

BCG TECHNOLOGY ADVANTAGE

- DEVELOPING SOFTWARE AT THE SPEED OF THE CLOUD
- BANKING ON THE CLOUD
- LARGE-SCALE IT PROJECTS
- THE PROACTIVE CIO
- DIGITAL INSURANCE FOR THE LONG TAIL
- GETTING FIT FOR TRANSFORMATION
- HOW TO AVOID THE BIG BAD DATA TRAP



FACING THE
DIGITAL
“BIG BANG”

The Boston Consulting Group (BCG) is a global management consulting firm and the world's leading advisor on business strategy. We partner with clients from the private, public, and not-for-profit sectors in all regions to identify their highest-value opportunities, address their most critical challenges, and transform their enterprises. Our customized approach combines deep insight into the dynamics of companies and markets with close collaboration at all levels of the client organization. This ensures that our clients achieve sustainable competitive advantage, build more capable organizations, and secure lasting results. Founded in 1963, BCG is a private company with 82 offices in 46 countries. For more information, please visit [bcg.com](https://www.bcg.com).

Preface



Technology and digitization remain the biggest drivers of disruption and change in today's business world. But succeeding today requires far more than simply embracing the latest trends. Rather, success demands using today's capabilities to create real value for the company. For CIOs and other business leaders, this necessitates a new form of leadership—and a new mind-set. Today's leaders must recognize that if they are moving ahead under full control, they are not moving fast enough. Leaders must also be role models and learn how to fail. And they must be ambitious and seek to deliver a true step change in performance.

This issue of *BCG Technology Advantage* illustrates many of the challenges that leaders face. Our featured article highlights the vast changes that digitization is bringing to the media industry. Andrew Lam-Po-Tang recently completed three years as CIO and CTO at Fairfax Media, one of the largest media firms in Australia and New Zealand and one at the nexus of the print-to-digital “big bang” that is transforming the industry. He discusses his efforts to make Fairfax a “digital first” company by creating a demand- and customer-driven technology function.

We include two other interviews centered on how digital forces are reshaping individual industries. The first is with Frans van der Horst, ABN AMRO's CIO, and Piet Bil, IBM's managing director for the ABN AMRO relationship, who discuss the innovative outsourcing deal that the two organizations recently struck. The second interview is with Steven Mendel, CEO and cofounder of UK-based Bought By Many, a free, members-only service that helps people find niche personal insurance.

The remaining articles discuss ways the technology organization can optimize its performance and help the company gain competitive advantage. One discusses how to deliver large IT projects successfully. Another describes productivity gains that traditional software teams can achieve by emulating cloud development teams. A third defines steps CIOs can take to help corporate directors gain deeper understanding of technology matters. A fourth article details how IT leaders can ensure that the technology function is fit to support technology-enabled business transformations. A fifth piece explains how a company can get its big-data house in order.

I hope that you will enjoy these articles. Please send your comments to TechnologyAdvantage@bcg.com.

Ralf Dreischmeier
Global Leader, Technology Advantage Practice

Contents

Q&A	
Facing the Digital “Big Bang”: An Interview with Andrew Lam-Po-Tang, the Former CIO and CTO of Fairfax Media	2
FOCUS	
Developing Software at the Speed of the Cloud	6
INDUSTRY SPOTLIGHT	
Banking on the Cloud: An Interview with ABN AMRO's Frans van der Horst and IBM's Piet Bil	14
FOCUS	
Large-Scale IT Projects: From Nightmare to Value Creation	19
VIEWPOINT	
The Proactive CIO: Three Strategies for Engaging with the Board	25
INDUSTRY SPOTLIGHT	
Steven Mendel on Digital Insurance for the Long Tail	29
FOCUS	
Getting Fit for Transformation: The Other Strategy Every IT Leader Needs	33
VIEWPOINT	
How to Avoid the Big Bad Data Trap	40

FACING THE DIGITAL “BIG BANG”

AN INTERVIEW WITH ANDREW LAM-PO-TANG, THE FORMER CIO AND CTO OF FAIRFAX MEDIA

Andrew Lam-Po-Tang has just wrapped up three years as CIO and CTO at Fairfax Media, one of Australia and New Zealand’s biggest media companies. Fairfax is at the nexus of the print-to-digital “big bang” that is transforming the media industry. As the owner of two of Australia’s oldest and highest-profile broadsheets, The Age and The Sydney Morning Herald, Fairfax changed their format to compact in 2012 in an attempt to slow the industry-wide decline in profits. Fairfax also owns a portfolio of financial and regional newspapers, radio stations, and websites. It reaches around 60 percent of Australia’s and 80 percent of New Zealand’s reading populations.

Andrew Lam-Po-Tang joined Fairfax in 2012 with the goal of making it a “digital first” company through a demand- and customer-driven technology function. He led the design and implementation of a three-year IT strategy, centralized the IT and digital teams, and migrated the entire business to Google Apps in one of the first enterprise-wide cloud migrations in Australia. Before joining Fairfax, Andrew held senior roles with Amcor, worked at BCG for nearly ten years, and completed an MBA at INSEAD.

During an intense and challenging personal experience in the neonatal intensive care unit with his newborn daughter, Andrew observed approaches used by the high-performing medical team that he adopted and instilled in his teams at Fairfax.

BCG partner Joost de Kock interviewed Andrew Lam-Po-Tang at an Alumni Speaker Series event in Melbourne. Edited excerpts follow.

Andrew, take us back to Fairfax’s business environment in 2012 and your technology strategy. How did you respond to disruptive change in the industry?

In the four years to 2012, the print-advertising market declined by just over 30 percent. To put that into context, nearly 85 percent of Fairfax’s revenues came from that market. Imagine your revenue base collapsing by a third.

We were starting to see people shift from traditional media to desktops, and then to mobile devices. We were also seeing companion browsing. On a Saturday afternoon, somebody might be at home reading newspapers and watching sport on TV with their iPhone or iPad by their side. You get this incredible fragmentation

ANDREW LAM-PO-TANG

Andrew Lam-Po-Tang was the chief information officer and chief technology officer at Fairfax Media from 2012 to 2015. From 2007 to 2012, he was the director of IT and finance at Amcor. From 1993 to 2004, he was a consultant, project leader, and principal at The Boston Consulting Group. Earlier roles included positions as general manager at the Australian Graphic Design Association in 1996 and 1997, and creative director and managing director at Lam-Po-Tang & Co. from 1987 to 1992. He holds an MBA from INSEAD.



of media consumption and attention span, and that's the context in which we were trying to make money. Those factors were driving what we call the "big bang." So we boiled down our goals to three.

First, reduce cost. Not only did we have to reduce costs 25 to 30 percent, but we had to variabilize the costs that were left because we didn't know how volatile our market would be. The only reasonable response is to get fit and variabilize. If things turn out to be worse than anticipated, your cost structure will ride down that curve with you.

Second, go digital. With 85 percent of revenue coming from print advertising, we needed to grow our digital footprint.

If you are going to do anything in terms of product development, do it in mobile first.

Third, monetize. We needed to monetize digital relationships rather than relying on advertising. The growth in digital spend was in marketing search engines, social media, mobile, and video. We needed to get beyond the traditional base and think, "If you are a newspaper subscriber, how can I persuade you to give me \$5 more each week? Can I find you a babysitter? Can I help sell your home? What other digital services can shore up our revenue base and diversify some risk?"

From a technology perspective, what capabilities were required to help the business achieve these goals?

We know now that we can't understand the future that well. Things can pan out so many different ways that trying to be too precise

could be dangerous. So we focused on five capabilities.

First, we wanted to become more audience obsessed. Not simply thinking about audiences, but collecting data, analyzing it, using it to shape new offers and content, and pushing them out in real time.

Second, social. We needed to get better at monitoring what people are saying, inviting content via social media—Twitter, Facebook, Instagram—and bringing it back into our main digital properties. We needed to give our journalists and editors the tools to understand what is being said in those networks, because maybe there's an idea for a story. Recently, a big cyclone in Vanuatu came very close to the North Island in New

Zealand. If you look at the media coverage, a staggering amount of visual and verbal assets came from social media and were incorporated into stories.

Third, mobile. If you are going to do anything in terms of product development, do it in mobile first and worry about desktop later—if at all.

Fourth, valued. Valued was our way of understanding monetization outside advertising, such as subscriptions. This notion of being valued represents a big transformation. We need to figure out what you want, how you want to be served, how much we can charge you for it, and if it represents a valuable exchange.

Fifth, lean and agile. We were talking about lean and agile sim-

ply as muscle where it matters and flexibility. Pare back nonessential costs, outsource, and try to variabilize what's left.

Looking back on your role as CTO/CIO, what would you pinpoint as the two or three biggest challenges you faced? How did you tackle them?

In the middle of 2012, we migrated 10,500 coworkers to Google Apps. We refurbished our Sydney and Melbourne offices and moved to activity-based working. We launched two content management system initiatives at the same time. When you have that much going on, you are concentrating risks. You are becoming leaner and meaner, but stripping out management process and reaction time. As you get smarter, tougher, leaner, and meaner, the consequences of a single mistake go up.

Fast-forward to March 2013 and we had a problem of delivery quality. We were moving quickly and getting things done, but preventable accidents and errors were occurring—some of them very significant. In our haste to move quickly, we were starting to become careless.

How do you deal with such a problem? Well, you can start to lock things down or spend a lot of money to make a third backup, fourth backup, fifth backup.

Eventually, most people say, "We need to fix our culture. We need to fix how we think about these problems and anticipate them. We need to change the way we work, so that we care about getting things right the first time and our practices help us achieve that."

I believe you had an intense and challenging personal experience, where you observed

high-performing medical teams in action and drew inspiration from it to change your technology team's way of working. Would you be happy to share it?

We had a beautiful baby girl in May 2012. She was born with three heart defects, and when she was four days old she was taken to the Royal Children's Hospital for the first of two open-heart procedures. We spent a lot of time at the hospital and got to observe how these incredibly high-performing teams manage very high-risk situations.

The first thing we realized, because we were spending 24 hours a day in this room with all these different people, was a very simple but very powerful practice we called "check and check again." It works like this. They have patients with medications, treatments, and drips needing to be administered all the time, in different frequencies and dosages. Every time you change an environment, there is an opportunity to make a mistake and that introduces risk. So how do you make sure you get that right each time, every time? Check and check again. The idea is simple; the intensive-care unit nurse has to get somebody who is not involved in the normal day-to-day care of that patient to stand with them and independently verify every step of the drug administration process—every step.

This happened every time. Not once, multiple times a day, did they skip this independent validation process. It really worked. I can tell you this because we saw it work. One day the administering nurse misread the dosage and said, "It's 1.5 mL," and the validating nurse said, "That's the wrong dosage." If you are a parent sitting in the room, you freak out—but then

you calm down because that's how independent validation works.

It didn't add a whole lot of time or resource pressure to the ward. It was something they all knew had to be done, stopped what they were doing to help their colleagues, and then went back to their other duties.

I believe you shared that experience with your team and adopted some of these approaches for managing a technology function in turbulent times. How did they react to that story?

So how do you make sure you get that right each time, every time? Check and check again.

By being exposed and vulnerable, people understood I was deadly serious about this. The feedback was hugely supportive, positive, and encouraging, and reaffirmed our belief that being transparent is the right thing.

I asked our technology managers, "Are you aware of your process of delivery, of your guidelines, of your change process? Have you thought about getting a buddy to help you check through? It's not a direct analogy, or alive in the moment like drug administration, but maybe a colleague can help verify your work." That's exactly what we started to do.

We released upgrades and updates to hundreds of systems throughout the year and every now and then a release would break. One team that was handling the print-subscriptions system for Australia had a failed upgrade, so the manager said, "I am going to get somebody who's not familiar with the system to check our release process." As a result, the

second time was perfect. It's the check-and-check-again idea—getting somebody who is not familiar with the material to check it.

We set up a training program called Check and Check Again and ran it for the entire team. The measurement of success is very simple: how many fewer rollbacks do you need to do after a release.

With the highly performing medical team, what other behaviors did you observe and how were they relevant to your technology team?

We noticed storytelling was a very constant form of behavior. Nurses are on duty with a patient 24 hours a day. Two or three times a day the incumbent nurse has to hand a patient in their care to the incoming nurse. On top of that, there are two ward rounds—one in the morning, one in the evening. On top of that, various specialists come in. Each medical professional who comes into the room needs to be told who the patient is.

The way they did it was really interesting. They told it like a story with a beginning, a middle, and an end. The story would begin by introducing our daughter. They would say, "Hello, this baby joined us two weeks ago after an open-heart procedure. She has been with us since then and is recovering nicely." The middle would be what happened today, and the end would be what has to happen on the next shift. The listener becomes the holder of that story. Eventually I asked, "Why do you do it this way?" It turns out that

storytelling is one of the most powerful ways we have as human beings to impart information. It is primal. We live to tell stories, we live to hear stories, and we live to internalize stories. They very pragmatically just said, “If it’s such an efficient way to transmit knowledge, that’s the way we are going to do it.”

At Fairfax Media, we tried to put storytelling into practice. Instead of telling you what I did, I need to tell you the story of the system. Who should be in the story? Is it a story about a subscription system, or is it a story about a relationship with our print subscribers? We started to see people using slide packs to support a story, rather than drop a whole lot of data and charts onto people, and that was really powerful.

Did you have any insights into other practices that you could apply?

I also asked, “Why do you write everything down?” The nurses said it was for obvious reasons—disaster recovery, power outage. But the main reason is that the act of writing forces us to concentrate on the metrics. The act of drawing the chart immerses us in the numbers. It was another instructive, simple practice. We may be surrounded by all the data in the world, but are we thinking about how to internalize that data and make it real?

We also noticed that on every round the lead doctor would ask us how our daughter was. They weren’t doing it to be polite or make us feel better. They asked because they expected us to have a point of view and to share it. Why would they do that? Because we are her parents and nobody is more invested in her outcome than us. Dedicated, specialized profes-

sionals may be looking after a situation, but you need to acknowledge there are stakeholders with a huge investment in a productive outcome standing right next to you.

The final observation was that intensive-care nurses were always learning. They all managed to squeeze in online study or additional procedural practice. They would say, “I’m uncomfortable with putting a cannula in, so I would like more practice. I am going to find a nurse or a doctor and ask them to do it for me and I can assist, or I’ll do it and they will assist me.” Imagine enacting that through your day. The expectation it sets up for leadership is extraordinary. Having people that committed to self-improvement, to recognize the challenges they face, is really impressive.

I asked my tech team, “How can we embody this kind of behavior in our own work and make progress as individuals, as well as for the outcomes of the team?”

It is very inspiring how you and your wife handled and learned from such a difficult experience. Taking you back to the business environment Fairfax finds itself in, what other major disruptive technologies are on the horizon that will further affect the media industry?

When we developed the strategy at Fairfax in 2012, five main forces were affecting our context as a media organization. Two were relevant to our sector—print decline and media consumption. Three were generic and affect everybody, consumer or enterprise, regardless of sector—social, mobile, and cloud.

