PERSPECTIVES

VOL.08

THE ASCENT OF
**SMARTER, FASTER,
LIGHTER** ENTERPRISES

TATA CONSULTANCY SERVICES

A WORLD OF
BOUNTIFUL OPPORTUNITIES

It is rather easy to forget, in today's time of economic and political uncertainty, the unprecedented opportunities presented by the rapidly changing technology landscape.

These opportunities are there in abundance because of a simple, undeniable fact: digital technologies are rendering obsolete many longstanding business processes and the business models on which they are based. And where there is obsolescence, there is also great opportunity—but only for companies that are willing and able to do things differently.

However, in a business world in which technology has been evolving at a fast pace, you may be asking this: "To what end?" What is the end result of doing things digitally?

That brings me to this issue of *Perspectives*. We explain why every large company must invest purposefully to become smarter, faster and lighter enterprises. Customers expect it, competition demands it.

N. Chandrasekaran
CEO & Managing Director

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THE ASCENT OF THE
SMARTER, FASTER, LIGHTER
ENTERPRISE

AUTHOR

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Peter Drucker, the legendary management scholar and consultant, noted in a 1994 *Harvard Business Review* article that the assumptions businesses make—about customer behaviors, competitors, and markets—constitute their theory of business.[1] The theory that a company develops, dictates what it should do and how it should do it, and can be a powerful tool to guide the enterprise.

However, when those assumptions no longer reflect reality, the decisions a company makes that once led to profitability can lead it astray. The failure to change the theory (and the assumptions that undergird it) to align with the new reality, Drucker wrote, is at the root of all business crises.

Today, because customer behaviors, markets, and competitors have all changed, and continue to change rapidly, business theories do not reflect reality for very long. This is why so many companies, especially those most affected by the digitization of everything, are in crisis. It is why they need to revise their theories of business to become smarter, faster, and lighter.

[1] Harvard Business Review, The Theory of Business, September-October, 1994. accessed July 5, 2016, https://hbr.org/1994/09/the-theory-of-the-business

THE REVOLUTION IN CUSTOMER BEHAVIOR

How much have business theories changed over this decade? Look at one aspect of customer behavior—the shopping patterns of consumers. Just a few years ago, when a shopper entered a store, his or her choice was limited to what was on the shelves. Today, armed with smart mobile devices, enabled by free, pervasive WiFi, a customer in Store A can:

- Compare the price and quality of what is on the shelves with an entire universe of competing products
- Obtain instant reviews of products from social media channels
- Text friends about their experiences with the products, or ask trusted strangers in online consumer forums
- Purchase the product from Store B while standing in Store A's aisle

This complex path to purchase promises to grow more varied, not less. According to a 2014 study, 22% of shoppers interacted digitally prior to shopping. While only 4% used a digital device during the shopping process, 75% said they planned to do so in the near future.[2] Just one year later, U.S. car buyers spent 60% of their time purchasing a vehicle doing online research. By the time they went to a dealer, 71% decided to buy the car they intended to purchase. If companies want to influence the customer's purchase, they need to do it much earlier in the so-called customer journey.[3]

A theory of business based on a static, linear customer journey, or one that prescribes a rigid customer experience, no longer reflects reality.

[2] IRI Worldwide, Channel Migration: The Road to Growth Has Many Lanes, September/October 2014, accessed July 5, 2016, http://supermarketnews.com/site-files/supermarketnews.com/files/uploads/2014/10/T_T%20SeptOct%202014_Channel%20Migration%20102714%5B1%5D.pdf

[3] PR Newswire, For Dealers, Online Presence Key to Influencing Car Shoppers, March 21, 2016, accessed July 11, 2016, http://www.prnewswire.com/news-releases/for-dealers-online-presence-key-to-influencing-car-shoppers-300238839.html

THE DIGITALLY SHIFTING COMPETITIVE LANDSCAPE

Traditionally, a company's growth strategy was to become the market leader in its core market segments, and then protect that position against competitors. But that does not account for the fact that competitors now emerge from different segments. In 2001, for example, Nokia was the top mobile phone manufacturer in the world. It had a robust, well-funded R&D function, and seemingly unassailable scale. In 2004, it still had over a third of the market.[4]

After Apple launched the iPhone in 2007 and Google's Android operating system came online the next year, Nokia's theory of the business became instantly obsolete.

Nokia was not defeated by another cell phone maker. It lost market share to a computer company and an online firm. Apple and Google developed technologies with an ecosystem that used the network effect, which made them valuable in the eyes of the consumers.[5]

A theory of business that fails to account for competitors emerging from entirely different sectors of the economy no longer reflects the reality of global competition. Due to powerful and fast-evolving technologies, easy access to capital, and lower barriers to entry, companies need to look beyond their segments and geographies to keep a weather eye out for fast-emerging competitors.

[4] GSMArena.com, The Rise, Dominance, and Epic Fall – a Brief Look at Nokia's History, August 12, 2015, accessed July 5, 2016, http://www.gsmarena.com/the_rise_dominance_ and_epic_fall__a_brief_look_at_nokias_history-blog-13460.php

[5] Harvard Business Review, Adaptability: The New Competitive Advantage, July-August 2011, accessed July 6, 2016, https://hbr.org/2011/07/adaptability-the-new-competitive-advantage

THE METAMORPHOSIS OF MARKETS

Nokia's size did not protect it. Indeed, scale, long an axiomatic part of strategies designed to dominate markets, has become less important and sometimes burdensome. In part, this is due to the increasing power of emerging markets. By 2025, it is estimated that developing economies could account for nearly 70% of global demand for manufactured goods.[6]

Increasingly, this shift in demand is forcing companies to personalize their offerings for markets by focusing on regional production, as have been the strategies of IKEA, P&G, Emerson, and others. This new reality can be seen clearly in the pharmaceutical sector. Large regulatory agencies like the U.S. Food and Drug Administration and the European Medical Agency have been promulgating faster approvals of new, personalized medicines for unmet medical needs in small patient populations. To take advantage of these new pathways, drug developers must be able to respond rapidly to guidance from regulators.

Smaller, more agile companies, unburdened by outdated workflows and less top-heavy, can make faster decisions and take advantage of regulator input more quickly than larger companies.

These small companies, with one or two drugs in their pipelines, can achieve enormous market valuations in short times. They move faster because they are much lighter organizations than big pharma.

[6] McKinsey, Manufacturing the Future, November 2012, accessed July 2, 2016, http://www.nist.gov/mep/data/upload/Manufacturing-the-Future.pdf

HOW TO GET SMARTER, FASTER, AND LIGHTER

How can companies change their theories of business to become smarter, faster, and lighter at the speed of these digitally driven transformations? We explain how to do it in the three sections of this edition of *Perspectives*.

Getting Smarter

One of the themes of this section is that companies must harness artificial intelligence (AI). TCS' Harrick Vin explains two key challenges that AI poses to companies. In our interview with Dartmouth Professor Vijay Govindarajan, he discusses how to accelerate culture changes of the type that digital technology is forcing companies to make.

TCS' Satya Ramaswamy's 2016 *Harvard Business Review* article, reprinted here in *Perspectives*, explains one big change that nearly every company will have to make over the rest of the decade to get smarter—listening and acting quickly upon the digital data that is streaming in from the wireless sensors they have installed in their products. Whether your company makes cars, coffee machines, or barbecues, it must give special treatment to such Internet of Things data that shows how your products are performing for customers.

We also profile The Associated Press, the 170-year-old news service that has been using AI to produce quarterly earnings stories without dedicating staff to write them. By the end of 2015, the software was generating 3,700 quarterly earnings stories covering all listed U.S. companies (and some in Canada). That has freed up AP's human workforce to do the deeper enterprise reporting its member newspapers need.

However, getting smarter through AI forces companies to get far better at analyzing the digital data that is coursing through their data centers. In her article, TCS' Lipika Dey explains the new tools for doing such crucial analytics. Our interview with University of Texas at Austin Professor Prabhudev Konana explores the metrics and skills necessary for analytics to have impact in an organization.

Finally, in this section the head of TCS' banking & financial services practice, K. Krithivasan, explains how banks and financial services firm are using analytics to make better decisions.

Getting Faster

As Tonya McKinney and Dave Anderson explain in their article on dynamic customer journeys, companies must design their customer journeys to respond to changes faster. They must also change their journeys in an agile, iterative fashion by monitoring every consumer channel, and every touch point, continuously.

TCS' Sunder Singh and Akhilesh Tiwari discuss in their article how global companies are getting faster at implementing enterprise systems. Ajoy Mukherjee, TCS' global head and vice president of human resources, explores how big companies can identify the key talent they will need long before others do.

Companies need to turn uncertainty about who the new competitors may be into their advantage, as CEO consultant Ram Charan explains in our interview with him. Our case study on Microsoft's embrace of machine learning shows how companies can gain share (for instance, the search engine market) by adopting new approaches to enhance digital products.

At the end of this section, the heads of TCS' retail (Pratik Pal) and life sciences practices (Debashis Ghosh) explain how companies are getting quicker at understanding their performance for customers and integrating acquisitions.

Getting Lighter

To get lighter, companies need to embrace technologies that reduce their IT burden and costs, such as cloud computing, automation, and Software-as-a-Service (SaaS). At the same time, they should seek expertise of third parties without having to inflate their workforces. This is what Nidhi Srivastava, global head of IT consulting at TCS, examines in her article.

Getting lighter places even greater demands on companies that make multiple acquisitions. They need to quickly integrate the operations of their newly purchased companies— for example, in six months rather than years, as TCS' vice president of business consulting Dave Jordan lays out in his

article. Merging IT-intensive operations is one of the best ways for two companies to shed excess weight—business processes, applications, hardware, and other infrastructure that are no longer necessary when one company is taken over by another.

