6% to 8.3% of revenues. Even after accounting for differences in size and IT complexity among the telcos, a wide gap remained. Why the variation? The broad palette of investments we saw, along with an overall increase in IT spending, suggests one explanation: some telcos are pursuing replacement and transformation projects they had previously put on hold, while others are not. Or at least, not yet.

TAPPING A RESERVOIR OF REVENUE

TIME TO START THE FLOW

OVER THE PAST SEVERAL years, telco IT departments have become increasing efficient, and savvy, in running their shop. They are using outsourcing in a more selective way, employing it where it brings the biggest benefits. They are getting better at managing complexity in their operating models. This is all welcome in a business environment that remains challenging. But it's not enough.

Telcos need to home in on unique offerings that can help them stand out.

TeBIT 2016 makes clear that even with all their momentum in getting more bang out of their IT spending, many telcos, especially in mature markets, are seeing declining revenue and average revenue per user. And almost every TeBIT participant has lost market share. Competition is fierce, and agile challengers—often from outside the traditional telco industry—are putting more established players under pressure. Innovation and differentiation are critical. Telcos need to home in on new and unique offerings that can help them stand out from the crowd.

These new paths to revenue are not hidden. Last year, we saw that digital initiatives were

starting to pay off. This year, our deep dive into big data and analytics found telcos with key advantages in the area—like location data that other players don't have. It also found that they have already invested in significant infrastructure and analytics, and they are continuing to invest. Yet for all the preparation and all of big data's potential, TeBIT participants are realizing little in the way of monetization. It's an odd situation, akin to finding oil, building a rig, and then, instead of drilling, building a bigger rig.

It's time to bring up the oil. Yes, there are obstacles. Privacy concerns need to be carefully assessed and addressed. Many of the most promising analytics must be self-developed, because so far at least, COTS packages focus more on traditional business intelligence. Telcos will have to bolster awareness about their data and analytics "brand"—what they bring to the table—or partner with key players in the field. They will need to foster more collaboration between the business side and IT, and take a joint approach to developing and executing monetization opportunities. And they must actively examine what additional data, such as social environment information, they could profit from. None of these are deal breakers. Telcos can and should start tackling them now.

But perhaps more than anything, telcos need to place their bets wisely. The relatively

broad investment focus we saw suggests that telcos are in a tight spot. They need to invest in new revenue-generating initiatives, yet many telcos—and likely more to come—can no longer delay the upgrades, replacements, and transformation projects they previously put on hold. With only so large a pie, it is vital to zero in on the most promising routes to revenue and make sure that these get a sufficient piece. That means creating a clear vision of how to monetize data, preparing the rig for that specific target—and start drilling.

FOR FURTHER READING

This publication is part of a series of TeBIT Executive Reports—telco IT benchmarking studies jointly developed and conducted annually by ETIS and The Boston Consulting Group.

Digital Delivers
The TeBIT 2015 Executive Report, October 2015

Telcos's New Business Cycle: Time to Invest Again
The TeBIT 2013 Executive Report, October 2013

Paving the Paths to New Revenue
The TeBIT 2014 Executive Report, October 2014

Telco's New IT Weapon: Business Value Creation
The TeBIT 2012 Executive Report, October 2012

Telco IT Units Did Their Homework
The TeBIT 2011 Executive Report, October 2011

NOTE TO THE READER

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