What is on our radar now is video, which is a profound change in the

way people receive information. The Internet of Things is another. It’s not obvious how it will affect media, other than to suggest that data or ideas for stories may come from things rather than people. The last new frontier is security, which has always been an issue, but in 2014 there was an explosion of major incidents—primarily in the US. If a customer trusts us to become party to a commercial transaction, we should not mess that up. We should not lose their data or credit card information. It’s a big deal and the Internet of Things is going to make it more complicated.

Joost de Kock is a partner and managing director in the Sydney office of The Boston Consulting Group. You may contact him by e-mail at decock.joost@bcg.com.

DEVELOPING SOFTWARE AT THE SPEED OF THE CLOUD

by David Mark, Mike Quinn, Saurabh Shah, and Sanjay Verma

CLOUDS MAY MOVE ACROSS the horizon in slow motion, but they are the jet rockets of software development. In today's mobile, ubiquitous, and instantaneous world, cloud teams are running far ahead of traditional teams in writing and releasing code. The cloud has also enabled these teams to become innovative and efficient, and to deepen their ties with customers.

Traditional software teams have a lot to learn from cloud teams about unleashing the creativity of their code writers. In fact, so do any companies that build software-enabled products and services. In today's landscape, in which software is embedded into everyday objects, that means virtually all companies.

After working with world-class cloud teams, we uncovered four principles that guide how they operate. These principles can help more traditional teams modernize their software-development practices.

- *Smashing Functional Silos.* Teams have end-to-end responsibility. Development, testing, operations, data instrumentation, and operational analytics all report to a common leader, creating a single point of accountability.
- *Living Software.* Many teams still treat each software release as a singular event

and then move on to the next big thing. Cloud teams instead launch services with the explicit understanding that they will be continually updating their code. To accommodate this shift, software must be modular and loosely coupled.

- *Embracing Automation.* Traditional software development has too much downtime and manual checking and testing. Cloud teams invest heavily in automation to improve their efficiency and consequently the quality of their software.
- *Connecting with Customers.* For cloud teams, the customer is not an abstract concept but a real-time and constantly changing composite of actual behavior, usage, and preferences. These teams have invested heavily in metrics that provide real-time insights unavailable through more traditional customer-feedback methods, such as focus groups. These insights show teams how customers are using their products and services, allowing the teams to build software that meets customers' exact needs and even delights them.

Collectively, these principles push decision making down into the organization, enabling software developers to own their code, understand their customers, and continually improve their service. They also eliminate the

traditional trade-offs that have long marked software development. Cloud teams are innovative and organized; they are agile without sacrificing quality.

Venture capitalist Marc Andreessen likes to say that software is “eating the world.” Companies that fail to adopt these principles risk being eaten by those that do.

Smashing Functional Silos

Software has traditionally been developed sequentially, with the waterfall serving as a rough metaphor for its progression. Separate groups conceive, design, build, test, put into operation, and maintain software, with each group waiting for the previous group to complete its work.

This setup is fraught with high transaction costs. Participants can spend more time sitting in meetings and managing handoffs across organizational boundaries than writing and testing code. Disputes among these groups are often discovered late in the game and have to be resolved by senior executives.

Cloud development organizations are flat. Many of their functions report to the same manager. In addition, engineers in cloud teams often develop, test, deploy, and maintain their own software or service.

In this setup, individual contributors have a better sense of how their decisions affect the overall development and release of software, so there are fewer slowdowns and do-overs.

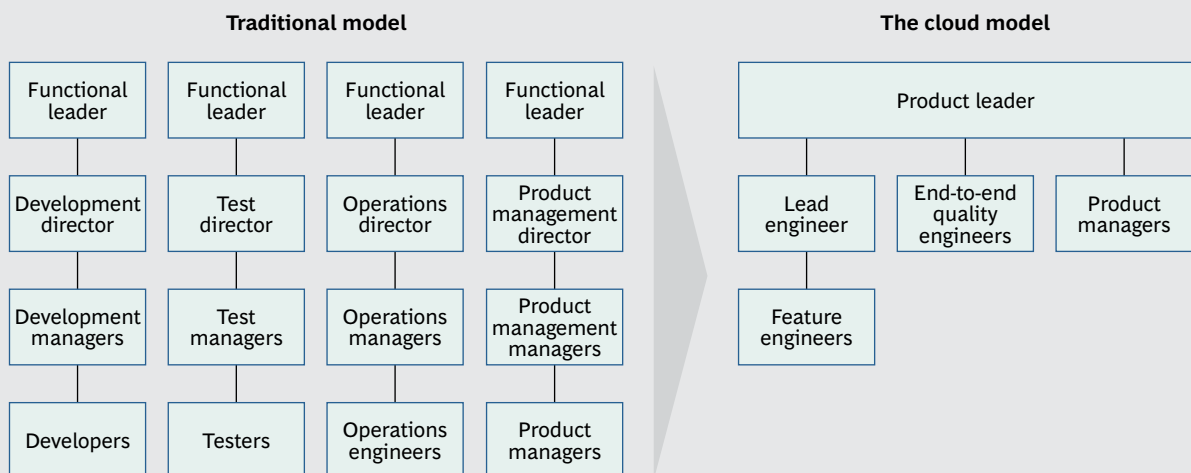
As one cloud manager put it, companies “need to have a single throat to choke for each service.”

LEADERSHIP STRUCTURE

In many traditional software organizations, executives lead specific functions or disciplines, such as development or testing. An unintended consequence of this type of system is software complexity. To paraphrase Conway’s law, software mirrors the organizational context in which it is created. Software takes on the mishmash that results from trade-offs, handoffs, poor communication, and competing organizational power bases. Most perniciously, there is little sense of ownership. In fact, a static plan, which is often out of date shortly after it is written, determines the outcome, rather than intimate customer connections. The final decision maker is much closer to the CEO than to the development teams.

In cloud development organizations, executives tend to head cross-functional product teams, rather than functional silos. All the functions required to deliver the product or service report to them. (See Exhibit 1.) In addition, these leaders are responsible for revenue realization and the overall approach to

EXHIBIT 1 | Cloud Organizations Eliminate Silos



Source: BCG research and analysis.

marketing, sales, and channels. When they need to adjust to changes in market or customer demand, they have the authority to marshal resources without time-consuming and wasteful negotiations with other parts of the organization.

NEW ROLES AND RESPONSIBILITIES

Conventional wisdom and practice dictate that software teams separate development, testing, and operations functions. To use a reference from *Top Gun*, developers are akin to “Maverick,” the creative risk-taking leader played by Tom Cruise, while testers fall into the background as “Goose,” his reliable sidekick. This division of labor was ostensibly created to promote accountability for each type of activity. Instead, it caused management overhead.

Who better to fix the code than the person who helped write it?

Conventional wisdom is wrong. Cloud teams have developed a software engineering role that is responsible for not only writing but also testing and deploying features. The idea of relinquishing operational control to traditional developers can be daunting, so cloud teams build automated guardrails to ensure that testing and deployment are of high quality despite democratization of control. They have found that the productivity and quality gains of this organization design typically outweigh the risks. After all, who better to fix the code than the person who helped write it?

As developers take on more of a traditional testing role, a new “end-to-end quality engineering” role has emerged. Engineers in this role continually replicate and test the customer experience to ensure that the user interface, speed, response time, and overall quality are delighting customers. This role is crucial as customer environments become more complex and fragmented. Software teams need to ensure that their software works on public clouds, private

clouds, on-premises servers, desktops, mobile devices, and multiple operating systems. The end-to-end quality engineers have this responsibility before, during, and after launch.

The product manager’s role is also fundamentally changing at cloud companies, as software engineers assume more responsibility for scheduling and managing development. The product manager is no longer responsible simply for “hitting a date” but also for the business and operational success of the program. He or she has to take on a more strategic, analytical, and technical role. The product manager defines hypotheses and features that can be tested, prioritizes their development, and continually monitors actual usage of those features. This manager is responsible for informing and training sales and marketing personnel, setting up partnership programs, developing a pricing framework, and monitoring pricing realization.

The role of data scientists is also becoming more prevalent at cloud companies. Their sole responsibility is to interpret the incoming stream of information. Unlike developers, they are not biased in favor of specific features and serve as honest brokers to determine which emerging trends will have the biggest impact. (See Exhibit 2.)

Living Software

To build cloud software, it’s not enough simply to create new organization structures and roles that facilitate continual development and constant updating. Companies also need a software architecture that allows cloud teams to move quickly and independently.

A cloud “product,” in fact, often consists of literally hundreds of microservices. Cloud development organizations create small teams—usually, just 10 to 15 members—that are responsible for a specific software module or service. The teams are able to release their software independently. If a service needs a larger team, then it probably has not been broken into small enough component parts.

EXHIBIT 2 | The Shifting Roles of Software Development

	Traditional model	The cloud model
Product manager	<ul style="list-style-type: none"> Oversees schedule and project management Acts as proxy for customer 	<ul style="list-style-type: none"> Acts as product owner Prioritizes features and services Defines product strategy and differentiation Encourages customer engagement and usage analysis Acts as a bridge to marketing
Customer experience engineer	<ul style="list-style-type: none"> Designs user interface, often late in the cycle 	<ul style="list-style-type: none"> Owens holistic user experience, beyond just user interface, across products and features Engages early in the development cycle
Developer	<ul style="list-style-type: none"> Writes code Performs limited testing Has limited customer interaction 	Feature engineering teams <ul style="list-style-type: none"> Write and deploy code Define architectural design Own both unit and functional tests Oversee schedule and project management Release the microservice or feature when ready
Tester	<ul style="list-style-type: none"> Tests features Has limited customer interaction 	
Release engineer	<ul style="list-style-type: none"> Ensures that releases are tracked Tests the final bits to ensure high quality Manages distribution of code 	End-to-end quality engineering teams <ul style="list-style-type: none"> Validate customer scenarios Run horizontal testing and validation during production
Data scientist		<ul style="list-style-type: none"> Analyzes usage data to identify trends and insights across features and services Has a pure data focus without feature bias

Source: BCG research and analysis.

TEAM COMPOSITION

All software teams are not staffed equally. Teams follow the same principles, but their composition will vary significantly depending on the type of software under development. In our research, we found that software can be grouped into four archetypal categories on the basis of the complexity of customer interactions and who (the company or the customer) controls software deployments.

A common benchmark of software development teams is the ratio of traditional developers—whom we call “feature engineers”—to other members of the team. As Exhibit 3 illustrates, these ratios can differ greatly depending on the category.

When a software team internally controls an application or a service, such as consumer cloud software, developers can directly write, launch, track, and adjust code without engaging with the customer. This reduces the need for end-to-end quality engineers, as illustrated in the boxes on the right side of the exhibit.

At the other extreme, when the customer controls and deploys the application or ser-

vice, as illustrated in the boxes on the left, feature engineers have less ability to modify the software after launch and must address a more fragmented user base. Accordingly, end-to-end quality engineers are necessary to serve as a proxy for customer needs and to monitor deployments.

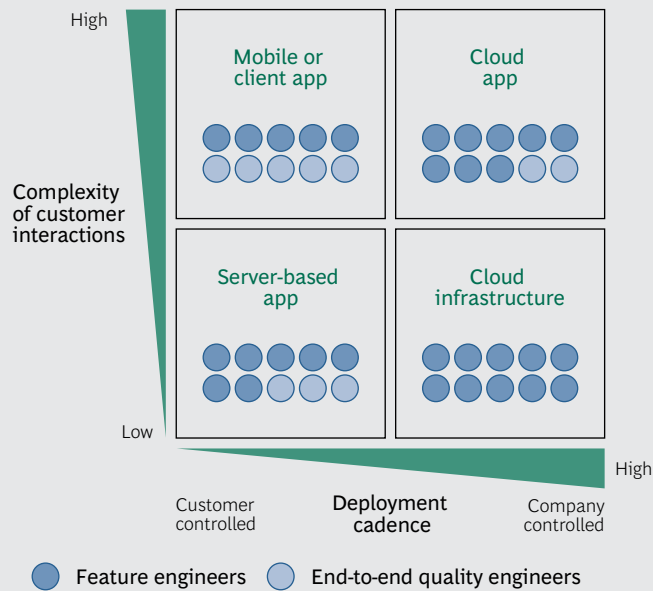
All software teams are not staffed equally.

This model applies to the individual microservices that compose a product, not to the product itself. A single product will frequently have services that fit within all four categories. For example, the team launching an app on the iPhone will have a very different composition from the team responsible for launching the app’s underlying server infrastructure.

MODULAR ARCHITECTURE

To support such decentralized team structures, cloud development organizations build

EXHIBIT 3 | The Composition of the Development Team Varies



Source: BCG research and analysis.

loosely coupled software modules that interact seamlessly with other modules. The loosely coupled modules typically sit on top of stable infrastructure software. This approach allows developers to work flexibly—adding, replacing, and changing individual modules while maintaining high quality and reliability.

In this environment, teams are no longer forced into large-scale monolithic annual or quarterly release dates. Without the need to manage complex software integration, cloud teams can release features as they become ready. Features not ready for prime time are “toggled” off in order to control what the customer sees while preserving code integrity for easier version control.

Embracing Automation

Automation promotes speed in cloud software development, allowing teams to launch frequently and independently while maintaining high-quality products. It is often what separates the best software teams from the rest of the field.

Cloud teams invest heavily in tools to ensure that bugs and glitches are caught quickly. With a single click, developers’ code can be checked in, tested, and deployed. Automation

serves as a safety net that notifies developers of small problems before they become large. These systems are not cheap, but they are critical for teams that want to maintain quality.

New products are generally released as “canary builds” that are staged so that only a small proportion of customers receive an update. If the software encounters issues, the automated system can quickly roll back deployment without affecting the entire customer base. If the software works as expected, it is automatically rolled out sequentially to larger subsets of users and regions until full coverage is achieved.

With a single click, developers’ code can be checked in, tested, and deployed.

Automation improves the efficiency of software development teams by reducing the time they spend in manual tasks such as check-in, testing, and deployment. This downtime can reach 20 to 30 percent—or more than one day a week when developers are not using their creativity.

Connecting with Customers

The most successful software developers are not sitting in a silicon tower, imagining what customers want. They have an intimate understanding of the features that customers use and the roadblocks they encounter. These teams invest heavily in systems that generate real-time usage metrics, and they constantly monitor this data. Operational dashboards are generally updated every minute, while business dashboards are updated daily. The code from these teams is written in a way that allows detailed data and usage collection.

It should not be any surprise that cloud teams don't rely on "gut feel."

It should not be any surprise that cloud teams don't rely on "gut feel" to make decisions. They test a hypothesis and measure the result through frequent iterations and A/B testing that compares usage of identical software except for one variation. At cloud organizations, even marketing, documentation, and sales approaches are tested in this way.

Cloud teams are also democratic in their dissemination of information. Test results and other operational and usage metrics are available for anyone in the company to see, opening the door for innovative thinking and cross-pollination of ideas.

All the Pieces Matter

In the television show *The Wire*, one of the main characters, a detective, frequently says, "All the pieces matter," meaning that every element of police investigations—every wiretap, witness, and piece of the puzzle—is significant. All these principles matter, too. To achieve breakthroughs in your software development, you need to have all four principles in place.