Companies that can profit from changing environments, and are built to incorporate continuous transformations, will be the ones all of us will be doing business with tomorrow and for the foreseeable future.

In our interview with Professor Jeanne Ross of the MIT Sloan School, she explains how digital companies are able to move at the speed of light and the lessons for established companies that now must become digital.

Big data tool provider Cloudera is using its own technology to identify the changes its customers must make on the systems it runs for them, as its chief strategy officer, Mike Olson, explains in the case study on the company. And the head of TCS' manufacturing practice, Milind Lakkad, explains how manufacturers can lighten up their operations while remaining world-class.

GETTING SMARTER

RIDING THE COGNITIVE WAVE

AUTHOR
By Dr. Harrick Vin

Vice President and Global Head, Digitate, Tata Consultancy Services

Many exciting new digital technologies have evolved rapidly this decade–potent mobile devices that perform a myriad of tasks, big data and analytics tools that crunch petabytes of data, and Internet of Things sensors that report continuously on everything from our cars to our coffee pots. So it may surprise you that a far older technology–artificial intelligence (AI)–is poised to become the primary driver of business transformation by 2020.

How can that be, given that AI has occupied the pages of science fiction for at least 75 years and technology labs for more than 50? While it sounds old-hat compared to emerging technologies, AI is beginning to revolutionize the way companies do business.

That is why we see articles every week about what cognitive systems are achieving or can achieve: driving cars without anyone in them over long stretches, beating the world's best player at a complex game (the Asian game 'Go' is the latest), outperforming surgeons at stitching up a pig, and spitting out financial stories faster than even a big newsroom could.

It is also why new multibillion-dollar businesses for services are flourishing–Uber for taxis, Airbnb for booking rooms, and the personal digital assistants of Google, Microsoft, Amazon, and others. For sure, they are capitalizing on a bunch of digital technologies. But it is the modern strain of artificial intelligence, or cognitive technologies if you prefer the more modern nomenclature, which now makes them possible.

To put it succinctly, the cognitive wave is here. The question is whether your company is ready to ride it. That is what this article will try to answer. It will give you an overview of the technology and explain the two biggest challenges to using cognitive tools to transform your business in the years ahead.

THE BASICS: WHAT IS COGNITIVE TECHNOLOGY?

To understand why cognitive technologies will be transformative, you first have to understand what they are and what they can do. Think of cognitive technologies as performing four core tasks:

1. Sense

Until the last few years, computers have been very poor at doing what humans do with ease—scanning the environment around them and understanding the context. The reason is that most computers had neither the capabilities nor the processing power to analyze anything but 'structured' data. By structured, I mean the transaction data of a spreadsheet or database with numbers in it. 'Unstructured' data is the source food for cognitive systems—the text of a call center's transcript of a customer conversation, the thousands of online articles published every day, the static images of pictures and moving images of video, and so on. The world is full of digitized data today, and it is doubling every two years, according to IDC.[7] Between 2013 and 2020, it is predicted to increase ten-fold. But 80% or more of it is unstructured, which is one reason that only an estimated 22% of digital data in 2013 could be analyzed.[8] But this is changing: cognitive technologies can increasingly assimilate and mine unstructured data in a wide range of formats, extract relevant information from them (e.g.,

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[7] IDC, The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things, April 2014, accessed July 12, 2016, http://www.emc.com/leadership/digital-universe/2014iview/executive-summary.htm
[8] IDC, The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things, April 2014, accessed July 12, 2016, http://www.emc.com/leadership/digital-universe/2014iview/executive-summary.htm

existence of a person or an animal in a picture, or extracting sentiments from a blob of text), handle multiple overlapping data sources and versions, and perform data integrity and completeness checks, among other tasks. This kind of capability is opening up a complex new world of possibilities.

2. Think

A cognitive system is not useful if it only recognizes data; it must also decide what that data means, and at the speed of light. Cognitive technologies use machine learning and deep learning techniques to analyze the context gleaned during the 'sense' phase to understand and characterize normal behavior. This is used to predict future system behavior under expected and anomalous conditions as well as produce actionable insights and recommendations.

3. Act

After the system has arrived at some insights, it needs to drive an automatic reaction that corrects things. If a car manufacturer has trained an onboard system to sense electronic control data from its automobiles and discern when they are heading for mechanical problems, the system must also figure out proactive actions to correct those problems and improve customer experience. A driverless car is AI on four wheels—an automobile that is continually sensing, thinking, and acting in order to avoid all the hazards of busy roads. Cognitive systems think and act like experts. Unlike a robot, they do not need to be programmed with explicit instructions to perform actions in all possible contexts the system may encounter. Instead, cognitive systems mimic the human brain; they combine self-learned context with reusable patterns to construct procedures to perform complex activities utilizing reusable simple skills.

4. Learn

The best cognitive systems do not stop at acting on some data that they have analyzed. Through technologies such as machine learning, they are able to continuously refine their knowledge and algorithmic models based on the real-world outcomes from them. Like people, cognitive systems need to be designed to learn from experience—the systems' experience. Most cognitive systems support two methods for continuous learning—explicit training and observational self-learning.

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WHY IS IT IMPORTANT NOW?
THE PERFECT STORM

A new class of computer systems can now sense, think, act, and learn. Why is that happening now? And where is it all going?

It is happening now because what we are witnessing today is the perfect digital storm. Products, processes, and information systems today are getting hyper-instrumented and hyper-connected. Wireless sensors in devices ranging from mobile phones and cars, to computer printers are reporting on their performance. Extensive networks are connecting everything. Big data and analytics technologies can crunch the data that is being emitted.

So all the technical elements of the perfect storm—the digital technologies that can guide what people need to do—are in place. Entrepreneurs like Elon Musk (the connected, self-driving electric car), Travis Kalanick (Uber), and Brian Chesky and Joe Gebbia (Airbnb) are the ones turning those perfect storm elements into viable new businesses that are giving entrenched industries a run for their money.

Uber does not own taxis or taxi drivers (they are contractors). Yet its latest round of fund raising valued it at more than $60 billion. In 2014, its revenues in its home San Francisco market alone were more than three times what taxis were generating in the city.[9] Clearly, consumers are using Uber much more than taxis, for its convenience and other reasons.

Clearly, Uber has seized the perfect storm of digital technologies, and it is reshaping a century-old industry.

Is your industry next? And, if so, is your company prepared?

[9] Business Insider, Uber CEO Reveals Mind-Boggling New Statistic
That Skeptics Should Put In Their Pipes And Smoke, January 19, 2015, accessed July 12, 2016,
http://www.businessinsider.com/uber-revenue-san-francisco-2015-1

PREPARING FOR THE STORM

To be able to lead this cognitive wave, companies will have to overcome several challenges. They are many and disparate, but you could group them into two broad categories—technical challenges, and people and safety challenges.

Let us start with the technical ones. Oddly enough, 'technical' does not mean 'technology.' It is really about knowledge and how to codify it so you can train an AI system to do the task you want it to do, whether it is to drive a car, perform a surgery, monitor and protect a household when the family is away (or even at home), and much more.

No matter how much sophisticated technology is in a cognitive system and how well it can sense, think, act, and learn about some issue it will not be useful unless it can also collect and sense the right digital data, think and act

It will not be useful unless it can also collect and sense the right digital data, think and act on that data, and then perfect its learning for the future.

on that data, and then perfect its learning for the future. Take the self-driving automobile. Its developers, whether they are at Tesla or Toyota, must understand the physics of a car, the physics of braking, the physics of other objects such as other cars, trucks, deer and people, that share the road with it, the physics of weather and every part of the internal and external physical environment that enables the car to operate without colliding into something. To cite one narrow slice of this, how much braking should be applied in bad conditions such as rain or snow? Does it depend on the weight of the car? (yes). The height of the car? (yes). The speed of the car? (yes). The road conditions? (yes).

And that, in turn, means the developers of the self-driving car need to capture that knowledge coherently. That is not the topic that most people talk about when discussing AI and cognitive technologies. They are largely discussing the technology pieces—the natural language software, the image-recognition technologies, and so on. That is all necessary, but not sufficient.

You need to capture the domain knowledge necessary to train a car to drive as expertly and hopefully better than the most skillful drivers. That is a huge barrier, and it takes a huge amount of effort to overcome it.

The second challenge involves the people and safety issues. The people issues are probably the most perplexing. What new jobs might arise in that firm given that the 'doers of work' can be liberated from those manual jobs and become 'creators and curators of knowledge'? TCS conducted a major study this

What happens to a company that can automate 60% of its workforce through AI systems?

year of what more than 800 mostly big companies are doing with AI. One big finding was that the companies getting the greatest value from the technology in terms of revenue and cost improvements can envision the technology both automating more jobs and creating additional new jobs, as compared to the companies realizing less value from AI.

Cognitive systems are about to unleash huge changes in big companies, which I boil down to automating the work of the 'doers' and liberating them to take on the new jobs of creation and curation of knowledge. But that, of course, poses big questions for companies—how do they determine which jobs can be automated? How do they determine what the new jobs will be? And then how do they retrain and redeploy people for those new jobs? It figures to be a massive job and skill shift that will keep many chief HR officers awake at night. History, however, does indicate that this problem is solvable.

A 2015 Deloitte study found that during the past 144 years, new technologies have created more jobs than they have destroyed.[10]

As for the safety issues, how do we make products and processes powered by cognitive systems safe for people and for companies? Consider the self-driving car example again. When you design and develop the autonomous vehicle to avoid an accident, if the choice is between the driver suffering in a crash or another car or pedestrian suffering, which one does the system choose? It is a huge ethical (and probably legal) dilemma.