Carefully instrumented code allows cloud companies to track usage and performance in

order to understand the market's reaction to their software. The way the code is written actually brings them closer to their customers. Modular software speeds the reaction time of developers. To respond quickly to customer needs, they can release new code without waiting for the other modules to be updated. Automation accelerates development time and efficiency, permitting developers to release their code rapidly, rather than waiting for other teams to catch up.

Collectively, usage metrics, modular software, and automation lay the groundwork for development teams to have end-to-end responsibility for their code, which improves innovation, customer responsiveness, and employee engagement.

TRADITIONAL software teams may not need to adopt a pure cloud model. But they should try to become speedier and more innovative in their development activities.

It's not just talent and legacy systems, structures, and processes that are preventing companies from fully adopting a cloud development model. It is also mind-set. Teams have to be willing to break down the historical divide between development and testing and to expand the roles and responsibilities of the software engineers. They must view testing as an ongoing function, not an afterthought. They must be willing to make significant investments in training, automation, and data-capture-and-retrieval systems. (To see how your team measures up in cloud development activities, see the sidebar, "The Transformation Journey.")

A company's success ultimately rests with its leaders. You need to challenge conventional ways of working and delegate decision making down into the organization. You need to give your best software developers a reason to be excited about going to work in the morning and staying late at night. The closer you come to adopting the cloud development model, the more success you'll have in achieving your goal of innovation and speed.

THE TRANSFORMATION JOURNEY

This way of working under the cloud development model is a significant departure from tradition. The principles are straightforward, but the transformation journey is not simple. Companies must change across four dimensions.

Principles. Communicate a focused vision to the development organization based on the principles of the cloud software-development model.

Metrics. Set up well-defined targets and timelines to reach them. The exhibit below outlines a set of leadership metrics that can serve as a barometer of your progress toward your goals. Your performance and incentive structure needs to be consistent with these metrics. For example, as developers take on greater testing responsibility, the quality and speed of their output may decline. However, this setback will be short-lived if you have the right metrics and monitoring infrastructure in place.

People. Redefine roles for developers, testers, and product and operations managers, and create a flatter organization structure on the basis of prod-

ucts and services rather than functional silos. Exhibit 3 can help you create the optimal team composition.

Technology. Automate check-in and deployment, create loosely coupled architecture, enable code sharing across teams, and write instrumented code that facilitates real-time analysis.

The goal of the cloud development model is to enable faster development and more powerful customer connections. By aligning your organization's principles, metrics, people, and technology, you can change the trajectory of your business and your relationship with customers.

The Best Cloud Teams Monitor Metrics

Customer connection	<ul style="list-style-type: none">• <i>Engagement:</i> Measured by high user growth and low churn• <i>Usage:</i> Success is defined as first or second place in market share• <i>Customer Experience:</i> Defined by high customer-satisfaction levels, low levels of crashes, and strong performance on service level agreement
Data-driven decision making	<ul style="list-style-type: none">• <i>Data Access:</i> Ease of data access across the team• <i>Experimentation:</i> All engineers can create a feature A/B test• <i>Data Availability:</i> Operational metrics available in less than a minute; business metrics available in less than an hour
Fast code releases	<ul style="list-style-type: none">• <i>Cloud Services:</i> Continuous, often daily deployments• <i>Mobile or Store Apps:</i> Monthly releases, daily internal releases• <i>On-Premises Services:</i> Quarterly feature updates, monthly service releases
Engineering system	<ul style="list-style-type: none">• <i>Build Time:</i> Occurs in seconds• <i>Check-in Time:</i> Takes less than five minutes• <i>Level of automation:</i> 100%• <i>Code Access:</i> All engineers can review and check out code

Source: BCG research and analysis.

David Mark is a senior partner and managing director in the San Francisco office of The Boston Consulting Group and the global leader of the technology sector. Prior to joining the firm, David was the chief strategy officer of Flextronics, a leading contract manufacturer that has more than 150,000 employees in more than 35 countries. At Flextronics, David helped launch Elementum, a software-as-a-service supply-chain company. You may contact him by e-mail at mark.david@bcg.com.

Mike Quinn is a project leader in BCG's Detroit office and a core member of the Technology Advantage and Automotive practices. Mike has deep expertise in the intersection of the automotive and technology sectors, specifically infotainment, telematics, and cloud software development. Prior to joining the firm, Mike was the lead engineer for Internet-application product development at General Motors, where he launched GM's connected-vehicle and smartphone-integration efforts and led GM's strategic partnerships with app developers. You may contact him by e-mail at quinn.mike@bcg.com.

Saurabh Shah is a project leader in BCG's Los Angeles office. He is a core member of the Technology, Media & Telecommunications practice and a member of the Consumer practice. Saurabh has extensive experience in developing technology and digital strategies for clients in the software and hardware, apparel, and media industries. You may contact him by e-mail at shah.saurabh@bcg.com.

Sanjay Verma is a partner and managing director in the firm's San Francisco office. Prior to joining BCG, Sanjay was with Flextronics, where he led its cloud-solutions business. He launched and led CloudLabs, the company's cloud and rack-scale converged-infrastructure and integration-services business unit. Before working at Flextronics, Sanjay led lean-software and application-development consulting practices, and he has been an active architect and developer as well. You may contact him by e-mail at verma.sanjay@bcg.com.

BANKING ON THE CLOUD

AN INTERVIEW WITH ABN AMRO'S FRANS VAN DER HORST AND IBM'S PIET BIL

Frans van der Horst, the chief information officer of ABN AMRO, wanted the bank's IT services to become more flexible, agile, and innovative. In a ten-year outsourcing deal with IBM, announced last December, the bank aims to accomplish these objectives through the transition to cloud technologies.

The deal represents a coming of age of cloud technology and standards within the banking industry. Banks have been slow to move to the cloud because of security concerns. A move to the cloud also forces them to address their overhang of legacy technologies—an array of different systems and incompatible data structures.

By signing a ten-year deal, ABN AMRO is making a major commitment to the cloud and to a new way of working that is built on standardization, simplification, and trust. The prior agreement with IBM was thousands of pages long, laying out in great detail the processes and activities that IBM had to follow. Realistically, employees from both sides often did not understand what the deal said, so the bank's employees would try to lower costs and IBM's employees would try to boost revenues.

The new agreement is a fraction the size of the previous contract in length, and does away with the tug of war by establishing a fixed annual value, providing predictability for both sides. Assuming that it hits key per-

FRANS VAN DER HORST

Frans van der Horst is senior managing director and group chief information officer at ABN AMRO, a position he has held since 2014. From 2010 to 2014, he was the company's senior managing director responsible for global operations, facility management services, and procurement. From 2008 to 2010, he was an executive board member and vice chairman and chief operations officer at Fortis Bank. From 1992 to 2008, he held various positions at VSB Bank and Fortis Bank.



PIET BIL

Piet Bil has been IBM's managing director for the company's relationship with ABN AMRO since 2013. Prior to that, he held a number of positions within IBM. From 2008 to 2013, he was the company's general manager of global technology services in the Benelux region. From 2004 to 2008, he was IBM's managing director for the company's relationships with Philips and NXP Semiconductors. From 1990 to 2004, he held various other positions within the company.



formance metrics, IBM has greater flexibility to perform work the best ways it sees fit.

The ABN AMRO–IBM agreement covers the bank’s data center and end-user computing, including help desk and application support. The bank will deploy cloud standards in its on-premises data center with the goal of moving to the public cloud when regulations permit. The bank’s customers and employees ought to benefit from the faster deployment of new and innovative technologies.

We are not operating under a traditional “revenue is price times volume” model.

End-user satisfaction will become an increasingly important KPI. In the past, the help desk was the only major function covered by this KPI.

This is the third outsourcing agreement between ABN AMRO and IBM. The second deal would have expired at the end of 2015, but van der Horst wanted to negotiate a new deal in conjunction with the start of the bank’s IT transformation. (The deal was primarily negotiated by Jan den Boer, head of sourcing and vendor management at ABN AMRO, and Eric Koek and Javier Lages, directors at IBM.)

BCG’s Wouter Pomp and Heiner Himmelreich recently interviewed Frans van der Horst and Piet Bil, IBM’s managing director for ABN AMRO, about the landmark agreement.

What was the motivation for ABN AMRO to enter a new agreement with IBM?

Van der Horst: IBM was involved in the setup and planning of our transformation, and we wanted

IBM involved in the execution, which will require extensive cooperation. It made more sense to reach a new agreement that covered the scope of the transformation rather than hold a contractual discussion halfway through it.

Why could you not have performed the transformation under the previous contract?

Van der Horst: Technically, it would have been possible. We de-

cidated that it made sense to make a new arrangement so that we could establish joint objectives at the start of the transformation program.

Bil: After nine years, I think both of us realized that we needed more flexibility. They say that the first house you build is for the next buyer. The second house you build is for your friends, and the third house you build is for yourself. This is our third contract, and I

think it will work well for both sides.

What are the elements that make this contract a success?

Van der Horst: The migration to the cloud to achieve scale and standardization, a reduction in complexity, and the ability to become more agile.

Bil: We both have a common understanding of what we are trying to achieve in terms of standardization, the cost model, and several other conditions. This common view allowed us to lower costs considerably.

Van der Horst: We are not operating under a traditional “revenue is price times volume” model, where one party thinks, “How can I raise the revenue?” and the other party thinks, “How can I lower costs?” Instead, we will have discussions on the conditions, the solutions, and the approach. I prefer to not talk about money anymore. I prefer to talk about the work that needs to be done on both sides. (See “Measuring Output Rather Than Monitoring Processes.”)

MEASURING OUTPUT RATHER THAN MONITORING PROCESSES

One of the novelties of the outsourcing deal is the degree of freedom it permits IBM to accomplish work. The focus of the new agreement shifts from *how* things get done to *what* gets done. The two sides are planning to implement “output-based contracting” in three areas: the help desk, end-user services, and data center services. Bank employees will spend less time monitoring

IBM’s processes and more time measuring its performance, such as progress toward standardization and movement of applications to the cloud. In other areas, such as infrastructure projects and the overall transformation, the bank will continue to monitor both processes and performance.

Bil: We will no longer have the moment when the bank has a request and we say, “Yes, but that will increase the price.” The conditions of the work we need to deliver have been defined. My interest in this is as large as Frans’s interest.

Van der Horst: We need to have discipline in the bank. If somebody wants to request work that is out of scope, he will have to pay for it. Is it then still worth doing? Most often, it is not. (See “The Governance Agreement.”)

What other elements are in place to make this contract work?

Van der Horst: We do not have a document that is hidden and locked away. It is instead a working document that we need to live by. We have an intensive education program in our company about rights, obligations, and dos and don’ts in the contract.

Bil: The contract is fully transparent. That has an impact on people. For example, we had a training session about the contract where IBM employees showed up. Someone from the bank asked, “What are you guys doing here?” Then everyone started to think and realized, “Why not?” That is a new style.

We like to think about this as a partnership rather than a pure supplier relation.

What was the reason for a ten-year agreement?

Van der Horst: IBM is investing in our transformation, and it will take time for them to earn back these investments. We like to think about this as a partnership rather than a pure supplier relation.

THE GOVERNANCE AGREEMENT

The outsourcing deal is a fixed-price and fixed-volume arrangement with built-in flexibility. Work that is outside the scope of the agreement needs to be approved by a “change board” consisting of both ABN AMRO and IBM executives. The board will also actively manage the volumes negotiated in the agreement

and make adjustments to reflect changes in the market, demand, or technology. After all, it is hard to predict what will happen next year, let alone ten years from now. Ten years ago, for example, YouTube had just been created, and the iPhone was still on the drawing board.

Bil: For IBM, this is an unusual contract because it really is a ten-year contract. It is not a contract that either party can step out from after seven years. It brings a sense of calmness. We can align our resources and investments.

You mentioned the transition to the cloud as an important part of the contract. What is the exact scope of the cloud, and what is your vision on achieving these targets?

Van der Horst: We will start with a technical replatforming of 1,100 applications. This will require the cooperation of the two main application-development-and-maintenance vendors we are working with. They will work col-

execute a delivery model built around standardization. The bank has taken an important step forward that is unique in the market. We did not need to hold endless workshops about requirements because we will be using a standard. This will require a change in thinking and a change in culture on both sides.

By making this choice, ABN AMRO will become much more agile. When regulators eventually allow the public cloud for banking, it will be relatively easy to switch over to it because of the standardization.

Van der Horst: Enforced standardization is easier to accomplish than if you would ask for standardization. Standardization is now a fixed wall that you cannot get through. Everything stops there. This is the standard.

Are there other elements that are important for IBM to make the contract a success?

Bil: Security. ABN AMRO recognizes that security is critical. IBM has therefore aligned its top team on security regarding this part of the engagement.

The next element is the end-user services transformation. A lot of

what we are talking about here involves the back office and will lower costs for the business. But the end-user service transformation is a nice example of what the end user will see in the short term.

Van der Horst: The end-user experience is our fifth priority for this year. Numbers one, two, and three are the cloud, and four is security because that is our lifeline. But after those, we want to provide collaboration tools and new ways of working for all users.

When will the end user notice these changes?

Van der Horst: This summer. Then there will be sequential improvements in functionality.

What would you see as the critical success factors?

Bil: We have to deliver the cloud. The technical replatforming needs to start running so that people will start to see this happening. Next, the end-user services transformation needs to kick off, as it has been under discussion for a long time. We can create a lot of goodwill on the work floor when employees say, “Now, I see a difference.”

Van der Horst: The joint governance described in the agreement is also very important. This governance will provide much more alignment at all levels. The goal is to help one another rather than have edgy relations between the supplier and the customer. We really have to bring this alive. We did not design it for nothing. It will really help us.

We started negotiating at a very high level about the principles we wanted to achieve in this agreement. These principles were

agreed to at the board level. Then we made sure that the agreement embodied those principles. These principles have allowed teams to talk about whether something is in the spirit of the contract, instead of what the contract literally says. We are trying to have teams working with each other rather than against each other. (See “The Principles Matter.”)

How would you like to measure outcomes and whether you are on the right track?

Van der Horst: We have several output measurements and critical success factors. (See “Defining Success.”) There are also clear metrics for the three providers working on the transformation.

Bil: End-user satisfaction is key. I would like to see end-user satisfaction go sky-high.

Van der Horst: Both the bank and IBM have agreed to pay for an independent third party to track end-user satisfaction using aca-

THE PRINCIPLES MATTER

Both ABN AMRO and IBM wanted the negotiations for this outsourcing deal to be different from other negotiations. The two sides had a long history together and were looking to extend it ten years into an uncharted future. They started out by agreeing on a set of principles, such as improving overall quality and relying on end-user satisfaction to measure performance, that would guide the negotiations. These principles were documented in a letter of

intent and a “heads of agreement,” which outlines the main issues. Rather than gather dust, as many similar documents often do, the heads of agreement became a working document that was commonly cited and mentioned during negotiations. Both van der Horst and Bil said that their teams continue to refer to the initial principles that were laid out in those initial documents.

DEFINING SUCCESS

Ten years is a long time to maintain a productive relationship. The ultimate success of this outsourcing deal depends on several ongoing mechanisms and processes. The bank and IBM will need strong program management to keep processes on track. They will need to ensure that IT is not operating in a vacuum but is aligned with its business partners. They must remain committed to the governance pro-

cess to help resolve small issues in the future before those issues become large. Finally, employees of both ABN AMRO and IBM must continue to focus on culture, especially the need to work cooperatively and to accept standards rather than push for custom solutions.

demically based methodology. It will not be subjective. We will conduct surveys regularly. Both IBM and the bank will jointly decide on the questions that are included, and we will jointly analyze the results.

Bil: I do not want only to measure whether we have made our commitments in the contract. I really want to know: Are people satisfied with what we deliver? Has the help desk really helped?

Van der Horst: If we are both managing the measurement, you cannot say, “We should have asked other questions.”

So, actually, the end user determines how successful the contract is?

Van der Horst: This is what it is about. If 23,000 people are happy, we are more than happy too. And if they have remarks, we should jointly work on these.

***Wouter Pomp** is a project leader in the Amsterdam office of The Boston Consulting Group. You may contact him by e-mail at pomp.wouter@bcg.com.*

***Heiner Himmelreich** is a partner and managing director in the firm's Amsterdam office. You may contact him by e-mail at himmelreich.heiner@bcg.com.*

LARGE-SCALE IT PROJECTS

FROM NIGHTMARE TO VALUE CREATION

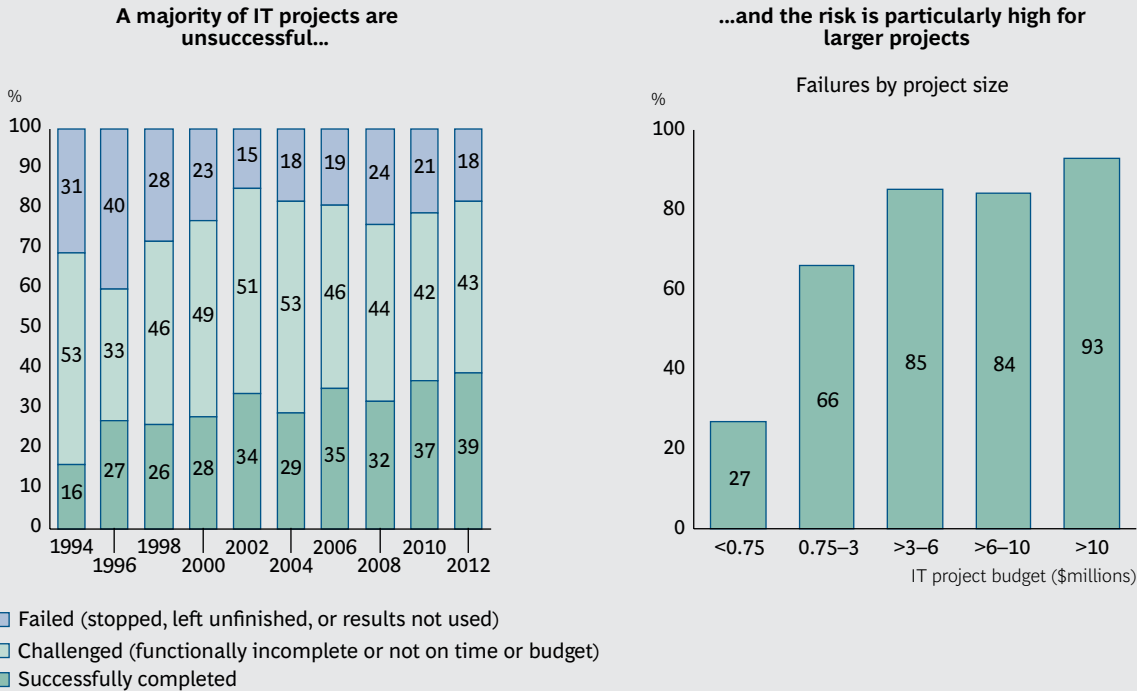
by Jon Brock, Tamim Saleh, and Sesh Iyer

FOR BUSINESS LEADERS, THE decision to embark on a large-scale IT initiative (that is, one with an investment of more than \$10 million) is often fraught with angst. Their worries are justified. According to one large study, the chances of delivering such a project successfully—on time, on budget, and with the desired technical objectives met—are

roughly one in ten. (See Exhibit 1.) And the cost of failure can be quite large: we estimate that the potential lost value from a major project delay, for example, can range from 100 to 170 percent of the investment cost.

Companies cannot run from the challenge, however. IT underpins an increasing percent-

EXHIBIT 1 | The Odds of Delivering a Large IT Project Successfully Are Roughly One in Ten



Source: The Standish Group's *CHAOS Report*, 2011 and 2013.
 Note: Based on data for more than 50,000 projects. Number of projects and average project size per year are unavailable.

age of essential business-transformation initiatives, such as the establishment of digital business models and big-data capabilities. The need for substantial IT investments can also arise when large supplier contracts expire or legacy IT systems reach the end of their lives. Large-scale IT investments are therefore unavoidable.

Can steps be taken to materially improve a large IT project's chances of success? Yes.

Can steps be taken to materially improve a large IT project's chances of success? The answer is an emphatic yes—assuming that executives know where to focus their efforts.

Why Do So Many Large IT Projects Run into Trouble?

Large IT projects are vastly more difficult to deliver successfully than smaller ones, because a project's complexity, interdependencies, and communication challenges grow exponentially as the project grows in size. What works well for the execution of small projects rarely suffices for the execution of large ones.

Although every major IT project and its circumstances are unique, projects that are flagging often have common characteristics.

Inexperienced Project Teams. Experience matters in large projects. Something we commonly see among project teams that lack large-project experience is the inability to anticipate all the various activities that will be required as the project's complexity grows. Such teams will underestimate the amount of testing activity necessary, for instance, or commit to aggressive milestones without underpinning this commitment with a bottom-up plan. Projects involving such teams frequently start to miss critical milestones and can even lose the confidence of senior stakeholders.

Lack of Engagement from Key Stakeholders. Projects that lack sufficient buy-in from the

business—a situation often triggered by an absence of clarity about the project's economics, scope, business strategy, or execution—can find themselves struggling for the necessary resources.

Requirements That Are Unclear or Too Complex Relative to the Business's Needs. Many companies either fail to define (and document) projects' business requirements at a sufficient level of detail—or define requirements that are too complex. They often make matters worse by pursuing development before all requirements are fully defined, which can result in "requirement churn" and lead to expensive redefinitions late in the game.

Insufficient Attention to Major Risks. Frank talk about project risks often gets "squeezed out" of the discussion in formal governance activities at status meetings or meetings of the project steering group. Those intimately involved in the project get so close to the details that they cannot see the forest for the trees. One of the most commonly short-changed risks, and a particularly critical one, is the risk associated with data. Poor-quality data, or data designs that have not been sufficiently validated early in the project, can undermine the project, as can a failure to think through the risks of data migration. Another risk that is often insufficiently discussed and planned for is the set of challenges accompanying projects that span multiple markets or countries: there may be material differences in products, processes, languages, and regulatory environments that cannot be left to chance. Yet another risk that is often poorly prepared for and managed is the risk that project teams incur when they commit to a specific delivery date (for example, the date when a contract with a key supplier will expire) without giving themselves the flexibility to change the date if the project is delayed. Although a sense of urgency can help a team focus, an overly aggressive schedule can lead to suboptimal decisions and compromises that cause lasting damage.

Taking the Solution Live Without Sufficient Testing. Companies typically plan sufficient time for testing. What often happens, however, is that the time available for testing gets

compressed because delays in earlier activities, such as development, lead to the short-changing of critical testing activities, including performance testing. The resulting toll can be steep, because once a solution goes live, fixing problems is vastly more expensive and difficult. And the business consequences of poor-quality software can be severe.

Failure to Manage the Project Plan Effectively. Projects whose leadership fails to detect early warning signs of major problems or a growing risk of missing milestones tend to lurch from crisis to crisis—and repeatedly surprise stakeholders as milestones are missed.

Insufficient Attention to Change Management. Although much has been written about change management in the last 20 years, we often still see project leaders underestimating what is involved in managing the human side of change. Leaders will devote insufficient resources to this aspect of their projects or generally be unaware of the extent of behavioral changes necessary for a successful outcome.

Any one of these conditions can be enough to undermine a project. More commonly, we find that projects that are going or have gone off the rails are characterized by several.

Setting the Project Up for Success

Despite the long odds, large IT projects *can* be delivered successfully. In our experience, however, winning in this realm is not luck. Rather, it is the result of careful, rigorous planning and attention to detail. From our analysis of successful projects, we have identified best practices in five domains.

- **Scope and Objectives.** Time is invested up front to determine the right project scope and to make sure that all relevant parties are crystal clear on what needs to be developed.
- **Business Value and Economics.** A positive business case for the project is developed and validated prelaunch; then the case is tested against scenarios that reflect risks that might emerge.

- **Governance and Organization.** Leaders are selected who have deep practical experience with similar large projects, and they create a culture of openness and transparency. Stakeholders are actively engaged and accountabilities are clear.

- **Solutions and Deliverables.** Solutions are designed and validated in a well-structured, methodical way—whether through agile or waterfall development practices—and efforts are made to minimize the customization of standard software. (See the sidebar, “Is Agile Development the Answer?”)

- **Planning and Execution.** A strong, proactive project-management organization, as well as a project-design authority structure that seeks to identify and tackle problems early on, are put in place at the outset.

These best practices can be codified and “baked into” a project through the use of a *quality assurance scorecard*, which can be a powerful tool for encouraging their adoption early in a project’s life. (See Exhibit 2.) Such scorecards can also promote better practices during the project’s execution and spread them to other projects that the company is undertaking or planning to undertake. Presented at steering-group meetings, the scorecards can also reassure stakeholders that progress is being made and that the project is under control.

The business consequences of poor-quality software can be severe.

Paying attention to these critical success factors early in a project’s setup can make a sizable difference in the outcome. BCG recently played the role of independent quality-assurance partner to a major U.S. utility that was implementing SAP enterprise software. The company had a history of troubled projects. BCG worked with the project team and the sponsor to ensure that optimized critical practices were established at the project’s

IS AGILE DEVELOPMENT THE ANSWER?

Agile-development approaches are often touted as an alternative to large projects, and a number of BCG clients have had success with them. The concept is to break system development down into smaller chunks, or short “sprints,” of coding, delivered by a “scrum” team of developers that is supported by analysts, designers, and business “product owners.” The aim is to create some working software within a compressed time frame—typically two to four weeks. Multiple such sprints are strung together to develop a complete working system. Given that there is a strong correlation between the size of the development effort (smaller is better) and a project’s success, this approach is logical and can be very effective with the right team, modern development technologies, and the right level of business support. In particular, agile approaches can promote significantly faster time to benefits delivery, as well as better testing and deployment practices, leading to higher-quality delivery.

Agile by itself, however, is insufficient. It can be a very effective methodology for the

pursuit of one critical dimension of the quality assurance framework—namely, solutions and deliverables. But its success is dependent on good practices in the framework’s other four dimensions—namely, scope and objectives, business value and economics, governance and organization, and planning and execution. Some of the biggest project failures we have seen, in fact, involved agile development deployed in a context of poorly defined business requirements and an inexperienced project team; this unfortunate mix led to serious problems, such as major gaps in requirements, lack of documentation, heavily customized “standard” software packages, and poorly performing systems.

In short, agile approaches are not a silver bullet. But they can be very helpful, even critical, in the delivery of digital process transformation and big-data initiatives.

EXHIBIT 2 | An Illustrative Quality-Assurance Scorecard

Category	Statement	Score	Category	Statement	Score
Scope and objectives	1. The project will meet the needs of the business	5	Solutions and deliverables	22. Requirements are clearly identified and documented, and have business signoff	5
	2. The project has a stable scope	3		27. A testing process is in place to ensure quality	4
Business value and economics	11. Business case assumptions have been subjected to rigorous testing and are documented	4		29. Data migration is rigorously planned and validated early in the project life cycle	2
	12. Actual performance numbers are rigorously tracked against budget	4	Planning and execution	31. Implementation is organized into well-structured releases and phases with measurable milestones and well-defined stage gates	4
	13. Financial projections are updated regularly	3		32. Estimates are developed and updated in a rigorous manner	3
Governance and organization	16. Stakeholders are actively engaged	2		33. Metrics and KPIs are in place to track progress against plan	5
	18. The culture fosters open communication and transparent reporting of progress	4			
	21. The project is adequately resourced, with key leadership and workstream roles populated by experienced people	4			

Source: BCG analysis.

launch and were measured through scorecards, surveys, and in-depth interviews. This early intervention ensured that the project team got off to a good start. Although the project's execution wasn't flawless, and various "course corrections" were needed, the project was delivered on time and on budget, and proved to be the most successful large project in the company's history.

Demand evidence of risk identification and risk mitigation plans and measures.

What is the size of the prize for successful execution of large projects? As noted, the potential lost value from a major project delay can range from 100 to 170 percent of the investment cost. In our experience, a 50 percent reduction in delays, cost overruns, and other problems across a portfolio of projects could easily produce economic benefits equivalent to 15 to 20 percent of total portfolio spending—significant money that could be devoted to other initiatives.

Steps for Business Sponsors and CIOs

Business sponsors and the CIO can take a number of steps to maximize the odds of a large IT project's success.

Challenge the decision to proceed with a large project; if possible, try to break the effort down into smaller, more manageable chunks, or "releases." Assuming there is consensus on proceeding with a piecemeal approach, strive to minimize interdependencies among projects in the planning stage and be clear on the minimum viable scope for a first release in order to reduce that release's scope and risk.

Get the right project leadership in place early. Select a project director who has significant experience with projects of this type and who will have the trust of senior executives. Seating the right leader should be carried out early in the project's life to ensure

that setup activities are properly executed, giving the project the maximum chances of success.

Make sure that the project team spends time up front defining and gaining clarity on the project's scope, high-level business requirements, benefits, and costs. The urge to launch the project and demonstrate progress quickly is understandable, but lack of clarity regarding direction is frequently a root cause of failure. It's often tempting to skip the definition of requirements in particular, but doing so almost always leads to trouble down the line.

Select a vendor that has done a large project of this type before, if possible, and establish the right contract. The contract should, for example, spell out risks and ensure that key members of the supplier's team are available for and committed to the project. It should also ensure that the vendor is committed to delivering the project's targeted outcomes.

Work to engage stakeholders. Try to ensure that the project has a culture of openness and transparency, and that business stakeholders understand their roles and responsibilities and are fully committed to them.

Confirm that the project's risks are being proactively managed. Demand to see evidence of risk identification and risk mitigation plans and measures, and commit to staying informed.

GIVEN today's rapidly evolving business environment, the ability to deliver large-scale IT projects successfully stands to become an increasingly critical competitive differentiator for companies (as well as an increasingly used yardstick for gauging the performance of leaders, including CIOs). The levers discussed above should be viewed as essential enablers of any such project.

Jon Brock is an associate director in the London office of The Boston Consulting Group and a core member of the firm's Technology Advantage practice. He has 25 years of experience in IT and is the global leader of BCG's de-risking of large

IT projects topic area. You may contact him by e-mail at brock.jon@bcg.com.