The other safety issue is one we have heard about for decades: computer security. How do we build cognitive systems that cannot be hacked, or at least easily hacked? In our study, this turned out to be the biggest challenge for the 800+ companies we surveyed, and it is not likely to go away.

JUMPING ON THE WAVE

Experienced surfers know how to time the waves just right. The same will hold true with companies and cognitive systems. But it is becoming more evident by the day that most large companies, across most industries, need to climb on top of that board now because the perfect conditions are here. It is time to begin exploring and investing seriously and strategically in harnessing the power of cognitive systems to reimagine your business.

[10] Deloitte, Technology and people: The great job-creating machine, August 2015, accessed on July 26, 2016, http://www2.deloitte.com/uk/en/pages/finance/articles/technology-and-people.html
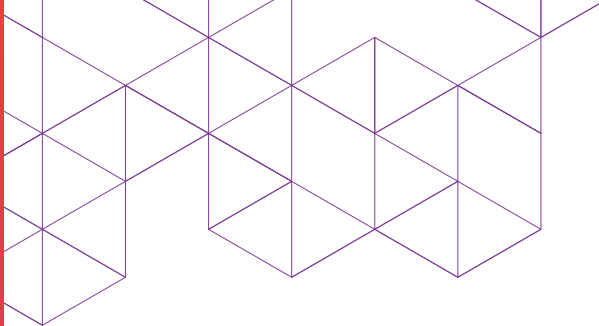
USING IOT DATA TO UNDERSTAND HOW YOUR PRODUCTS PERFORM

AUTHOR

By Satya Ramaswamy
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We have all seen some eye-bulging numbers in recent years about the Internet of Things (IoT). Since 2011, General Electric has publicly stated it would spend more than $1 billion on developing sensors, wireless devices, and related software to install on its aircraft engines, power turbines, locomotive trains and other machinery. Companies such as Ford, Toyota, and Caterpillar have invested heavily as well. And our own survey of 795 large companies (average revenue of $22 billion) in North America, Europe, Asia-Pacific, and Latin America found average per-company spending on IoT initiatives—$86 million in 2015—was projected to grow to $103 million by 2018.

Yet it would be a mistake to think that IoT is a game only for high rollers and crack technologists. Our research and client engagement experience has shown us that generating strong returns from the digital sensors, wireless communications devices, digital cameras installed in buildings and other smart, connected devices does not come down to writing big checks or being technologically savvy. The companies with the greatest value from IoT to date are the best at dealing with how products are performing for customers.

Once you accept that, it becomes a lot easier to understand what you need to do to get value from IoT.

Of course, every company eventually gets the truth about how its products and services are performing for customers. The call center logs customer complaints. Spot surveys become snapshots of limited customer input. More recently, social media monitoring tools have given companies the means of seeing who is sounding off on their offerings around the clock and around the world. But for many companies, such truth often comes too late—after customers have decided to find another supplier.

Consider a recent example: A friend's coffeemaker that he purchased two years ago just went on the blink. It was an expensive machine, but it is past the warranty period. His wife called the manufacturer, who walked her through a troubleshooting routine, but to no avail. The rep then said the company would mail the customer a diagnostic tool in 7-10 days so the customer could troubleshoot it further.

Like the two-thirds of American adults who consume at least one cup of coffee a day (according to Gallup), he and his wife are miffed. They need a coffee maker right away, and will not wait at least a week to get a possible fix for the machine they have. They told me they will now buy a competing brand.

The manufacturer could have avoided losing its customer had it installed a wireless digital sensor that reported on how well the machine was performing. If it had, the firm might have been able to alert the customer that the machine was headed for downtime before it happened, and sent the diagnostic tool before it broke down. Now the company will lose out on the big revenue stream from this customer that follows the machine: the money from its coffee pods.

This kind of data, on how a company's product is performing in the field for customers, is, indeed, the ultimate truth because it can alert companies to product problems and customers who are about to defect. This truth could be very different from what the company thought it was or was marketing it as. It is the ultimate truth because most companies get this information far too late, when a loyal customer has left them behind without a "Dear John" note.

In our survey, we found that as of last year, only 26% of big companies had put IoT technologies into their products. In other words, three out of four did not have the means to get the ultimate truth on product performance. What is more, that percentage generally goes down, the lower the price of a product. For example, only 6% of companies selling products with less than $100 price tags had embedded wireless sensors in their offerings. In contrast, 54% of companies whose products' average sales price was between $1 million and $10 million did have digital sensors that communicated product performance back to them.

But even if your firm has installed IoT technologies in its products, that does not mean it is about to get the ultimate truth about those products or that it will do something with that information. That requires your firm to do much more.

We see four key elements of using the IoT to get the ultimate truth on product performance:

1 **Getting customers to agree to have their products monitored, which in turn means giving them something of value in return.**

To get value from the IoT, you have to give value first. Or as Intel Corp.'s vice president and GM of its $2 billion IoT business Jonathan Ballon says: "The benefit has to be to customers. There has to be a value exchange," he told us. This is especially the case when a company's wireless sensors are transmitting sensitive customer data such as medical conditions. HP Inc., the part of the old Hewlett-Packard that makes printers, printing ink, PCs, and other digital devices, has found the same thing in its HP Instant Ink initiative. HP outfitted its printers in 2013 with wireless sensors that monitor ink levels and automatically trigger reorders before customers run out. So HP dangled cost savings of up to 50% and solved a problem (i.e., running out of ink), and it enticed many customers. The CIO of HP Inc., Naresh Shanker, told us: "There has to be customer value—cost savings, very high-quality ink, a great customer experience—all of that."

2   Product performance data must be processed and acted upon quickly.
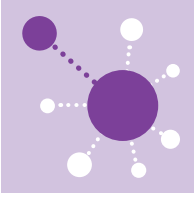
Had my friend's coffee maker been equipped with a digital sensor, the manufacturer may have had the chance to keep him a loyal customer. But that would have required it to be able to quickly process huge volumes of digital data (think about companies with millions of customers and millions of products in the field). And that would have then required the company to trigger an automated response, e.g., a customer call center to reach out to the customer; an email to be sent out saying (for example) that they will try to diagnose and fix the problem remotely; and then (if the fix is deduced) an enterprise resource planning system that is triggered to order a part to arrive at the customer (if the customer can fix it himself) and issue a bill for that part. In other words, a company's IoT systems must be connected to its ERP systems for billing, distribution, repair and other activities to "make the product right." So now the "product" is not just the physical object that was sold to the customer but also the entire set of systems and experiences that stand behind it.

3   A culture that accepts the truth, however bad.

Of all the technologies that companies have implemented in the last 50 years, the IoT may face the greatest organizational resistance. What product line leaders, production heads, or R&D executives will want the CEO to know on a daily basis that the products that they developed and delivered are having trouble in the field with customers? Said Intel's Ballon, "Without question, the biggest barrier to the internet of things by a large margin is cultural. It's organizational inertia that gets in the way. People are afraid what new technologies might reveal about the business." From our survey, we found one of the many ways companies that had gained the biggest benefits to date from the IoT differed from the rest is the support for IoT at the top of the company. "The companies I find that are brave are driving this change from the top," said Ballon. "The more timid and change-averse companies tend to dig in with their feet, get lost in the weeds, and take too long to make technology decisions."

4 "Reimagining the business" must become the mantra.

Digital technologies like the Internet of Things allow companies to do things operationally that were impossible or infeasible before. Technology for monitoring product performance has been used for decades but largely on very expensive and critical products such as public elevators. (You do not want people to be trapped in an elevator very long, and companies like Otis Elevator have outfitted their products for years with technologies that report on such outages). The Internet of Things gives companies the opportunity to monitor product performance of the cheapest of products. For example, Procter & Gamble has had an electronic toothbrush with wireless sensors for two years. In our research, we found companies such as grocery giant Kroger reducing checkout lines through technology that monitors its stores. Auto insurers have been offering usage-based policies based on technologies that track the way customers actually drive simply by leveraging their customers' existing smartphones. The opportunities to reimagine how to do business are abundant. But they only happen to companies that are open to reimagining the way they have done business for years.

When companies are prepared to deal with these four, they will be far more likely to see and act effectively on the possibilities of the Internet of Things. By dealing with the ultimate truth well—how their products are performing every day for customers—they will be far more likely to keep their customers for the long haul.

CHANGING CULTURE IN A TIME OF ACCELERATING MARKET CHANGE
INTERVIEW WITH VIJAY GOVINDARAJAN

Vijay Govindarajan *is the Coxe Distinguished Professor at Dartmouth's Tuck School of Business and a Marvin Bower Fellow at Harvard Business School. He is the author of "The Three Box Solution: A Strategy for Leading Innovation" (HBR Press, April 2016).*

Today's most innovative and successful companies are able to master three boxes, says innovation thought leader Vijay Govindarajan.

Box 1
Managing the present at peak efficiency and profitability.

Box 2
Escaping the traps of the past by identifying and divesting businesses and abandoning practices, ideas, and attitudes that have lost relevance in a changed environment.

Box 3
Generating breakthrough ideas and converting them into new products and businesses.
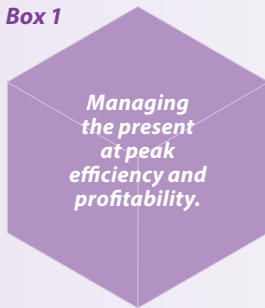
In the digital era, companies must get much better at Box 2. Escaping the traps of the past falls within the realm of corporate culture described by many leaders as the hardest part of digital business transformation.

Govindarajan shares ideas with TCS about developing a culture suited to an age of accelerated change.