***Tamim Saleh** is a senior partner and managing director in the firm's London office and a core member of BCG's Technology Advantage practice. He has more than 20 years' experience in business and IT transformation, technology strategy, and strategic sourcing, and he leads the firm's big-data topic area. You may contact him by e-mail at saleh.tamim@bcg.com.*

***Sesh Iyer** is a partner and managing director in BCG's Washington, DC, office and a core member of the firm's Technology Advantage practice. He has more than 20 years' experience in IT, including application development and maintenance, infrastructure management, and transformations enabled by large-scale technology systems. You may contact him by e-mail at iyer.sesh@bcg.com.*

THE PROACTIVE CIO

THREE STRATEGIES FOR ENGAGING WITH THE BOARD

by Sachpreet Chandhoke, Ralf Dreischmeier, Benjamin Rehberg, and Filippo L. Scognamiglio Pasini

TECHNOLOGY IS DISRUPTING BUSINESS models and markets—and the responsibilities of many corporate boards. To fulfill their oversight role, boards need to ensure that a growing array of IT risks and projects are being well managed. At the same time, they need to understand how technology can help attain and sustain competitive advantage. The upshot is that boards need to know much more about IT—a tall order for directors who often don't “speak the language.”

To be sure, some boards have sensed the shift and have created a governance mechanism—such as a technology committee—to keep pace and ensure that the next data

Critical to this understanding is having the right amount of detail and context.

Tackling this challenge isn't easy, but there is a person who is uniquely qualified to help: the CIO. A company's CIO can help the board assess not only IT risks and regulatory compliance but also the strategic value that technology can add.

A Three-Point Plan

Technology doesn't play the same role in every company or take on the same degree of importance. Accordingly, different boards need to provide different levels of IT governance.

an operational approach, creating technology committees that examine overall IT operational performance and information security, as well as project priorities and progress. Less frequently, boards are adopting a strategic approach, establishing a technology committee to evaluate the company's IT strategy and investments, as well as the business value of the IT function. Finally, the boards of a global financial-services company and a large media organization have gone further still, tasking their technology or “innovation” committee, as it is sometimes called, with reviewing IT as it relates to competitive advantage, in addition to overseeing risk, operations, and strategy. (See the exhibit below.)

Boards need to ensure that a growing array of IT risks and projects are being well managed.

breach doesn't happen on their watch. But even if a board has implemented such a structure, directors still need to have an understanding of the organization's IT, including the risks and potential.

Consider the various approaches boards are currently taking toward IT oversight. Most still focus on internal controls and risk, and the audit committee steers the effort. But some boards have moved to

No matter which approach a board takes, CIOs can help directors home in on and better understand the IT issues—and solutions—most relevant to the business. CIOs do this by providing information on and the context for technology and concerns. Like most people who are not technical experts, directors often have misconceptions about IT. Security breaches, for example, are often blamed on faulty

Boards Engage in Technology Oversight at One of Four Levels of Detail

	Degree of scrutiny			Unique focus
	Audit committee approach	Operational approach	Strategic approach	Innovation approach
Responsible committee	Audit committee	Technology committee	Technology committee	Technology or innovation committee
Objectives	Review IT as it relates to internal controls and audit findings	Examine operational performance and information security	Evaluate IT strategy and investments	Oversee all aspects of IT, including competitive advantage
Company examples	Prudential Financial The Guardian Life Insurance Company of America	FedEx Morgan Stanley Nationwide Mutual Insurance Company	American International Group Westpac Banking Corporation	American Express The New York Times Company
Areas of focus	<ul style="list-style-type: none"> Internal controls Audit findings Risk management 	<ul style="list-style-type: none"> Overall IT performance Information and data security Project priorities and progress 	<ul style="list-style-type: none"> IT strategy and investments Business value of the IT function IT capabilities, in the context of trends 	<ul style="list-style-type: none"> Risk management IT performance and security Strategy and investments Competitive advantage

Source: Audit and technology committee charters from company websites.

technology. In fact, many breaches aren't rooted so much in IT as they are in processes and people. CIOs can help boards by shedding light on the circumstances and conditions that lead up to such events.

The three strategies we present here enable CIOs to engage with their board, reducing the mystery, misgivings, and misconceptions surrounding technology and helping directors understand and evaluate what really matters when it comes to the company's IT.

Take the lead on shaping the board's IT conversation. Instead of waiting for the board to ask for reports and updates, CIOs should initiate and steer the conversation. This doesn't mean delving into a full array of technology topics with every director. Rather, CIOs should carefully choose the issues to discuss and the sequence in which to present them, so as to gradually

build directors' comfort and knowledge with the topics.

How should CIOs choose the issues? Clearly, the focus should be on IT topics that are most relevant to the business—a list that the CIO should develop with input from the CEO. Collaborating with the chief executive is a crucial first step; CIOs can lock down important topics and avoid conflicts with someone who can be a powerful ally and facilitate access to the board.

The CEO can also help identify board members who have a technology background or a heightened interest in IT oversight—such as the chair of an audit committee. These directors are important stakeholders for the CIO. They can prove valuable partners when engaging with the rest of the board and, as such, should be a first point of contact. These directors

also have a feel for the board's IT concerns, as well as its level of technical sophistication. And these directors can act as a sounding board for presentations before the CIO speaks to the full board.

Indeed, board presentations can be tricky. They need to be tailored to the board's level of "IT savviness," striking the right balance between educating and informing, but they also must be compelling. The benefits and the business cases should be clear. Any examples should resonate. Drawing on how directors use technology in their own lives can make IT personal. To ensure a successful presentation, CIOs may want to consider taking a media-training course or having professional marketing or communications talent to call on when creating and giving a presentation. These individuals can greatly enhance a CIOs ability to "make it real" for the board.

Assume the role of technology advisor. CIOs should look for ways to build a rapport with and earn the trust of the board. One way is to provide the full story on hot-button topics and trends—such as headline-grabbing data breaches—and separating fear, uncertainty, and doubt from reality. Directors who are not technology experts may not realize that hackers aren't always as clever as some news accounts make them seem. Laypeople often do not know that gaining unauthorized access to data doesn't necessarily require advanced technical skills: hackers can simply prey on faulty processes and human behavior that is, well, human. Indeed, an effective method is phishing, a scam that uses deceptive e-mails to fool recipients into divulging confidential information, such as credentials for accessing IT systems.

By putting such events in context, CIOs can help board members identify—and evaluate—the true risks related to IT. Context can also help boards understand why certain IT investments should be made or prioritized, why particular technologies make sense for the company or a specific business model, and what steps boards themselves can take to fulfill their oversight role. (See the sidebar “The Proactive Board.”)

Linking IT initiatives to the business problems they address is important, as is the ability to come up with roadmaps that show what technology will enable over the next few years. Such roadmaps help boards assess IT's strategic direction.

Effective communication—using compelling, accessible language and images—is once again important. But so, too, is business acumen. A CIO needs to know the ins and

outs of the company's strategies and operations in order to develop these roadmaps. That's why CIOs should be proactively engaged with other managers across the business, as well as with the board.

Hands-on demonstrations of technology can make a deeper impression on directors than a PowerPoint presentation ever could. Indeed, one CIO created an “immersion experience” so board members could touch and test some of the technologies the IT unit was planning to deploy. After this demonstration, the board approved a multibillion-dollar transformation of the company's digital strategy.

Create an IT report for the board. CIOs have to instill confidence among board members that IT risk is under control and being proactively managed. Transparency is crucial: be forthcoming and thorough about the objectives, progress, and challenges of ongoing technology initiatives. Written expressly for the board and issued on a regular schedule, a “state of IT” report can be a powerful tool for keeping directors abreast of the status and payoff of projects. Constructing a report for board members, however, isn't the same as writing one for management. While the C suite needs information that helps them make opera-

THE PROACTIVE BOARD

Many boards have one or more technology veterans on their committees. The effectiveness of these directors can vary, however, depending on their level of engagement and the mandates of the committees. CIOs can help boards better evaluate a company's IT, but boards can also help themselves. A good place to start is by taking one of the following two steps, which can be implemented in parallel with the strategies recommended for CIOs.

- *Reserve a place on the audit committee for a technology expert.* This board member could oversee efforts to test the integrity of the company's IT systems, helping to identify and mitigate risk. An increasingly common—and effective—practice is the use of so-called ethical hacking: outside technology experts are hired to try to penetrate the security of the IT infra-

structure, exposing areas for improvement. These efforts should be sponsored by the CIO but overseen by the audit committee.

- *Create a technology committee.* A dedicated committee can take the lead on assessing technology trends and strategic direction, as well as approving and overseeing major IT investments. But creating a technology committee isn't the right move for every organization. If IT is not core to the business, then a company probably doesn't need a technology committee. If IT is a critical component, however, then a company should be sure to include technology experts whose strengths and knowledge match the challenges and opportunities facing the organization.

tional decisions, boards are more interested in information that helps them perform their oversight function and minimize risk.

When preparing a state-of-IT report, then, the objective is twofold. First, the report should provide insight into the progress and risks of major initiatives, the value they have generated, and IT's impact on the bottom line. The IT depart-

surfaced since the previous report, comparing the company with its competitors using industry benchmarks, and making projections for these metrics in the coming months or years.

In addition to a state-of-IT report, CIOs should prepare project briefs that facilitate board buy-in for technology adoptions or large undertakings. Three elements are

CIOs should prepare project briefs that facilitate board buy-in for technology adoptions.

ment at Intel, for example, publishes an annual report—publicly available on the company's website—that lays out the unit's performance for the year. The report for 2014 noted that the IT department implemented advanced analytics software that generated more than \$350 million in revenue.¹

The second objective for the report is to convey this information in a concise and accessible way.

The CIO at a large global insurer took a savvy approach to preparing a report for the board—an approach that became the model for quarterly CIO updates. He created four simple dashboards, each of which was devoted to a category of IT metrics, such as financials (to demonstrate the value and costs associated with IT), technology risks (to show the status of patching server software and the status of testing and validating business continuity plans, among other things), customer satisfaction, and major IT projects. The dashboards were supported by a 15-page memo. While the dashboards gave board members a quick view of IT's performance, the memo provided more detail, discussing important trends that had

critical: a clear description of the business problem, the trade-offs for various options, and the logic for the suggested path. In making the case for a planned upgrade of its IT architecture, one company created a 20-page brief for the board, outlining the pros and cons for all of the viable options. This helped the board understand that the recommended solution was the best option available and that the budget request was reasonable.

PROACTIVELY engaging with the board is entirely doable, and CIOs can begin today by using these three strategies. The only requirements are a willingness to make the first move and to put in the work that all close relationships require. Both parties will benefit. CIOs will spend less time defending IT and more time spurring it forward; boards will glean the insights they need and see the value IT creates.

NOTE

1. "How Intel's CIO Helped the Company Make \$351 Million," *Wall Street Journal*, February 18, 2015.

Sachpreet Chandhoke is a project leader in the New York office of The Boston Consulting Group. She is a core member of the People and Organization and Public Sector practices. Sachpreet has extensive experience in IT organization design and governance. You may contact her by e-mail at chandhoke.sachpreet@bcg.com.

Ralf Dreischmeier is a senior partner and managing director in the firm's London office and the global leader of BCG's Technology Advantage practice. He has developed technology and digital strategies for clients in financial services, telecommunications, media, and consumer goods and supported multiple large-scale business and technology transformations. You may contact him by e-mail at dreischmeier.ralf@bcg.com.

Benjamin Rehberg is a partner and managing director in the firm's New York office and the global topic leader for software in BCG's Technology Advantage practice. He has more than 15 years of experience advising financial services clients in IT-related areas. You may contact him by e-mail at rehberg.benjamin@bcg.com.

Filippo L. Scognamiglio Pasini is a principal in the firm's New York office. As a core member of the Technology Advantage practice, he has worked with financial institutions and insurance companies across the world, focusing primarily on strategy and technology. You may contact him by e-mail at scognamiglio.filippo@bcg.com.

STEVEN MENDEL ON DIGITAL INSURANCE FOR THE LONG TAIL

Steven Mendel is CEO and cofounder of Bought By Many, a free, members-only service based in the UK that helps people find insurance for the out of the ordinary. Its motto: “Insurance made social.”

The company uses social media and search engine optimization to assemble groups of people who need niche personal insurance—travel insurance for people with diabetes or pet insurance for owners of French bulldogs, for example. The company negotiates with insurers on behalf of its more than 58,000 members. The result can be coverage for people who previously could not get it. (The company was profiled in “Insurance and Technology: The Emerging Role of Ecosystems in Insurance,” BCG article, April 2015.)

Mendel recently spoke with Miguel Ortiz, a senior partner and managing director in BCG’s London office and the firm’s worldwide topic leader for life insurance. Edited excerpts from the discussion follow below.

How does Bought By Many work?

We use a combination of search and social media to group together

people who have similar insurance needs. We then take that group requirement out to the insurance industry and negotiate on behalf of members of the group to bring them a better deal than they can get on their own. A better deal might be better pricing, it might be more tailored benefits, or it might be both of those things. Once we bring the offer back to the group, individuals buy directly from the insurer on the better terms that we negotiated for them.

Strategically, we are focused on the long tail of insurance demand.

It’s similar to the way that Amazon thinks about the long tail in music and book demand: where historically your local bookseller might have had thousands of books on the shelves, Amazon has millions, for example.

Right now in the insurance space, the vast majority of businesses are focused on the short tail. So if you are looking for mainstream car or home insurance, you are very well served in countries like the UK. You can go to a direct seller, or you can go to a broker, and you’ll get pretty much the same policy from any of them.

STEVEN MENDEL

Steven Mendel is the CEO of Bought By Many, a company he cofounded 2012. From 2004 to 2012, he held senior roles at Barclays Wealth and Investment Management, Christie’s, and Close Brothers Group. From 1998 to 2004, he was an associate principal at McKinsey & Company, and from 1988 to 1998, he was a principal and actuary at Aon Consulting. He holds a BSc in mathematics and statistics from the University of Leeds and is a fellow of the Institute of Actuaries.



What do insurers think about all this?

When we have a conversation with insurers, we ask them, “In which areas do you want to write more risk?” You would think that was a relatively easy question to ask an insurer. Many insurers just say, “Bring us lots of business. And if you can bring it cheaply, that’s great.”

Increasingly, insurers interpret that question in one of three ways. Some insurers look at it from an underwriting perspective, and they say, “We really like this area of risk and we have a very clear understanding of it from an underwriting perspective, so if you could bring us more business in that area, we’d be really happy.”

We analyze more than a hundred million lines of insurance search data.

Some insurers look at their existing book of business, and they say, “We’re really happy with our current mix of business, but our current distribution model is inefficient. If you can bring us that same mix of business but from a more cost-effective channel, we’d be much happier.”

And some insurers are starting to look at their business from the perspective of Solvency II (a European Union directive that regulates the amount of capital an insurance company must hold to reduce the risk of insolvency). Solvency II says that the more diversified an insurer’s book is, the less capital it needs to hold; the more concentrated it is, the more capital it needs to hold. We’re seeing lots of opportunity to help them increase diversification.

Once insurers identify the areas where they currently have gaps, if we can bring them exposure in those areas, they can hold less capital across the whole of their book.

For whatever reason, insurers often come back to us with long lists of areas where they think we can bring business or where they would like to have more business. So that’s, if you like, the supply side of our equation.

What are some of the other benefits to insurers?

We work with insurers to change what they bring to members, and we also work with the insurers to give people back the benefit of our much lower acquisition costs.

Broadly, we’re saying to insurers, if you currently pay 30 percent to a broker for business, take that 30 percent and divide it into three. Put 10 percent into the pot for our members to get a better benefit, give us 10 percent, and keep 10 percent for yourself, because we want you to want to do this business.

The other usual thing that we do is to drive renewals. Renewals are a very important part of this industry. What happens if people don’t renew? At some point in the future, their premiums will go up. Actually, it’s a win-win situation for people to renew, presuming of course that they have the right policy in place. When it comes to renewals, we make sure that we’ve still got the right deal in place, and then we actively encourage people

not to shop around but instead to renew. If they want to shop around, they can, but they will still find it’s the best deal going.

Can you offer some examples of groups you’ve served?

We were approached by the chief executive of a large cancer charity that had a big problem for its members. When people are in remission, they can buy travel insurance. But if they are currently undergoing any form of treatment, even if that treatment might be just once a year, it’s almost impossible to acquire travel insurance. For a person who is undergoing chemotherapy, for example, an oncologist might tell her that she won’t be having another treatment for another four weeks and the best thing to do would be to get some sun on a vacation. In the past, we have helped an insurer develop a policy specifically for people who are undergoing treatment.

Another example is pugs. The dogs are the most stolen pets in the UK. They are perfectly sized for sticking in a handbag, and they cost £2,500 each. We heard from many people that pet policies pay only about £600 if your pet gets lost or stolen. So we worked with a big pet insurer to tweak their policy slightly, such that the payout is £2,000 if your pug gets stolen. There’s also a £2,000 reward you can advertise for its safe return, and you can spend £2,000 advertising the reward, as well. This has proved hugely popular.

How do you identify these opportunities?

We analyze more than a hundred million lines of insurance search data, examining what people are looking for when they search for

insurance. We have a very clear understanding of what people are typing into a search engine when they're looking for insurance. Increasingly, people are being much more specific about what they're looking for. Instead of saying that they're looking for home insurance, they might say they're looking for thatched-roof home insurance.

Search engines are getting better at understanding how to deal with those slightly unusual searches, whereas two or three years ago they had no answer. In fact, Google reported recently that 15 percent of all searches done on any given day have never been done before.

We look to see what people are searching for, and our algorithm can analyze how successful that search is likely to have been. With these two pieces of information—volume of search and success of search—we can identify unmet insurance needs. We then look at a variety of social media to learn what people are talking about in the insurance space. Out of that, we create what we call our “taxonomy of demand,” which is a very long list of places where demand is not being met. We're finding a big opportunity space.

How do you bridge what the market wants and what insurers want?

We take the supply side and we compare it to the demand side that we've identified. Where there's overlap in the middle, we create groups. We have 250-odd groups that have been formed since we started in September 2012, with more than 58,000 members spread across those groups. We're currently working with 17 UK-based insurers.

Once we identify the groups we're going to launch, we use a combination of search and social media to bring people into those groups. If you remember, we know what people are searching for. Everything we do is specifically designed to hit the Google analytics search algorithms. Consequently, we score very highly on Google analytics for more than 6,000 insurance search terms. We collect the different things that people are searching for and put them into the group. “Pet insurance and French bulldog” might be one.

We also get customers by talking with them actively on Facebook. This is very much about changing the way people think about insurance. We want people to engage. We want people to talk to us. We want people to talk to each other about insurance. Only then are people going to find the offering that works best for them.

Insurers often think people are not interested in insurance. People look at it once a year, and they

to invite friends on Facebook or Twitter. If someone has diabetes and is looking for travel insurance, you can be pretty sure that person will know someone else with diabetes, and that person might eventually want travel insurance.

How do you prioritize the groups you serve?

There are three routes for an individual to get us to launch a group. The first and highest-priority space is where an insurer has a very interesting angle on something and we can find sufficient demand that satisfies the supply.

The second priority is if we can find massive discontinuities in demand—for example, if there's massive demand and not a lot of supply, or supply is very poorly served for that demand. Take the case of young drivers. We will agitate for the industry to change to better serve that market

The third priority is a form on our website that asks, “What insurance

Search engines are getting better at understanding how to deal with unusual searches.

groan when they have to do it. They're not interested past that. And to a great extent, that's true. But increasingly, people are happy to talk about insurance, because if they've got a problem, they know there are others out there with the same problem. They're happy to share that problem in the hope and expectation that someone will help them solve it.

Once they've joined our groups, we also actively encourage people to bring other people they know into the group. It's a one-click process

are you looking for?” Every now and then, we get some interesting replies. For example, someone asked us to create insurance for quad bikes, also known as all-terrain vehicles. You cannot insure a quad bike in the UK if it's not a road-going vehicle. The vast majority of quad bikes in the UK are not road-going vehicles because they're driven on beaches or on private land. As a result, they're not insured. We're working to find an insurer to provide coverage for this member, who incidentally got 450 people in her club to join a

group of people who want insurance for quad bikes.

Where will you take the business in the next year?

For starters, we are working toward creating a “social thumbprint” of each of our groups to help identify an individual’s insurance needs. We can use that to talk to people in the same way Amazon does to make personalized recommendations. We want to use the social

data we have to improve an individual’s insurance experience.

We also want to analyze claims experience and what people are claiming for. We want to use this data to analyze which groups of people have better or worse claims experiences and are more or less likely to claim. Insurers can use that information to drive pricing. If you can do all of that using publicly available information, that’s hugely compelling.

***Miguel Ortiz** is a senior partner and managing director in the London office of The Boston Consulting Group and the firm’s worldwide topic leader for life insurance. You may contact him by e-mail at ortiz.miguel@bcg.com.*

GETTING FIT FOR TRANSFORMATION

THE OTHER STRATEGY EVERY IT LEADER NEEDS

by Andrew Arcuri and Richard Helm

TO BUILD ADVANTAGE, ORGANIZATIONS must do more than just change. They must transform. As technology's role in business becomes ever more important, transformations will increasingly be underpinned by significant technology programs. In such technology-enabled transformations, IT leaders need two different strategies to ensure success.

One is a strategy for delivering significant changes, such as digitizing operations, replacing or modernizing systems, and standardizing infrastructure and applications. As part of this strategy, IT leaders must also develop the necessary tactics, multiyear roadmaps, and plans to deliver the technology to support the business transformation.

The second strategy, which is often overlooked, must ensure that the IT organization itself has the right functional capabilities to drive and sustain the transformation. Organizations that reap material benefits from transformations are those with the right organizational capabilities in place—the right team, organization, processes, tools, and culture—to become truly world class. (See *Transformation: The Imperative to Change*, BCG report, November 2014.) In a technology-enabled transformation, the maturity of the IT team's capabilities is especially important.

To get their organizations fit to support a transformation, IT leaders must develop a

strategy and design an explicit plan to assess and develop the capabilities they need to make the transformation successful. The plan must consider how well IT management functions and disciplines are embedded and executed across the business and encompass functions such as IT planning, sourcing, delivery, budgeting, and benefits realization.

The Importance of a Fit IT Function

When technology-enabled transformations fail, they fail hard. Average performance is not good enough. (See Exhibit 1.) In most cases, that failure arises not because intent or talent is lacking but because the IT organization is not fit to complete the multi-year marathon that a transformation represents. Common weaknesses include inadequate management of the portfolio, program, and projects, which can erode the full benefits of the transformation, and poor capabilities in managing vendors and contracts, which can allow costs and scope to spiral out of control.

An unfit IT organization can jeopardize a technology-enabled transformation and with it benefits worth hundreds of millions of dollars.

In contrast, fit IT organizations deliver transformation programs more consistently and

EXHIBIT 1 | Average Is Not Good Enough

Program type	With average performance, you will...		
	deliver only...	spend...	finish...
IT-enabled business transformation <ul style="list-style-type: none"> • Core-system modernization • Digital transformation • Structural-cost transformation 	25% of the benefits	80% over budget	75% over schedule
IT transformation <ul style="list-style-type: none"> • Complete IT infrastructure transformation • Full cloud transformation • Complete IT-sourcing transformation 	60% of the benefits	15% over budget	35% over schedule
Smaller IT projects <ul style="list-style-type: none"> • Application rationalization • Desktop upgrade 	70% of the benefits	10% over budget	20% over schedule

Sources: Panorama Consulting Solutions' 2014 ERP Report; Nexus Strategic Partnerships' Commonwealth Governance Handbook; Oxford University; Gartner; The Aberdeen Group; BCG experience.

Note: Numbers are rounded to the nearest 5 percent.

predictably, make better trade-offs and resource-allocation decisions, and work more effectively and efficiently internally and with third parties, including vendors and system integrators. (See the sidebar, "Getting the IT Function Fit to Support a Global Operating Model.")

How to Get Fit for Transformation

To develop their fit, transformation-ready IT strategy, leaders must answer three questions:

- *Which specific capabilities are needed to support the transformation?* Different types of transformation require different strengths.
- *How good are my capabilities today, and how good do they need to be?* Organizations should identify where, and how much, muscle is required to reach the desired target.
- *What is the right way to improve capabilities?* Leaders must define a manageable set of clear, outcome-focused initiatives to improve capabilities in the areas where they are needed most.

An IT organization can rely on a framework called the IT Capability Maturity Framework (IT-CMF) to answer these questions. The IT-CMF was developed by the Innovation Value Institute, a global consortium that brings together a broad set of industry practitioners, academics, and corporate advisors; The Boston Consulting Group is a founding member. The IT-CMF is the only framework that explicitly aligns IT with business value.

The framework provides a structured and comprehensive set of 32 capabilities linked to the ways in which IT drives value. Individual capabilities are supported by an objective set of criteria to assess or demonstrate maturity and metrics to measure the contribution to business value. These capabilities fall into nine groups that address the different ways that technology drives value to the business:

- *IT-Enabled Business Innovation:* Value through executing product, service, process, and IT innovations
- *Agile IT Architecture:* Value through achieving system flexibility and integration capability to enable efficient business change

GETTING THE IT FUNCTION FIT TO SUPPORT A GLOBAL OPERATING MODEL

A leading company with more than 100,000 employees and a global footprint was pursuing a major transformation to establish a global operating model that would allow it to run standard processes and maintain common structures across geographically separate operations and business functions. It wanted to build a leaner, more productive, and flexible organization through standardization, global efficiencies, and insights from standard planning and operations.

Technology was a critical enabler for the target state, based on standard enterprise-resource-planning systems, desktop operating environments, and global infrastructure. To move toward a global operating model, the company needed to transform the way it delivered technology by using standard, cloud-based, and smarter-sourced technology assets and service inputs.

To get the IT organization fit for transformation, the company developed a roadmap for the three most critical areas:

- Refocusing the IT organization to describe, provide, and support technology service outputs from end to end in a way that was relevant to the business, to inform business-led trade-offs involving technology volumes, quality, and costs
- Developing the capability to drive real transparency of technology service

costs and performance, in particular by linking cost and quality measures to business consumption

- Building a minimum-sufficient capability for capacity forecasting and planning to provide a line of sight into future business supply and demand in terms of IT service outputs rather than just technology inputs

The plan drew heavily on the IT-CMF to frame the analysis and discussions; provide clear, business-value implications for investing in functional capabilities; and describe the practices, outcomes, and metrics for success necessary to strengthen these critical capabilities.

The completed functional-technology strategy, roadmap, and detailed implementation plans were incorporated into the company's overall IT strategy, with strong resourcing and senior-executive commitment. With the potential to reduce technology costs by as much as 30 percent, the investment in functional-technology capabilities is already returning multiples of investment, within a very short time frame. This investment is now seen as central to the success of the company's ongoing technology-enabled transformation and productivity agendas.

- **Business and IT Operational Integration:** Value through strong business and IT collaboration
- **Business and IT Strategic Alignment:** Value through an integrated business and IT strategy and roadmap
- **High-Performance Organization:** Value through an effective and efficient organization to deliver IT services
- **Portfolio, Program, and Project Delivery:** Value through well-governed portfolio-prioritization and program-delivery processes
- **Service Delivery:** Value through standard, simple services with cost and quality differentiated on the basis of business needs
- **Sourcing Management:** Value through a strategic sourcing capability that enables

access to scale, efficiency, and market innovation

- *Cost Management:* Value through transparent, relevant, and business-oriented forecasting and allocation

Which capabilities are needed? To get transformation ready, an IT organization first needs a clear view of its current capabilities. Then, it can pinpoint the capabilities it needs to strengthen when getting fit for a particular transition—particularly important because required capabilities vary by type of transformation. (See Exhibit 2.)

For example, when contemplating a fundamental shift in operating models such as a core-system modernization, capabilities associated with large-program delivery will be the most critical. In contrast, during a structural-cost transformation, capabilities such as

sourcing management and cost management will be essential to deliver a simpler and more efficient IT environment. And a transformation that focuses on digital innovation should focus on strengthening the capabilities encompassed in the IT-enabled business innovation group (among others) to drive alignment, innovation, and collaboration between the business and IT teams.

The relevance of different capabilities also differs over time. In the early stages of a transformation, when funding the journey is the priority, the cost management group is likely to be prominent, for example, and portfolio, program, and project delivery will come to the fore once savings have been reinvested in IT.

The IT-CMF can provide invaluable guidance for organizations that seek to pursue a variety of strategic imperatives. Some organiza-

EXHIBIT 2 | Matching Capabilities to Transformation Types

Functional-capability groups	IT-CMF key capabilities	Transformation examples		
		Core-system modernization	Digital transformation	Structural-cost transformation
IT-enabled business innovation	<ul style="list-style-type: none"> • Innovation management • Knowledge management • Research development and engineering 		Most relevant	
Agile IT architecture	<ul style="list-style-type: none"> • Enterprise architecture management • Business process management • People asset management 	Most relevant	Most relevant	
Business and IT operational integration	<ul style="list-style-type: none"> • Relationship asset management • Service analytics and intelligence • Risk management 			Most relevant
Business and IT strategic alignment	<ul style="list-style-type: none"> • Strategic planning • Business planning • Portfolio planning and prioritization 	Most relevant	Most relevant	
High-performance organization	<ul style="list-style-type: none"> • Organization design and planning • IT leadership and governance • People asset management 	Most relevant	Most relevant	
Portfolio, program, and project delivery	<ul style="list-style-type: none"> • Program and project management • Benefits assessment and realization • Portfolio planning and prioritization 	Most relevant		
Service delivery	<ul style="list-style-type: none"> • Technical infrastructure management • Solution delivery • Service management 			Most relevant
Sourcing management	<ul style="list-style-type: none"> • Sourcing • Supplier management • Capacity forecasting and planning 	Most relevant		Most relevant
Cost management	<ul style="list-style-type: none"> • Total cost of ownership • Accounting and allocation • Budget oversight and planning 			Most relevant

Source: BCG analysis.

tions will use the framework to reduce costs in the face of high IT spending, and others will use it to target areas for investment to improve capabilities. It can also be used to align the capabilities an organization has currently with those it needs for the future.