TCS: *Why is it so hard for leaders to escape the traps of the past, even in the digital business age when they are being urged along at high speed?*

Vijay Govindarajan: If you cannot forget, you cannot create new things. Yet forgetting is so difficult. What you need to forget still has value today, but it will become a weakness in the future.

The U.S. automobile industry grew up in an era when mechanical engineering was a core competency. In the last couple of years, with autonomous vehicles and the sharing economy, the auto industry is transforming to prioritize computer science, artificial intelligence, and so on. For auto companies to forget that the core competency is mechanical engineering is very difficult, because today their executives still taste success. And today's success is still based on mechanical engineering. Looking ahead, it is a future weakness.

TCS: *What can leaders do to accelerate the pace of 'culture change' inside their companies?*

Govindarajan: You have to be careful when defining the parts of the company where you want to change the culture. A wholesale change in culture is not needed in all companies. If you go back to the auto industry for a moment, what you want to change is the part of the organization that has to experiment and learn new things such as electric cars or driverless cars. In many instances, you want a selective approach.

TCS: *Are there companies that stand out for executing quickly on culture in this digital age?*

Govindarajan: The best way to do it is to create a dedicated team focused on bringing about a fundamentally different culture. GE is doing this. GE's industrial businesses are not going away. But GE is trying to transform itself from an industrial company into an information company. So GE is launching this breakthrough business model based on the Industrial Internet (GE's term for connected devices). That is a fundamentally different business model when compared to the core business. Therefore, they have created GE Digital where the culture is very different from GE's core business.

TCS: *Could you point out some things that GE is doing right with regard to culture change?*

Govindarajan: You do not directly change culture. Culture is an outcome variable. What you do is change the rewards system. You change the kinds of people you hire. GE created a separate team in Silicon Valley. That brings about a culture change. Second, they recruited very different people, in the thousands. They allowed them

to have a different process, a much leaner, experimental, adaptive kind of a mindset. They were not held accountable for short-term financial results, but on their ability to test and learn about assumptions. This is how you change the culture. That does not mean the same culture change is happening in the core business.

Create a dedicated team focused on bringing about a fundamentally different culture.

TCS: *Yet there are many examples of big companies that set up Silicon Valley teams to bring innovation and culture change to the rest of the company, but which did not work as well. Xerox, which set up its Palo Alto Research Center in the 1970s, was one of them. Xerox PARC created several great personal computing innovations but other companies capitalized on them. So are there any cultural lessons to be learned for GE and others that have been setting up shop in Silicon Valley?*
Govindarajan: First, Xerox PARC was just an R&D lab. We should not mistake R&D for creating new businesses or business models. R&D is a source.

Second, Xerox PARC was created as an island and it was not connected to the businesses of Xerox in any rigorous way. Ultimately, the success will come only if you create a dedicated team in Silicon Valley that is strongly connected to the mother ship. In the GE case, GE Digital is strongly connected. That is the only way GE can win against the Silicon Valley startups.

TCS: *For companies that have identified the part of the business they want to change, is there such a thing as moving too fast?*

Govindarajan: Absolutely. Moving too fast is not doing low-cost, low-risk experiments as a way to understand the territory. Moving too fast is scaling up the new business model without understanding the unknowns. The next big things are always full of unknowns. You can move too fast because you think speed to market is important. Everybody is facing the same set of unknowns. Learn fast, before you move fast.

The need for change has to start at the top.

The other problem is companies try to do too many new things. They jump in and start too many initiatives. That is part of the reasons so many firms fail. If you tell companies "you are doing too much," it really resonates with them. Not only are resources thinly allocated, you are also letting a lot of projects without promise proceed. Then you throw good money after bad money. You need to spend a little bit, learn, and then spend more.

TCS: *What are the techniques or strategies that leaders can use to get their teams to buy into the need for change?*

Govindarajan: It really has to start at the top; that is the key. If the CEO does not see that multiple cultures can exist inside the same company, it is not going to happen. The CEO needs to articulate that having different cultures does not mean that one culture is superior to another, it just means that the need is different, and that you require a variety of capabilities, different processes, alternate metrics in one part of the organization. It is communication and more communication.

The best way to communicate may not be to just talk, but also to make other visible statements. Sometimes, you might want to let go of someone who is resisting this kind of culture change, even if that person is a high performer. Letting go of a high performer sends a strong signal that you really believe in the importance of change.

TCS: *What we are describing here is a federated model for companies, where you have a core group focusing on the established parts of the business and a separate group focusing on a new business opportunity. Is there a risk to that model?*

Govindarajan: That separate group should be strongly connected to the mothership. I am not recommending 'skunkworks' projects; they are all mistakes in my opinion. What I am recommending is a distinct team with specific tasks. Skunkworks gives the image of someone working in the basement, subverting the systems. We want people to be collaborative and cooperative.

What is the downside? If not managed properly this can create all kinds of conflict.

TCS: *What kinds of connections to the mothership are we talking about?*

Govindarajan: The connections have to be where there is a significant asset in the core business that you can leverage. So if you go back to the GE example, the significant asset is the information that is embedded in the business. The connection between GE Digital and GE Healthcare has to be around machines generating patient data.

TCS: *Do many of the companies that were born digital believe they are immune to the Box 2 trap, that they cannot get trapped by the past?*

Govindarajan: Yes. Typically, Silicon Valley companies think the three-box framework does not apply to them. But in the pure internet business, someone else's ability to imitate what you are doing is high. Box 3 (breakthrough ideas) will become Box 1 (current, core business operations) very quickly. That is why they face the Box 2 problem (escaping the traps of the past) even more than industrial companies. They just do not realize it.

That is why Google set up the Alphabet companies, created the separate dedicated teams for driverless cars and robotics, and virtual reality businesses.

TCS: *In companies like Google Alphabet, what are the key elements of healthy culture?*

Govindarajan: These companies realize there are two types of innovation: linear and non-linear. Linear is to improve your current business. Non-linear is to create new business models. You have to manage both with different processes, metrics, and people. That will result in different cultures too. Accepting that is critical. We must understand that there are two different sets of talents that CEOs need to manage.

SMARTER DECISIONS:
HOW SMART COMPANIES GET MORE VALUE FROM ANALYTICS

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Today's companies do not struggle to collect a lot of data: They struggle to wring value from that data. Thanks to big data tools becoming mainstream during the last few years, many companies have gathered huge data sets. Few have grabbed the real prize—using that data to make smarter business decisions in new product development, customer service, marketing, sales, and other key business functions. What is holding them back?

Companies across all industry vertical segments, from telecom to manufacturing, see the potential of analytics and seek to gain competitive advantage from it. And they are spending heavily to do so: revenues for sellers of big data and business analytics will rise from $122 billion in 2015 to $187 billion in 2019 globally, according to research firm International Data Corporation (IDC).[11]

[11] CIO.com, Big data and analytics spending to hit $187 billion, May 2016, accessed on July 18, 2016, http://www.cio.com/article/3074238/ analytics/big-data-and-analytics-spending-to-hit-187-billion.html

Despite all that spending, several challenges prevent many companies from realizing strong ROI on analytics projects. For starters, companies struggle to find the right metrics for analytics projects. Next, given the amount of data that can be collected—think petabytes in a day—companies often wrestle with carving out subsets for targeted analysis. Notably, companies may ignore or fail to fully tap into rich new data sources, such as social data and mobile app data.

In another significant obstacle, companies face an increasing amount of unstructured data to analyze (such as text, images, and voice calls). This is not ignorable data: some useful business insights (say on customer satisfaction issues) will only come up in unstructured data. Companies can analyze this unstructured data to improve customer satisfaction and brand image association, for example.

But analyzing unstructured data adds a layer of complexity to analytics projects. For example, how do you coordinate this information with structured business data from traditional enterprise software? Additionally, unstructured data comes in from multiple channels (phone calls, email, social media posts, surveys) and each channel has pros and cons. For instance, if you are analyzing social media posts, you may not know what percentage of your customers are using social media. Internal contact center data offers better statistical estimates. Additionally, fake customer reviews are a well-known phenomenon in social media and elsewhere online; companies must address such reviews, but these reviews do not offer value for analytics projects. A judicious approach is to listen to social media posts for signals pointing to particular issues, then collect more data around each issue in a systematic fashion through targeted questions or surveys for valuable analysis. Unstructured data mining can also raise privacy concerns, especially health and insurance data.

Finally, too much analytical data remains in too many business silos. How do you identify and share the data most wanted by front-line managers to enable better decision-making? This is where speed comes in: You cannot be smart if you cannot get insight to the front line fast. One key is mapping analytics work to the right business owners and processes. Pursuing holistic analytics work across departments and functions, rather than doing siloed analytics work, is key to producing strong ROI for the business.

SHORTCOMINGS OF CURRENT
ANALYTICS APPROACHES AND TOOLS

Today's analytics tools and techniques can fall short in several respects for companies seeking to turn data into valuable business insights to wield against rivals. Often, judging the ROI of analytics projects proves tough, because **some companies track too many metrics, or the wrong metrics.** For example, social media analysis often gets stuck with key performance indicators (KPIs) like positive and negative sentiment indices, or number of likes or shares. But the number of likes or shares, on its own, does not indicate how many people have actually read or heard the content.

Traditional industry data streams (for example, from finance and sales software) **do not reveal enough.** They are tapped out. What is more, every one of your competitors use the same data in the same way, which does not offer much hope for competitive differentiation. This leads smart companies to think creatively about additional data sources. For example, online real estate company Trulia analyzes more than a terabyte of data daily, in its work to give personalized suggestions to potential home buyers. Its multiple data streams include new home listings, public records, and user behavior data.[12] When a new listing matches a customer's preferences, the customer gets an alert.