One organization faced serious issues about the governance of its large IT-enabled transformation programs, which were worth more than \$500 million. The company had about a dozen large IT programs under way, and management was fielding regular requests from each for more funds. As a result, senior management and the board of directors were losing faith in the organization's ability to manage multiple large technology programs at the same time. Using the IT-CMF framework, the company was able to identify the necessary changes to get the transformation programs back on track: improved management of the overall technology-investment portfolio, better program and project management, and more effective ways of assessing and monitoring benefits, to ensure that they were actually delivered.

A large Asian bank with an ambitious digital agenda but immature capabilities and ad hoc service-management processes serves as another example. Its outsourcing arrangements were not well managed, and its IT architecture was not digital ready. Talent management was also a major issue. Using the IT-CMF, we designed a new organization structure that optimized spans of control, improved decision making, and introduced an initiative to nurture new capabilities in the areas of digital, enterprise architecture, and analytics. Ultimately, the plan led to improvements in the total cost of ownership, turnaround time, and quality of service delivery.

How good must the capabilities be? Getting IT fit for transformation requires strengths in particular capabilities. Too often, capability improvement is considered a business-as-usual activity and does not attract the funding or attention it needs in the context of transformation.

The IT-CMF provides a comprehensive, broad assessment that allows organizations to benchmark their IT functions against those of

peers in similar industries. The assessment process is fast and instructive, highlighting clear capability gaps and providing global benchmarking. The results remain clearly linked to required business outcomes.

A practical way to apply the framework is for IT and business leaders to jointly work through the priority capabilities and their relative importance and then determine the target level of maturity. This exercise not only gives senior stakeholders insights into the highest-priority capabilities but also builds stronger engagement between the business and IT.

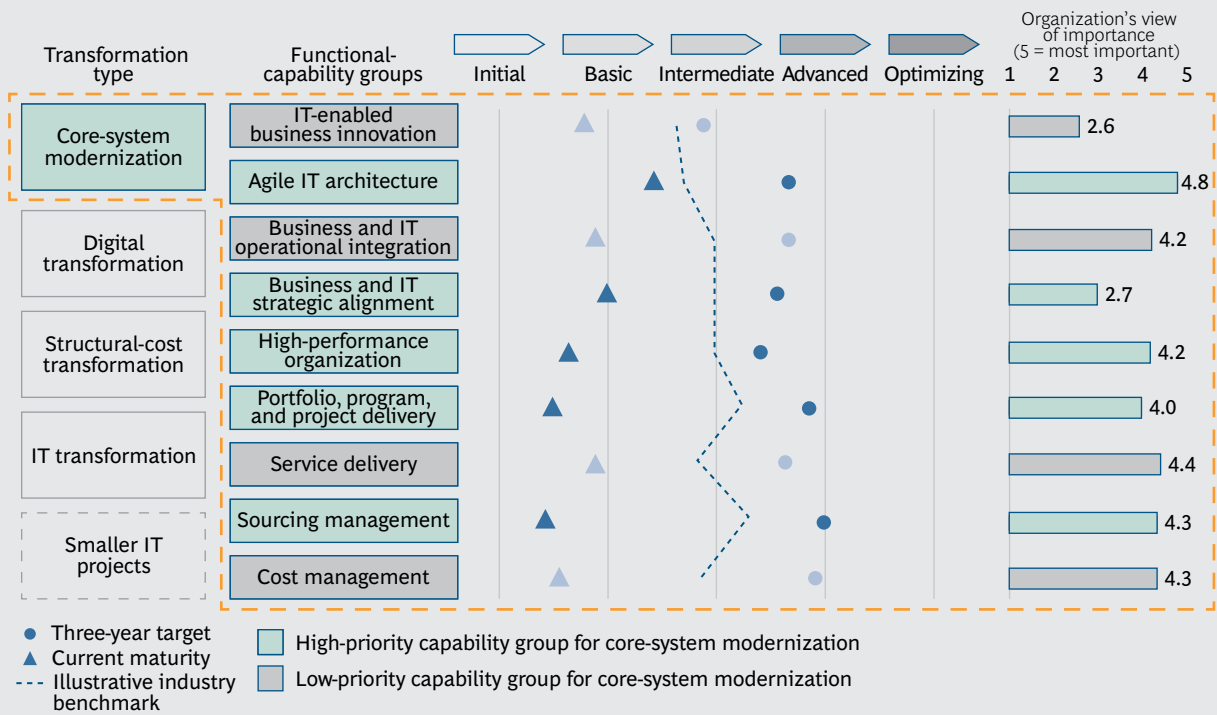
It takes 18 to 24 months of effort to lift a single capability area by one maturity level.

Exhibit 3 is an example of one organization's current functional IT capabilities, future aspirations, and comparison with industry peers. This type of output can support decision making about which capabilities an organization should invest in to become fit for transformation. Notably, this example shows that an organization's own perspective of the capabilities that matter most for a transformation is often different from the capabilities identified using an objective, evidence-based framework like the IT-CMF.

For a company that was shifting to a global operating model for technology and a global sourcing model, the IT-CMF assessment indicated the need to invest in the IT organization's capabilities for cost accounting and allocation, service management, and supplier management, as well as in systems to support packaging and billing the IT services that the function provided to the business.

What is the right way to improve capabilities? Improving organizational capabilities is hard. It typically takes 18 to 24 months of focused, well-resourced, and disciplined effort to lift a single capability area by one maturity level. This effort will include embedding accountabilities, processes, tools, and decision making.

EXHIBIT 3 | IT-CMF Shows Where to Invest to Become Fit for Transformation



Sources: Innovation Value Institute's IT-CMF executive assessment; BCG analysis.
Note: The exhibit shows an illustrative IT-CMF assessment.

The IT-CMF defines the set of activities an organization must undertake to reach the next level of maturity. For example, to move up from level 2 to level 3 in project and program management, where IT contributes directly to business value rather than just being a service provider, requires the following steps:

- A move from rudimentary project- and program-management disciplines that are inconsistently applied across the IT organization to consistent, well-defined, organization-wide project- and program-management approaches applied everywhere
- A move from basic and project-specific benefit assessment and tracking approaches that are applied inconsistently and only for some projects to a standard, enterprise-wide discipline for defining IT and business benefits and tracking them against project milestones
- A move from simple project budgeting done by project managers in isolation and with inconsistent detail, time frames, and

reporting to project budgets that are set and monitored in a way that enables regular comparison of project budgets across the entire IT project portfolio and at both top and detailed levels

Typically, these activities will translate into a portfolio of three to ten initiatives, with time frames ranging from 3 months for rapid, quick-win enhancements to 18 to 24 months for more-structural reforms. The work needs to be supported by clear accountabilities, milestones, and definitive metrics that can demonstrate improvement in functional capabilities. Including these initiatives within the wider organization's project portfolio in terms of getting approval and funding is essential to making sure they get done. Regular reporting on progress helps to maintain momentum by securing strong commitment and decisiveness from the most senior leaders of the IT business.

For example, a European bank was spending more than €150 million a year on IT infrastructure and seeking to unlock savings. The IT-CMF revealed key capability gaps in the

bank's technical infrastructure and a clear need to increase maturity for most of the IT-CMF's critical processes and life-cycle phases. As well as identifying quick wins, the resulting strategy focused on closing long-term capability gaps in two key areas. On the basis of a three-month assessment, the bank was able to save several million euros annually by improving its decommissioning practices.

The bank was able to save several million euros annually by improving its decommissioning practices.

Leading organizations that use the IT-CMF undertake periodic (often, annual) benchmarking of their IT capability maturity to assess how far they have progressed toward their goal of becoming fit for transformation.

ORGANIZATIONS that systematically strengthen their most critical functional IT capabilities early in a transformation are consistently better at delivering on the promised value. Indeed, an explicit and early focus on the most critical capabilities and the right investments in resources, effort, and management attention are what separates success from failure.

While the task may seem daunting, in practice, we have seen highly committed organizations use reliable and tested tools like the IT-CMF to enhance their most critical transformation capabilities in the course of just a few months. In this way, organizations can get fit quickly and lay the foundation for a successful business transformation.

***Andrew Arcuri** is a principal in the Sydney office of The Boston Consulting Group. Andrew has deep functional expertise in IT in both the public and private sectors, with a particular focus on IT strategy, IT transformation, IT sourcing, and cloud strategy. Before joining the firm, Andrew was the managing director of a technology solutions company, supplying ICT equipment and managed services to education providers. You may contact him by e-mail at arcuri.andrew@bcg.com.*

***Richard Helm** is a partner and managing director in BCG's Sydney office. He is a core member of the firm's Technology Advantage practice and has spent more than a decade supporting technology-enabled transformations in multiple industries. Richard is an internationally known authority on software architecture and has published widely on the subject. Prior to joining BCG, he worked for IBM, including a stint at the Thomas J. Watson Research Center. You may contact him by e-mail at helm.richard@bcg.com.*

HOW TO AVOID THE BIG BAD DATA TRAP

by Tamim Saleh, Erik Lenhard, Nic Gordon, and David Opolon

USING UNSTRUCTURED AND IMPERFECT big data can make perfect sense when companies are exploring opportunities, such as creating data-driven businesses, and trying to better understand customers, products, and markets. However, using poor-quality and badly managed data to make high-impact management decisions is courting disaster. Garbage in, garbage out, as the old technology mantra goes.

Data once resided only in a core system that was managed and protected by the IT department. In this small-data world, it was hard to get perfect data, but companies could come close. With big data, the quality of data has changed dramatically. Much of it arrives in the form of unstructured, “noisy” natural language, such as social media updates, or in numerous incompatible formats from sensors, smartphones, databases, and the Internet. With a small amount of effort, companies can often find a signal amid the noise. But at the same time, they can fall into the big bad data trap: thinking that the data is of better quality than it is.

The causes of bad data often include faulty processes, ad hoc data policies, poor discipline in capturing and storing data, and external data providers that are outside a company’s control. Proper data governance must become a priority for the C suite, to be sure. But that alone won’t get a company’s data-quality house in order. Companies must adopt a systematic approach to what we call “total data-quality management.”

The Impact of Big Bad Data

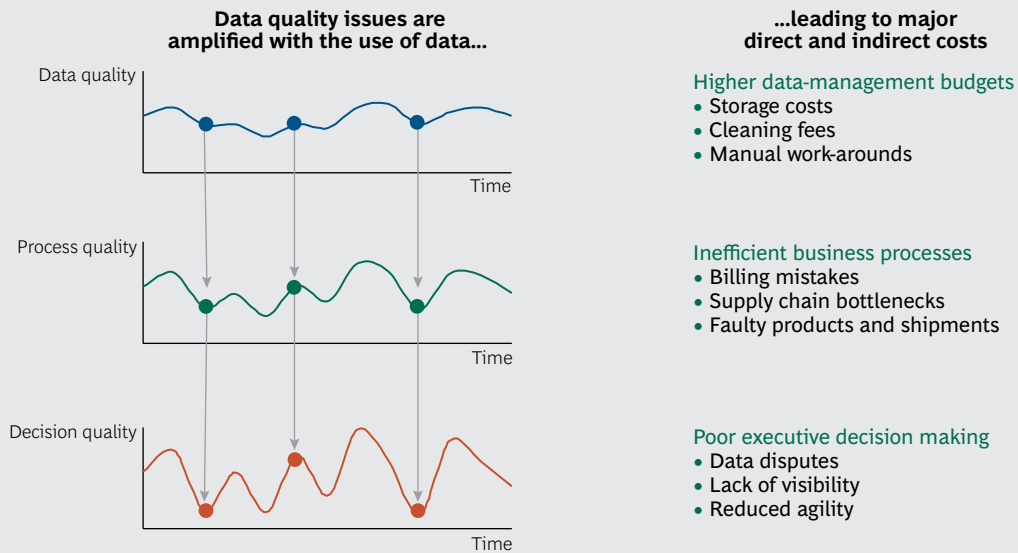
We regularly uncover contradictory, incorrect, or incomplete data when we work with companies on information-intensive projects. No matter the industry, often a company’s data definitions are inconsistent or its data-field descriptions (or metadata) have been lost, reducing the usefulness of the data for business analysts and data scientists.

Using poor-quality data has a number of repercussions. Sometimes data discrepancies among various parts of a business cause executives to lose trust in the va-

lidity and accuracy of the data. That can delay mission-critical decisions and business initiatives. Other times, staff members develop costly work-arounds to correct poor-quality data. A major bank hired 300 full-time employees who fixed financial records every day. This effort cost \$50 million annually and lengthened the time needed to close the books. In the worst cases, customers may experience poor service, such as billing mistakes, or the business might suffer from supply chain bottlenecks or faulty products and shipments. The impact is magnified as bad data cascades through business processes and feeds poor decision making at the highest levels. (See Exhibit 1.)

In particular, companies routinely lose opportunities because they use poor-quality big data to make major executive decisions. From our experience with 35 companies, we estimate that using poor-quality big data sacrifices 25 percent of the full potential when making decisions in areas such as customer targeting, bad-debt reduction, cross-selling, and pricing. Our calculations show that reve-

EXHIBIT 1 | Bad Data Destroys Value



Source: BCG analysis.

nues and earnings before interest, taxes, depreciation, and amortization could have been 10 percent higher if these companies had better quality data.

A global financial institution conducted a big-data pilot project and identified what it thought was a pricing opportunity to increase margins by more than \$50 million per year, or 10 percent of revenues. But the underlying data contained only invoice line items; it was missing important metadata about how the bank had calculated and applied fees. In the three months it took to correct the data quality issues and implement the pricing strategy, the company lost more than a quarter of its potential profits for the first year, equal to at least \$15 million. It also lost agility in seizing an important opportunity.

In simpler times, companies such as this one could base decisions on a few data sets, which were relatively easy to check. Now, organizations build thousands of variables into their models; it can be much too complex to check the accuracy of every variable. Some models are

so difficult to understand that executives feel they must blindly trust the logic and inputs.

How to Break Out of the Trap

As information becomes a core business asset with the potential to generate revenue from data-driven insights, companies must fundamentally change the way they approach data quality. (See “Seven Ways to Profit from Big Data as a Business,” BCG article, March 2014.) As with other fundamental shifts, mind-sets must be changed, not only technology.

However, companies frequently struggle to prioritize data quality issues or feel they must tackle all of their problems at once. Instead, we propose executives take the following seven steps toward total data-quality management, a time-tested approach that weighs specific new uses for data against their business benefits.

Identify the opportunities. To find new uses for data, start by asking, “What questions do we want to an-

swer?” A systematically creative approach we call “thinking in new boxes” can help unlock new ideas by questioning everyday assumptions.¹ Other approaches, such as examining data sources, business KPIs, and “pain points,” can be rich sources of inspiration. (See the “Big Data and Beyond” collection of articles for a sample of high-impact opportunities in a range of industries.)

After identifying a list of potential uses for data—such as determining which customers might buy additional products—prioritize the uses by weighing the benefits against the feasibility. Start with the opportunities that could have the biggest impact on the bottom line. Be sure to assess the benefits using multiple criteria, such as the value a data use can create, the new products or services that can be developed, or the regulatory issues that can be addressed. Then consider the uses for data in terms of technical, organizational, and data stewardship feasibility. Also look at how the data use fits in with the company’s existing project portfolio.