Traditional BI systems share data through reports. However, **well-built analytics dashboards enable business-side managers to ask more and smarter questions**, leading to smarter decisions. For example, Walmart analyzes social streams[13] (Facebook, Twitter, Pinterest) to feed data into social media analytics dashboards for its product buyers, who can capitalize on customer interest in products such as juice machines or a particular shade of nail polish.

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[12] CIO.com, How an online real estate company optimized its Hadoop clusters, April 2016, accessed on July 18, 2016, http://www.cio.com/article/3058187/big-data/how-an-online-real-estate-optimized-its-hadoop-clusters.html

[13] Fusionbrew, How Walmart uses Data Visualization to convert Real-time Social conversations into Inventory? April 2014, accessed on July 18, 2016, http://www.fusioncharts.com/blog/2014/03/how-walmart-uses-data-visualization-to-convert-real-time-social-conversations-into-inventory/

Deploying such dashboards is not easy. Analytics teams may think that if they just get the right BI tool to the business, they have cracked the problem. But business users seek prescriptive advice, not just attractive visualizations, for the tool to gain widespread use and effectiveness.

While more companies now collect unstructured data, many still keep too much of it in departmental or other organizational silos.

While more companies now collect unstructured data, many still keep too much of it in departmental or other organizational silos. For instance, social media data may be collected and analyzed in one business silo, and so will support center and call center data. Today's BI tools do not help much with visualization of unstructured data, or linking structured data to unstructured data. What is more, **models of how to deal with unstructured data are not mature yet, so companies fail to find best practice models**.

As a result of all these factors, **companies focus too much on handling the volume of data, and not enough on cutting across business silos to find the right information at the right time**—the magic moment when business value appears.

A SMARTER ANALYTICS APPROACH

Successful analytics projects seek to flip that focus, and cut across the boundaries that keep valuable information trapped. Let us delve into some techniques companies are using to overcome the challenges and derive more value from analytics work, starting with finding the right metrics.

This starts with rethinking KPIs for analytics projects. If you want different departments to work together, you must **look for a holistic or cross-department measure.** For example, on customer service analysis projects, do not use call resolution, but single-contact resolution across all channels, such as email, phone, and social media. This ensures that social customer service teams drive towards the 'one and done' ideology so customers are not just hopping to another channel for answers.

Rather than creating and tracking a separate set of KPIs for unstructured data, **seek to link the analytical insights to business processes**, and thus standard business KPIs. This helps prove business value and ROI.

To do this, companies can **use software tools to model the relevant business knowledge**, organized by business divisions, products or attributes of products, capture the business rules, and match up the data. For example, a company may use tools such as Clarabridge, Clearforest, and Temis to analyze large chunks of text and route key insights to appropriate business units. Companies also use custom-built tools for the purpose, though such cases are rare.

In one project of this kind, a leading U.S. retail chain needed to analyze customer survey text. It used a suite of tools to do information extraction, text labeling, business modeling, and sentiment analysis. The tools automate work that would otherwise have to be done by hand, for instance, categorizing similar groups of products and customers. The retail chain gained insights on different product categories. Issues for each product category were further classified by factors such as price, product quality, associate behavior, store cleanliness, product availability, and variety. Combined with the geographical information about the stores, the retailer identified actionable insights to increase sales.

A grocery store could use a similar approach to analyze huge sets for customer sentiment data. For example, text analysis can group customer complaints from multiple channels (phone, email, social, survey) under labels. Comments such as "lower your prices," "checkout lines are too long," or "I love your dairy products, but keep more types of cheese" can be grouped and acted upon. The business labels might be pricing, checkout process, dairy, and variety. Without automated analysis tools and good mapping back to business process, you could try to analyze such data. However, it would take many people, and there would be subjectivity bias in interpreting the comments. Here, if there is a bias, it is uniform across the data. Also, with automation, the company can run reports like this every 24 hours.

Mapping analytics insights to divisions, products, and services leads to valuable input from business-side teams on what business KPIs, such as a customer satisfaction index and sales volume, relate to the project. For example, if you are doing customer sentiment analysis on social data for an online retailer, the ultimate business KPI is sales. Effective metrics could include click-to-conversion rates or lead generation to sales conversion rates.

NEW DATA SETS, NEW TOOLS

In addition to rethinking metrics, it is also important to take a fresh look at your data sources, since valuable information lies in mobile app, geographic, and Internet of Things data, for example. What is more, an emerging and intriguing source to consider is news feed data.

News data can inform everyday business activities, especially at the strategic level, and help a company build contextual intelligence, which is highly desirable. For example, if you are acquiring a business in a new geography, you want to build intelligence about economic factors, political issues, and lessons learned by other companies in that locale.[14] Multinationals setting up in India or China face many local issues that have to be understood. In another example, an auto company would want to be up-to-date on all news related to changes in pollution-related laws in regions for which it is designing vehicles. The earlier companies come to know of such changes, the better.

[14] Harvard Business Review, Contextual Intelligence, September 2014, accessed on July 18, 2016, https://hbr.org/2014/09/contextual-intelligence

Human analysts can only look at so much news. But today, companies such as Bloomberg and RavenPack offer tools that scan and organize large volumes of news content and social media posts for purposes like these, as well as for financial services and stock trading.

In addition to new data sources, companies want to examine additional data analysis methods and tools (to complement traditional ones). For unstructured text analysis, open graph databases and NoSQL databases prove helpful (in addition to natural language processing tools). Why? In a NoSQL database, data is stored as key-value pairs and not in tables with predefined schema. This helps in indexing unstructured data and retrieving it quickly. Open graph databases are all about resources linking to resources, as in Wikipedia's example. Wikipedia holds a great deal of unstructured data, but a graph on top links resources. This helps resolve certain issues related to handling unstructured text. For example, using Wikipedia, software tools can easily conclude that the entities 'Barack Obama' and 'President of the U.S.' refer to the same person.

For example, using Wikipedia, software tools can easily conclude that the entities 'Barack Obama' and 'President of the U.S.' refer to the same person.

Today, many linked open data sources store valuable information curated from the unstructured content of Wikipedia, ready for business use. Companies can use them to obtain valuable information like "Honda is a competitor of Toyota" or "Toyota manufactures Camry" without much effort. A company might deploy tools that use this knowledge to continuously track negative sentiments about its competitors or their products, or positive sentiments about its own brand.

UNSTRUCTURED DATA, SURPRISE INSIGHTS

What kind of results can companies glean from analytics projects that include a fresh approach to KPIs, multiple data sets, and unstructured data? Often, unstructured data yields insights you may not envision at the start of the project.

Consider the case of an insurance company with global presence in more than 70 countries, which operated a toll-free call center to receive customer complaints. After the company observed, over two months, that call durations grew significantly longer than expected, it decided to examine the calls using analytics tools.

Speech-to-text technology helped transcribe the audio calls. In addition to examining the transcript, analysis included non-linguistic parameters like lengths of silence, number of call transfers within one call, and so on. Clustering techniques grouped like communications together, and communications were mapped to services provided by the insurance company.

Analyzing customer complaint content may not only reveal frequent customer problems, but also identify business process flaws.

The insurance company discovered several unexpected insights. Not only did the technology identify the most frequent reasons for customer complaints, deeper analysis revealed flaws in its process for handling new insurance policy requests. The company gained actionable insights for improving that process. Addressable flaws in the call-center operational processes also came to light, adding more ROI on the analytics work.

CONQUERING COMMON BARRIERS

With analytics projects like these, the smartest companies seek to make the data-driven insights available across the company, not just in isolated departments. That is how companies move beyond incremental analytics project success to company-wide business improvements, as has been exemplified by companies such as Procter & Gamble and GE. Potentially valuable insights will perish if stuck inside silos. For example, as cited above, analyzing customer complaint content may not only reveal frequent customer problems, but also identify business process flaws. Often, owners of analytics projects are only concerned about a specific issue—say brand reputation—and do not bother with other insights that come out of the data.

To change this mindset, and to combat cultural resistance to sharing data across organizational boundaries, you need executive support from C-suite leaders. Executives can also pave the way for moving to new KPIs tied closely to business results. Any change to KPIs can create pushback, since it affects compensation for people from management to delivery teams. So people need to understand the business benefit, as articulated by the

CEO. A clear business objective will not only put new KPIs in context for the team, but also ease the case for proving ROI in business terms.

Privacy and compliance issues pose a final hurdle that can trip up analytics projects, especially those involving unstructured data. For example, if a customer intended a communication (call, e-mail) to serve one purpose, the company may not be able to harvest additional insight without suitable permissions in place. In banking, a customer communication may reveal the need for a product or service. However, banks face many regulations in using that information. Insurance companies and internal HR departments see similar restrictions around health information. Your company's internal privacy and compliance experts should be looped in early in the analytics project to stave off wasted efforts or possible privacy violations.

ANSWERING THE
ANALYTICS CHALLENGE

The time has come to pay attention to unstructured data, such as customer communication data that is being ignored. In the cases of the retail chain and insurance company, these brands surfaced actionable business information from their data before rivals were able to capitalize on weak spots, and realized ROI directly tied to business goals.

Try to look beyond optimizing business operations by analyzing sales and revenue graphs. Smart analytics platforms can link structured and unstructured data about your company and its rivals, to generate new insights about the 'why' of business intelligence. Beyond the sales or revenue graphs, unstructured data holds valuable clues to what excites or dismays your customers—issues that may not have been on the radar at all. Combine this with public information about your competitors, and the data mined from sources such as news feeds and social media, and you get a fuller picture of your competitive situation, faster than before.

Companies have become experts at analyzing sales spikes and falls, adding in seasonal variation. The smart ones have also learned to capitalize on unstructured data. For example, clothing retailers in the U.K. jumped on the opportunity to sell blue dresses that looked similar to the one Princess Kate wore in a photo celebrating her engagement, and later, baby clothing modeled after her childrens' outfits.

What will the next opportunity look like for apparel retailers, or for any company that masters analytics technology? The answer is out there, ready to be analyzed in unstructured data.

ANALYTICS:
A STILL-EMERGING BUSINESS FRONTIER
INTERVIEW WITH PRABHUDEV KONANA

In the age of big data, companies have unprecedented access to information on everything from connected IoT products to customer opinions. But collecting large amounts of data and wringing business value from it are two different things—and most companies struggle greatly with the latter.

What is holding companies back from achieving greater ROI? Which aspects of analytics are important looking forward? Which are over-hyped?

To delve into these questions, TCS spoke with **Prabhudev Konana**, *the William H. Seay Centennial Professor of Information Management, and past chairman of the Department of Information, Risk, and Operations Management in the McCombs School of Business at University of Texas at Austin, where he founded the Master of Science in Business Analytics degree program.*

The real analytics struggle for many companies starts at the beginning, says Konana. "Knowing the right business questions to ask as you analyze data is vital. If you do not ask the right questions, you will never realize significant ROI."

TCS: *How do forward-looking companies measure the success of analytics projects and which emerging metrics might be important in a few years time?*
Prabhudev Konana: The most important business metric is the basic one: dollars and cents. Many companies are using social media analytics to target the right customers, but at the end of the day, are they converting those potential customers into real customers? That is the biggest missing piece in analytics today: how it affects top-line and bottom-line growth.

Once you answer that question, you can drill down to the more operational level and choose the right metrics to support that growth. For example, if you are dealing with credit card fraud detection, your metrics can gauge whether you are reducing fraud situations or flagging incidents before they happen. If you are looking at security issues, your metrics should be able to detect intrusions and spot potential security violations early.

However, the benefits eventually become elusive when these metrics inevitably become widely used and part of the status quo. For example, competitors might invest in metrics that measure customer retention for the same customer base, so every time that you improve, somebody else improves too. So it has less and less of an impact on the bottom line. But it will hurt you if you do not make the investment in analytics. Companies that have superior analytics capabilities in the marketplace will benefit. Others may perennially play a catch-up game.

TCS: *Today companies can tap into a range of data sources—social media, mobile apps, geolocation data, government databases, and news feeds. Which emerging data sources intrigue you?*
Konana: The biggest source is going to be the Internet of Things, which is making it possible to collect massive amounts of data, including mobile data from smart cars and driverless cars. Data from the IoT is creating smart homes and we are moving towards smart cities. Healthcare is going to be massive in this area; we will see lots of new interesting data sources coming in.

My problem is that over 90% of companies still have no idea what to do with social media data, mobile data, location data, and so on. We are still learning. IoT is the next big thing, but some companies are still struggling with what to do with Facebook data. We are still trying to master the existing data sources to create value.

TCS: *Many business users are frustrated with today's data analysis dashboards, because they are not terribly usable. Do you have any thoughts on what is coming and if that situation will improve any time soon?*

Konana: I think it is going to get better. The old dashboards had problems because they were not fully integrated and companies had to force-fit the information sources. Eventually we are going to see 'micro-level' dashboards that are more meaningful; they will show things such as "this is our business target; this is what you will reach; this is how we can get there; this is a shortfall." You can see these kinds of dashboards appearing at the business unit level and at the corporate level.

Over 90% of companies still have no idea what to do with social media data, mobile data, location data, and so on.

The behavioral side must be managed, though. Dashboards can backfire, because if everything goes well, people may feel complacent, and when things are not going well, they may panic. Having too much information on the dashboard can hurt the morale of the company and the way people work. Nonetheless, dashboards can be powerful.

TCS: *Can you share an example of a company that you think is doing a better than average job of getting ROI from its analytics?*
Konana: Very few companies come anywhere close to the Amazons and Starbucks of the world, the new-generation companies. Traditional large companies have a tougher time, especially if they need to integrate their analytics for online and offline sales. Comparing internet years and the traditional years is like comparing human years and dog years. A traditional company can spend seven years to develop the degree of integration that a new-generation company can do in one year.

That being said, analytics is still a strategic necessity for any kind of company today, and if you do not do it, you are finished. Best Buy has done an extremely good job in using analytics. While we all focus on the problem of 'showrooming' (visiting the Best Buy store and then scouting for the best deal online), Best Buy is investing lots of resources to understand what people are saying, what they might buy, and how they might be influenced. They are using Facebook and other social media very well. Home Depot is another example.

TCS: *Visualization technology looks to be an important trend for companies seeking better ways to present data to business users. What do you think?*
Konana: Visualization is important, but it is really the last stage of the analytics process, when you are presenting insights to senior management. Before that can happen, people must define what they want from the analytics. A lot of senior managers say that their industry is moving fast and there is lot of hype about visualization, so it is something the company should be doing. However, when you drill down, many companies still do not know what questions to ask.

Along with not being clear on what visualization and analytics should accomplish, senior managers are often disconnected from the talent in the company who can do the actual dirty work of analysis and bring it to them. This is a classic business/IT alignment problem.

TCS: *Companies are fighting for scarce analytics talent. How important will it be for companies to train up analytics expertise in-house, in addition to hiring outside analytics talent?*
Konana: Analytics by definition is very technical and quantitative, and it gets harder to teach the longer a person has been away from mathematics. Many big-name companies found this out when they tried to bring in people with four or five years experience and make them into analytics specialists. Many of them had forgotten their math because they had not done it for years.

Bringing in people with math skills intact, but with less business experience, brings a different set of problems: They often do not fully grasp the complexities of what needs to be analyzed. Those who understand the math often can not explain how it relates to their company's or customers' goals. Sometimes that means completely detaching from all the complexities of the predictive models and explaining something simply. That is not easy to do.

That is why the University of Texas requires students to learn accounting and finance along with analytics. We do this because even though they might do social network analysis, they must be able to relate all these metrics to business growth. These metrics are the ones that count.

TCS: *Which aspects of the future of analytics are perhaps overhyped?*

Konana: The use of social media is one. Companies have been bragging about using social media, surfing data, and analyzing location data. These are noisy, messy data sets and you need specialized people to be able to do it. I have a feeling that many companies will fail trying to create those capabilities inside the firm.

The real hype is that somehow analytics is going to magically change your business. You still need a well defined strategy, and you have got to use data in order to push your strategy ahead.

TCS: *What excites you about the future of analytics?*

Konana: Healthcare. Hospitals are trying to analyze data so they can understand for example, drug interactions, or early symptoms. According to a recent New York Times article, Microsoft researchers were able to identify symptoms for cancer by analyzing an individual's web searches. This could quickly identify people at risk for cancer. The challenge will be embedding healthcare analytics capabilities into tools where people do not really have to understand programming to use the data productively.

Another exciting tool is sentiment extraction; for example, what are people saying about my product? Products are being developed that help companies figure this out without doing massive programming; you just feed the data and the technology has the capabilities to do it.

WHY ARTIFICIAL INTELLIGENCE IS A BIG PART OF AP'S FUTURE

Anyone who has followed the travails of the U.S. newspaper industry knows it has been in a steep decline since the rise of the Web in the 1990s. Between 2003 and 2014, the industry's annual advertising revenue plunged 56%, from $46 billion to $20 billion. Numerous newspapers have folded (there were 125 fewer U.S. dailies in 2014 than in 2003), and several prominent newspaper chains have gone in and out of bankruptcy over the last two decades.

Nonetheless, for Jim Kennedy, the future of journalism could not be brighter, or more exciting, because he sees technology transforming it. "I think the next 20 to 25 years will be amazing," says Kennedy, senior vice president of strategy and enterprise development for The Associated Press, the 170-year-old news service. "We will see the rebirth of the journalist."

The AP is one of the largest newsgathering operations in the world. It is operated as a not-for-profit cooperative, owned by the daily newspapers of the United States and serving 15,000 news outlets worldwide. It reported $568 million in revenue last year.

Kennedy has had an excellent perch from which to observe the recent evolution of the newspaper business. He has been a fixture at AP since 1987, except for an 18-month stint at the turn of the century, as head of planning and product development at *The Wall Street Journal*'s online edition. In 1995, Kennedy witnessed the birth of Craigslist, one of many websites whose free want-ads siphoned off classified ad revenue from newspapers to the tune of $5 billion alone between 2000 and 2007, according to one estimate.[15] A year later, he started the AP's first department devoted to launching digital products. AP realized back then that it needed to deal with online competitors, and also to start figuring out how to leverage technology to work for, not against, newspapers.

AP's latest digital initiative is one that harnesses artificial intelligence to write stories.

AP's latest digital initiative is one that harnesses artificial intelligence to write stories. In 2013, several AP journalists alerted Kennedy to a North Carolina company, Automated Insights, whose AI technology was being used to write releases for the Cleveland Indians baseball team and sports stories for Yahoo. Kennedy and others at AP were intrigued. They put the software to a small test: writing

[15] Robert Seamans (New York University Stern School of Business) and Feng Zhu (Harvard Business School), "Responses to Entry in Multi-Sided Markets: The Impact of Craigslist on Local Newspapers," *Management Science*, November 2013. Accessed June 27, 2016. http://pubsonline.informs.org/doi/abs/10.1287/mnsc.2013.1785

short articles on the weekly statistical performances of National Football League offensive players—stories AP's newspaper customers could use to supplement their own NFL coverage.