Determine the necessary types and quality of data. Effectively seizing opportunities may require multiple types of data, such as internal and third-party data, as well as multiple formats, such as structured and unstructured. Before jumping into the analysis, however, the best data scientists and business managers measure the quality of the required data along a range of dimensions, including the following:

- *Validity*, the degree to which the data conforms to logical criteria
- *Completeness*, the degree to which the data required to make decisions, calculations, or inferences is available
- *Consistency*, the degree to which data is the same in its definition, business rules, format, and value at any point in time
- *Accuracy*, the degree to which data reflects reality

- *Timeliness*, the degree to which data reflects the latest available information

Each dimension should be weighted according to the business benefits it delivers, as explained in the previous step. We also recommend that companies use a multitier standard for quality. For example, financial applications require high-quality data; for bundling and cross-selling applications, however, good data can be good enough.

Define clear targets for improvement. The data assessment process provides a baseline from which to improve the quality of data. For each data source, determine the target state per data quality dimension.

A gap analysis can reveal the difference between the baseline and target state for each data source and can inform an action plan to improve each data-quality dimension. Gaps can be made visible and

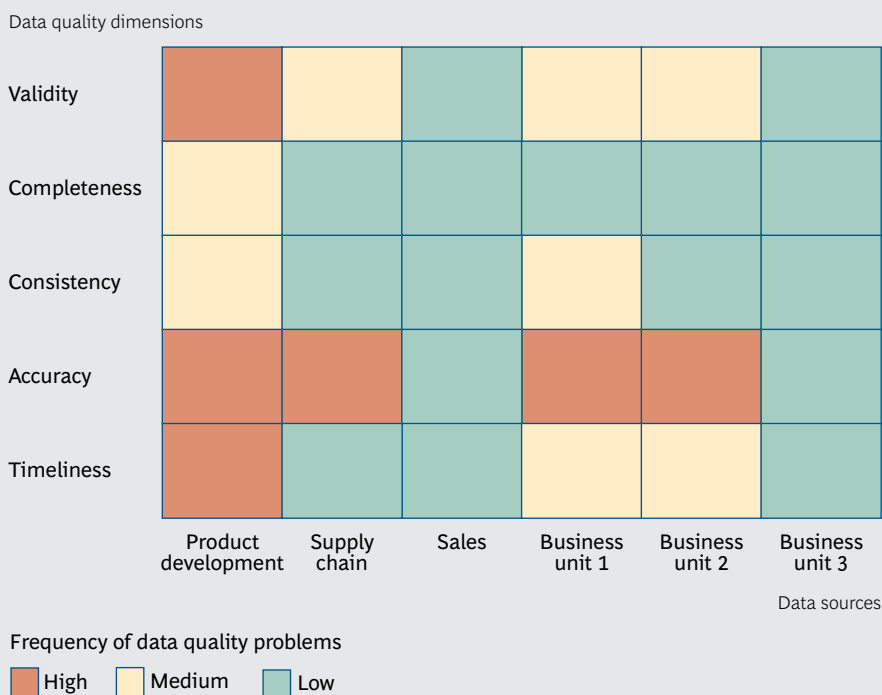
tracked through a dashboard that color-codes performance for each of the major dimensions of data quality. (See Exhibit 2.)

Build the business case. Data quality comes at a price. To develop an argument for better-quality business data, companies must quantify the costs—direct and indirect—of using bad data as well as the potential of using good data.

Direct costs can include, for example, additional head-count expenditures that result from inefficient processes, cleanup fees, and third-party data bills. Indirect costs can result from bad decisions, a lack of trust in the data, missed opportunities, the loss of agility in project execution, and the failure to meet regulatory requirements, among other things.

The upside of high-quality data can be significant, as the prioritization of particular uses makes

EXHIBIT 2 | Dashboards Make Data Quality Gaps Visible



Source: BCG analysis.

clear. For example, microtargeting allows companies to reach “segments of one,” which can enable better pricing and more effective promotions, resulting in significantly improved margins. The more accurate the data, the closer an offer can come to hitting the target. For example, an Asian telecommunications operator began generating targeted offers through big-data modeling of its customers’ propensity to buy. The approach has reduced churn among its highest-value customers by 80 percent in 18 months.

With costs and benefits in hand, management can begin to build the case for changing what matters to the business. Only then can companies put in place the right controls, people, and processes.

Root out the causes of bad data.

Many people think that managing data quality is simply about eliminating bad data from internal and external sources. People, processes, and technology, however, also affect the quality of data. All three may enable bad data to accumulate. For example, we have seen companies spend enormous amounts of time and money cleaning up data during the day that is overwritten at night.

Certain types of data quality issues can and must be fixed at the source, including those associated with financial information and operating metrics. To do that, companies may need to solve fundamental organizational challenges, such as a lack of incentives to do things right the first time. For example, a call center agent may have incentives to enter customer information quickly but not necessarily accurately, resulting in costly billing errors. Neither management nor the data entry person feels what BCG Senior Partner Yves Morieux

calls the “shadow of the future”—in this case, that entering inaccurate data negatively affects the overall customer experience.² Companies can also simplify data models and minimize manual interactions with data through approaches such as “zero-touch processing.”

Data must be owned to become high quality.
Companies can’t outsource this step.

It may not be possible or economical to fix all data-quality issues, such as those associated with external data, at the source. In such cases, companies could employ middleware that effectively translates “bad data” into “usable data.” As an example, often the structured data in an accounts payable system does not include sufficient detail to understand the exact commodity being purchased. Is an invoice coded “computing” for a desktop or a laptop? Workarounds include text analytics that read the invoice text, categorize the purchase, and turn the conversion into a rule or model. The approach can be good enough for the intended uses and much more cost effective than rebuilding an entire enterprise-software data structure.

Assign a business owner to data.

Data must be owned to become high quality. Companies can’t outsource this step. Someone on the business side needs to own the data, set the pace of change, and have the support of the C suite and the board of directors to resolve complex issues.

Many organizations think that if they define a new role, such as a data quality officer, their problems will be solved. A data quality offi-

cer is a good choice for measuring and monitoring the state of data quality, but that is not all that needs to be done, which is why many companies create the position of business data owner. The person in this role ensures that data is of high quality and is used strategically throughout the organization.

Among other responsibilities, the business data owner is accountable for the overall definition of end-to-end information models. Information models include the master data, the transaction data standards, and the metadata for unstructured content. The owner focuses on business deliverables and benefits, not on technology. The business ownership of data needs to be at a level high enough to help prioritize the issue of quality and generate buy-in but close enough to the details to effect meaningful change. The transformation needed is sometimes quite fundamental to the business.

Owners must also ensure that data quality remains transparent. Companies should have a target of 100 percent across all quality dimensions for customer data, such as names and addresses, and make that data accessible through a system such as a “virtual data mart” that is distinct from the storage of lower-quality data, such as reputation scores.

Scale what works. Data quality projects often run into problems when companies expand them across the business. Too many big-data projects cherry-pick the best quality data for pilot projects.

When it's time to apply insights to areas with much higher levels of bad data, the projects flounder.

To avoid the "big program" syndrome, start small, measure the results, gain trust in effective solutions, and iterate quickly to improve on what works. But don't lose sight of the end game: generating measurable business impact with trusted high-quality data.

the top 25 KPIs. And the company is launching a pilot program in advanced analytics to act as an incubator for developing big-data capabilities in its business units and creating a path to additional growth.

Finally, it is creating a position for a business data owner who will be responsible for governing, designing, and improving the company's information model.

Tamim Saleh is a senior partner and managing director in the London office of The Boston Consulting Group and the global leader of the firm's big-data and advanced-analytics topic area. Tamim has extensive experience in areas such as business and IT transformation, big-data and technology strategy development, mergers and acquisitions, cost reduction, and outsourcing. You may contact him by e-mail at saleh.tamim@bcg.com.

Erik Lenhard is a principal in BCG's Munich office. He is a core member of the firm's Technology Advantage practice and a member of BCG's big-data leadership team. Prior to joining the firm, Erik was head of information management at Europe's largest cable operator. He is also highly experienced in data warehousing and agile software development. You may contact him by e-mail at lenhard.erik@bcg.com.

Nic Gordon is an associate director in BCG's London office. He has nearly 25 years of experience in financial services and has focused on developing data governance policies and building big-data capabilities. Nic has led global teams tasked with developing the IT strategy and data architecture for leading companies. You may contact him by e-mail at gordon.nic@bcg.com.

David Opolon is a principal in the firm's Boston office. He is a core member of BCG's Marketing, Sales & Pricing and Financial Institutions practices. David's expertise includes transforming pricing strategies and increasing companies' share of wallet using big data and advanced analytics. You may contact him by e-mail at opolon.david@bcg.com.

With the rise of big data, companies risk magnifying the impact of underlying inaccuracies.

Consider the journey of an international consumer-goods company that wants to become a real-time enterprise that capitalizes on high-quality data. Before the transformation began, the company had a minimal level of data governance. Data was locked in competing IT systems and platforms scattered across the organization. The company had limited real-time performance-monitoring capabilities, relying mostly on static cockpits and dashboards. It had no company-wide advanced-analytics team.

To enable a total data-quality management strategy, the CEO created a central enterprise-information-management (EIM) organization, an important element of the multiyear strategy to develop data the company could trust. The company is now beginning to centralize data into a single high-quality, on-demand source using a "one touch" master-data collection process. Part of the plan is also to improve speed and decision making with a real-time cockpit of trusted customer information that is accessible to thousands of managers using a standardized set of

This multiyear transformation will be entirely self-funded from improved efficiencies, such as a projected 50 percent decrease in the number of employees who touch the master data and a 20 to 40 percent decline in the number of full-time information-management staff.

The Data Quality Imperative

Poor-quality data has always been damaging to business. But with the rise of big data, companies risk magnifying the impact of underlying inaccuracies and errors and falling into a big bad data trap.

Smart companies are beginning to take an end-to-end approach to data quality. The results from such transformations can be truly big.

NOTES

1. Luc De Brabandere and Alan Iny, *Thinking in New Boxes: A New Paradigm for Business Creativity* (New York: Random House, 2013).
2. Yves Morieux and Peter Tollman, *Six Simple Rules: How to Manage Complexity without Getting Complicated* (Boston: Harvard Business Review Press, 2014).

NOTE TO THE READER

Acknowledgments

The authors thank their colleagues at The Boston Consulting Group who contributed to the publication, especially Astrid Blumstengel, Julia Booth, Marita Hastings, Jérôme Moreau, Daina Paulikas, Amanda Provost, Stuart Scantlebury, and Skye Whiteman, as well as former colleagues Thomas Krenik and Tim Whiteley, and Elliot “Skip” Stein Jr. The authors also thank Katherine Andrews, Mickey Butts, Gary Callahan, Alan Cohen, Angela DiBattista, Elyse Friedman, Kim Friedman, Abby Garland, Gerry Hill, Sara Strassenreiter, and Mark Voorhees for their help in the publication’s writing, editing, design, and production.

For Further Contact

Ralf Dreischmeier

*Senior Partner and Managing Director
Global Leader, Technology Advantage
Practice*
BCG London
+44 020 7753 5353
dreischmeier.ralf@bcg.com

Andrew Arcuri

Principal
BCG Sydney
+61 2 9323 5600
arcuri.andrew@bcg.com

Jon Brock

Associate Director
BCG London
+44 020 7753 5353
brock.jon@bcg.com

Sachpreet Chandhoke

Project Leader
BCG New York
+1 212 446 2800
chandhoke.sachpreet@bcg.com

Joost de Kock

Partner and Managing Director
BCG Sydney
+61 2 9323 5600
dekock.joost@bcg.com

Nic Gordon

Associate Director
BCG London
+44 020 7753 5353
gordon.nic@bcg.com

Richard Helm

Partner and Managing Director
BCG Sydney
+61 2 9323 5600
helm.richard@bcg.com

Heiner Himmelreich

Partner and Managing Director
BCG Amsterdam
+31 20 548 4000
himmelreich.heiner@bcg.com

Sesh Iyer

Partner and Managing Director
BCG Washington, DC
+1 301 664 7400
iyer.sesh@bcg.com

Erik Lenhard

Principal
BCG Munich
+49 89 231 740
lenhard.erik@bcg.com

David Mark

Senior Partner and Managing Director
BCG San Francisco
+1 415 732 8000
mark.david@bcg.com

David Opolon

Principal
BCG Boston
+1 617 973 1200
opolon.david@bcg.com

Miguel Ortiz

Senior Partner and Managing Director
BCG London
+44 020 7753 5353
ortiz.miguel@bcg.com

Wouter Pomp

Project Leader
BCG Amsterdam
+31 20 548 4000
pomp.wouter@bcg.com

Mike Quinn

Project Leader
BCG Detroit
+1 248 688 3500
quinn.mike@bcg.com

Benjamin Rehberg

Partner and Managing Director
BCG New York
+1 212 446 2800
rehberg.benjamin@bcg.com

Tamim Saleh

Senior Partner and Managing Director
BCG London
+44 020 7753 5353
saleh.tamim@bcg.com

Saurabh Shah

Project Leader
BCG Los Angeles
+1 213 621 2772
shah.saurabh@bcg.com

Filippo L. Scognamiglio Pasini

Principal
BCG New York
+1 212 446 2800
scognamiglio.filippo@bcg.com

Sanjay Verma

Partner and Managing Director
BCG San Francisco
+1 415 732 8000
verma.sanjay@bcg.com

© The Boston Consulting Group, Inc. 2015. All rights reserved.

For information or permission to reprint, please contact BCG at:

E-mail: bcg-info@bcg.com

Fax: +1 617 850 3901, attention BCG/Permissions

Mail: BCG/Permissions

The Boston Consulting Group, Inc.

One Beacon Street

Boston, MA 02108

USA

To find the latest BCG content and register to receive e-alerts on this topic or others, please visit bcgperspectives.com.

Follow [bcg.perspectives](https://www.facebook.com/bcg.perspectives) on Facebook and Twitter.



BCG

THE BOSTON CONSULTING GROUP

Abu Dhabi
Amsterdam
Athens
Atlanta
Auckland
Bangkok
Barcelona
Beijing
Berlin
Bogotá
Boston
Brussels
Budapest
Buenos Aires
Calgary
Canberra
Casablanca

Chennai
Chicago
Cologne
Copenhagen
Dallas
Detroit
Dubai
Düsseldorf
Frankfurt
Geneva
Hamburg
Helsinki
Ho Chi Minh City
Hong Kong
Houston
Istanbul
Jakarta

Johannesburg
Kiev
Kuala Lumpur
Lisbon
London
Los Angeles
Luanda
Madrid
Melbourne
Mexico City
Miami
Milan
Minneapolis
Monterrey
Montréal
Moscow
Mumbai

Munich
Nagoya
New Delhi
New Jersey
New York
Oslo
Paris
Perth
Philadelphia
Prague
Rio de Janeiro
Riyadh
Rome
San Francisco
Santiago
São Paulo
Seattle

Seoul
Shanghai
Singapore
Stockholm
Stuttgart
Sydney
Taipei
Tel Aviv
Tokyo
Toronto
Vienna
Warsaw
Washington
Zurich