The technology worked. "I thought to myself, 'That is the acid test,'" Kennedy remembers. "The point was to take a data stream and see if it could be turned it into a narrative blurb [of text] that looked like a human wrote it." For Kennedy, the experiment validated three important proofs of concept: 1) the software could produce new content that AP's writers didn't have time for, yet member newspapers coveted, 2) the content was indistinguishable from stories written by humans, and 3) it could be done rapidly.

The following year, in 2014, the experiment gave AP the confidence to turn the technology loose on another kind of article. AP and Automated Insights trained the AI program to write quarterly earnings stories on publicly held companies. There are 5,300 companies listed on U.S. stock exchanges, far too many for AP's 65

business journalists to write stories about when the firms announce their quarterly results. In fact, AP's business reporters wrote about 300 such stories every three months, typically only about the biggest companies (Apple, McDonald's, and so on) that newspaper readers were interested in. By the end of 2015, after working to train the software to write these 150-word articles using financial data from Zacks Investment Research, the AI was spitting out 3,700 earnings stories every quarter—more than 12 times as many as was possible before.

Importantly, Kennedy notes, AI was not being used to take work away from journalists. It supplemented their work, while giving AP's daily newspaper owners more of what they wanted: earnings stories covering the smaller companies in their locales, companies with which their local readers had an intimate connection. Training the technology to write short articles about the results of sports games is next, says Kennedy.

To Kennedy, this is merely the beginning of how AI will help AP's journalists dramatically improve the way they gather, analyze, and produce news. He sees AI giving the AP three big opportunities for the rest of the decade and beyond: continuing to produce content that its reporters do not have the time to write; giving journalists tools to see patterns and make connections from the mountains of data that have been collected about people, organizations, and issues; and enabling new readers to get answers to specific questions about an organization (company, sports team, government agency, and so on), people, and issues based on AP's ability to tag items in each article at more granular levels.

Tagging will allow AP to "make our news reports more granular so that we can move it into all kinds of applications that would support vertical industry insights, research use cases, and the on-demand consumer world," Kennedy explains. "We have an opportunity to expand to other customer segments."

With that in mind, Kennedy believes the newspaper industry's embrace of AI has just begun. "I predict that eventually the technology will produce more game stories in sports than humans will," he says. That, in turn, will not only result in more stories being produced, but it will free up journalists to get the story behind the story, focusing on the more complex articles that readers crave but take more time to produce.

"We have to free our people to produce the kinds of content that no one else has," concludes Kennedy.
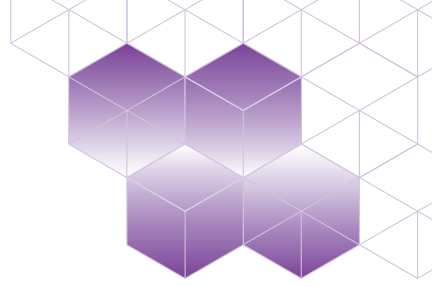
BANKING AND FINANCIAL SERVICES
ANALYTICS FOR COMPETITIVE ADVANTAGE
TCS Industry Insights

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1. Why is a strong analytics effort key to competitive advantage for banking and financial services companies?

As banking and financial services companies search for new revenue streams, analytics projects let them deliver more personalized products in a shorter time to market. Analytics help banks present the customer with the right product at the right time via the right channels. Also, thanks to the growing body of application programming interfaces (APIs) with the ability to connect disparate data sets, banks can create added services for existing customers, often using financial tech companies as sales channel partners.

Machine learning, combined with analytics, teaches banks much about customer behavior and preferences, so the banks can continuously learn and fine tune analytical models to optimize products and services, plus optimize the cost of offering products in various

channels. Cloud-based analytics platforms give banks flexibility and elasticity to work with big data workloads at high velocity and reap business value faster.

2. What types of new data sources are banking and financial services companies using to wring more value from data analysis projects?

Given the valuable data now residing in sources ranging from social media posts to mobile applications, banks need to acquire more data types, from more channels. For example, banks work with a growing amount of NoSQL data to harness value from semi-structured data, from sources such as website clickstream tracking reports, weather and news data, product reviews, and social media posts. Hadoop tools can help banks glean insights from unstructured data such as call center customer inquiries, video clips, image scans, and text messages. To deal with these data types efficiently, the unified data architecture approach has become popular. This lets the bank create a unified semantic layer for internal and external data, using APIs to deliver the data to various business groups based on need.

3. What are the biggest worries for BFS companies around analytics right now?

First, data management is a key concern for BFS organizations. As banks use big data tools to analyze data in increasing variety, velocity and volume, governance and data quality become key challenges.

Second, banks must meet significant legal, risk and compliance requirements on the security, auditing, retention, and backup of analytic data. Customer data privacy and security, as well as granular security for employees, also pose key worries as companies explore wider use of analytics.

Finally, BFS companies are struggling to find talented people who can transform analytics data into actionable business data.

4. What is holding back better analytics ROI for these companies?

Several factors hold BFS companies back from realizing more ROI on analytics projects. At some companies, federated business structures and a lack of accountability cause delays in reaping ROI. A unified framework that includes various business processes and points teams toward the same business

goals is essential. Additionally, BFS companies struggle with deciding which key performance indicators (KPIs) are critical for managing analytics projects and evaluating analytics project ROI. Until ROI measurement matures, banks will struggle to demonstrate business impact.

Within BFS companies, a great deal of data remains cordoned off. It still does not flow through analytics tools or influence business decisions. Also, some banks remain far away from using big data analytics, machine learning, or real-time analytics because their infrastructure concerns or governance, data privacy, and security worries hinder progress. These banks struggle exploring how to monetize analytics.

Finally, self-service analytics tools have not become a reality for most business users yet. The democratization of data, where people at all levels of a BFS company can access huge amounts of data and derive insights, has not arrived because self-service tools are still emerging. Until those tools mature further, APIs can help banks connect analytics data to day-to-day business processes and automate decision making.

GETTING FASTER

HOW TO KEEP YOUR CUSTOMER JOURNEY FROM PASSING ITS SELL-BY DATE

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What is the shelf life of the journeys you have mapped out for your customers? How long will they be relevant to their wants and needs?

Is it two years? One year? Six months?

It is a lot shorter than you think.

The customer journey maps that companies use to attract, win, and keep customers degrade quickly because customer preference and purchase criteria change rapidly.

How fast do customer expectations change? In a TCS analytics study on wireless communication providers, we discovered that in early 2013, customer choice was driven by contract.[16] By March 2013, T-Mobile—touted as the 'uncarrier'—had obliterated contracts, which shortly thereafter ceased to be a prime purchase criterion.

[16] "TCS South Area Social Insight Study," 2013–2014 Twitter data.

Any customer journey designed around the contract experience expired in that quarter, and customers continued changing their wireless provider purchase criteria.

In this research covering millions of social media posts and two years of customer behavior, we observed that the criteria customers used to choose among wireless providers changed fast—some rising (pricing, data, devices such as iPhones), others dropping (contracts, coverage, generic phones). They changed on a monthly basis.

Clearly, if a company creates static or rigid customer journeys, their sell-by dates will come and go just as fast.

We found that customer criteria are not just variable by time; they differ by geography. While wireless phone service customers in Atlanta focused on coverage and download speeds, customers in Oklahoma City were up in arms about what they perceived as 'data capping'—setting monthly limits on how much digital data they could use at a preferable rate. At the same time, customers in Miami and Houston were more likely to choose providers based on international access and coverage.

Companies of all types—not just wireless carriers—need to pay heed here. To respond to the rapid pace of customer change, companies need to measure the customer experience frequently, if not continuously, across all channels. They also must be operationally adept enough to change as fast as the customer does.

ADJUSTING AT THE SPEED OF MARKET SHIFTS

During the 2014 holiday season in the previously mentioned study (Figure 1), the highest number of Twitter discussions in the Southeast U.S. (33%) were on down payments for phones. The next most frequent topics were monthly fees (22%), upgrade fees (17%), and fee waivers (14%). Responding quickly, one provider eliminated down payments on some iPhone models for the holidays. Another provider, noting that upgrade discussions were spiking in Texas, Georgia, and Alabama over the holiday season, offered new phone purchases with lower monthly payments in those regions. It also eliminated upgrade fees for certain programs, and began offering shorter contract terms.
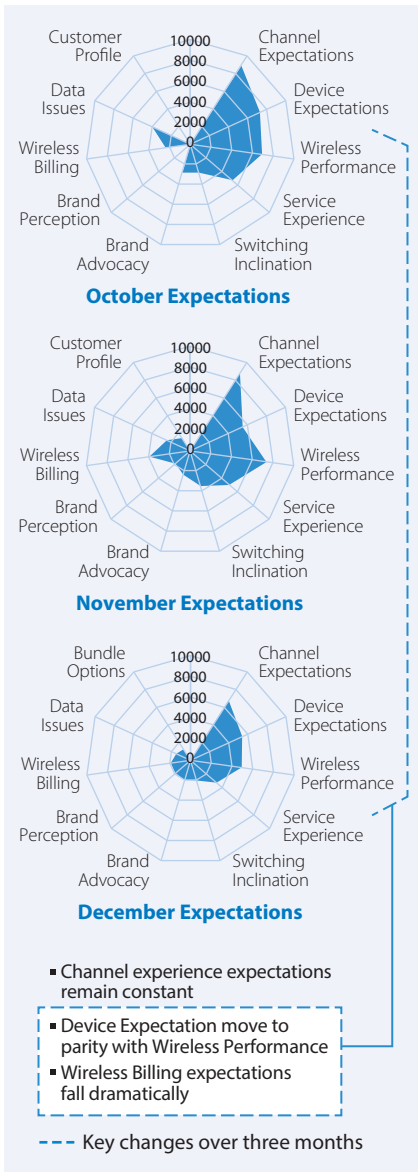
October Expectations

Radar chart axes: Customer Profile, Channel Expectations, Device Expectations, Wireless Performance, Service Experience, Switching Inclination, Brand Advocacy, Brand Perception, Wireless Billing, Data Issues. Scale: 0, 2000, 4000, 6000, 8000, 10000.

November Expectations

Radar chart axes: Customer Profile, Channel Expectations, Device Expectations, Wireless Performance, Service Experience, Switching Inclination, Brand Advocacy, Brand Perception, Wireless Billing, Data Issues. Scale: 0, 2000, 4000, 6000, 8000, 10000.

December Expectations

Radar chart axes: Bundle Options, Channel Expectations, Device Expectations, Wireless Performance, Service Experience, Switching Inclination, Brand Advocacy, Brand Perception, Wireless Billing, Data Issues. Scale: 0, 2000, 4000, 6000, 8000, 10000.

- Channel experience expectations remain constant
- Device Expectation move to parity with Wireless Performance
- Wireless Billing expectations fall dramatically

- - - Key changes over three months

Figure 1: Customer Experience Changes Over a Three-month Period

Over the fall of 2014, the holiday season, the criteria customers used to choose among wireless service providers shifted on a monthly basis.

To stay competitive, all companies must build the internal capability to alter those customer journeys—not in a year, or in a matter of weeks, but potentially in days and hours. Researching customer needs, creating solutions to address them, managing all the possible customer touchpoints, optimizing them for each customer segment, and finally creating a customer experience that encourages the target customer to buy (and remain loyal) must become a continuous activity for companies, not a one-off.

Unfortunately, most companies make a single Herculean effort to map a set of customer journeys. Their designs are often informed by gut instinct and internal anecdotes (which can skew those journeys to whatever hot issues may be affecting one department or another)—*not* by data. Then these firms spend months and years building out the capabilities for those journeys. However, they do not design them with the capacity for rapid change. Nor do they frequently monitor customer preferences and experience to understand what to change, where to change it, and when.

Customer journey maps need to be dynamic; processes, systems, and even people must have plasticity.

THE FOUR DRIVERS OF FAST-CHANGING CUSTOMER EXPECTATIONS

Customer preferences change more quickly than businesses expect, largely because of four factors:

■ **Information.** Customers inarguably are better informed today. Free and open market information that allows customers to compare prices at every stage of the journey is one of the most disruptive capabilities to come with the mobile internet. Social media and consumer forums are becoming more important in all phases of the customer journey: researching, consideration, purchasing, and servicing.
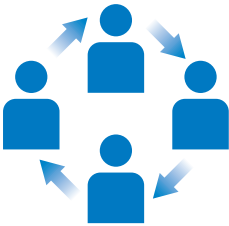
■ **Social influence.** The primary influence on the customer purchasing decision no longer comes from the companies they buy from. It does not come from advertising. It comes from personal recommendations and peer reviews (81%).[17] Word-of-mouth recommendations have been industrialized through social media. They are not one-to-one; they are many-to-many, with their impact magnified exponentially. Indeed, 74% of shoppers rely on social networks to make purchase decisions.[18] According to a 2012 study by the Chief Marketing Officer Council and Lithium, the purchases of about four out of five U.S. social media users are influenced by their friends' posts.[19]

[17] Deloitte University Press, On the couch: Understanding consumer shopping behavior, 2015, accessed July 5, 2016, https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/consumer-business/on-the-couch.pdf
[18] ibid.
[19] Forbes.com, Are Brands Wielding More Influence In Social Media Than We Thought?, May 7, 2012, accessed July 16, 2016, http://www.forbes.com/sites/marketshare/2012/05/07/are-brands-wielding-more-influence-in-social-media-than-we-thought/#2175995e7748
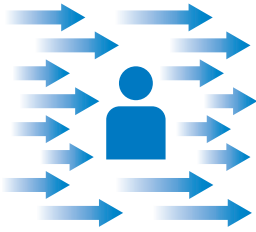
- **Technology innovation.** The pace of technology change has become faster, and customers are adopting new software, hardware, and functionality all the time. This changes their expectations of *your* technology. Years ago, banks were slow to unveil new ATM features, but today new mobile phones and features are constantly entering the market. The result for banks: many customers expect them to leverage those new features and functions—even in their ATMs.
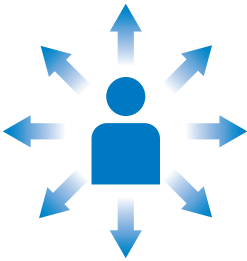
- **Market influence.** Customers' interactions with other industries are influencing their expectations of how *your* business should operate. Previously, you monitored your competition to stay competitive. What happened in another industry—retail, for instance— had little or no impact on insurance, or banking. But every business is now operating on the same or similar online platforms. Almost every company has a website, a mobile app, a Facebook page, a chat interface, etc. So if one industry or company eliminates contracts, allows mobile payments, offers 60-day returns, and sends geo-targeted coupons, your customers will know about it. They will also expect you to do the same, or something similar, regardless of your industry segment.

This is true of business models, too. Customers adopting Uber, Lyft, and Airbnb approaches to managing the customer journey are expecting similar models from other companies. To stay competitive, businesses must monitor every entity in their customers' ecosystem of products and brands.

DO YOU HAVE A 360-DEGREE, 365 DAYS-A-YEAR VIEW OF YOUR CUSTOMER?

Because customers are dynamic, a business needs to continuously loop customer feedback into the customer journey. Without that feedback loop, no customer journey can succeed for long; it will quickly fall behind customer expectations.

According to Forrester Research, most companies make the following customer experience analytics mistakes:[20]

- 39% do not regularly ask customers about the quality of their interactions
- 77% do not track customer experience drivers in their organizations (which makes it difficult to know how to change even if change were possible)
- 72% do not track how customer experiences affect business results (which makes it difficult to get leadership buy-in to invest in improving and changing the customer experience)
- 79% do not share the customer experience findings they do gather with employees or leadership (thereby effectively guaranteeing that the customer experience they provide will neither improve nor change)

Businesses have responded to the dissonance in what customers want and what their companies offer by investing a great deal of time and money into creating seamless and consistently branded customer experiences across all channels. However, companies tend to monitor those channels inside-out, deriving metrics from internal key performance indicators (KPIs). They also typically report those metrics channel-by-channel (for example, web reports, store reports, call center reports), even though they have designed a holistic, omnichannel customer journey.

Siloed channel analytics can be very misleading. During focus group customer interviews, a cable company discovered that customers who dropped its service cited poor service.[21] However, it also found that customers were satisfied with each channel. In the case of onboarding, there were many touchpoints (phone calls, service visits, web forms, emails, and so on), and each showed 90% satisfaction. That was pretty good. But over the course of the whole customer journey, satisfaction fell to 40%. Not so good.

[20] Forrester, Seven Steps to Successful Customer Experience Measurement Programs, February 4, 2016, accessed July 16, 2016, http://reprints.forrester.com/#/assets/2/153/'RES91981'/reports

[21] McKinsey, From touchpoints to journeys: Seeing the world as customers do, March 2016, accessed July 12, 2016, http://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/from-touchpoints-to-journeys-seeing-the-world-as-customers-do

In summary, each touchpoint worked well, but the whole customer experience did not because while the company was focused on optimizing touchpoints, customers engaged with the company through integrated, cross-channel journeys. The entire customer journey turned out to be less than the sum of its channel parts.

To manage and modify a customer journey, companies need to monitor customer experience holistically. However, amid all the hoopla over analytics, marketers still distrust data. They reportedly depend on data for only about one-tenth of the decisions they make about customers.[22] And according to a CEB survey of 800 marketers at Fortune 1,000 companies, data-based decisions trail "conversations with managers and colleagues, expert advice, and one-off customer interactions."[23]

HOW TO KNOW WHEN YOUR CUSTOMER JOURNEY STARTS GROWING STALE

Here are some signals that your customer journey might be wearing a bit thin:
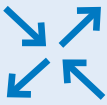
1. Customers shift channels frequently in their interactions with your firm. This indicates frustration in your channel experience.

2. Customers seek and provide information about your company or product from sources you do not control or to which you do not contribute. This indicates that your information and guidance is not complete, useful, or, in the worst-case scenario, not credible.

3. Customers go off the map, creating their own journeys from outside your company. This indicates the people, processes, interactions, and information you are providing in your journey map are not sufficient or dynamic enough to meet their needs. Your journey is too rigid.

[22] Harvard Business Review, Marketers Flunk the Big Data Test, August 16, 2012, accessed July 19, 2016, https://hbr.org/2012/08/marketers-flunk-the-big-data-test

[23] TCS.com, Omnichannel Banking Customer Experience: Forget What You Thought You Knew about Channels, 2014, accessed July 11, 2016, http://www.tcs.com/SiteCollectionDocuments/White-Papers/Omni-Channel-Banking-Customer-Experience-0414-1.pdf

Customers bouncing from channel to channel is not a sign your omnichannel strategy is working; our analysis shows that while brands are omnichannel, their customers are not. In a TCS analysis of retail banking channels, we discovered that customers only switch channels when their preferred one does not meet their expectations.[24] We call this channel inertia. Accordingly, when your customers hop from one channel to another, this should signal that the previous channel they preferred is no longer meeting their needs, and has to adapt.

If you offer avenues for customers to resolve issues but they post complaints and seek product information from sources you do not control or contribute to, then that is a signal your journey is stale. In one case, a cable company provided and responded to customers via many traditional and digital service channels. Still, we found its customers went to Amazon for modems and WiFi range extenders, then used Amazon's equipment review area to complain about and discuss the cable company's customer service, not just the products they were buying from Amazon. This indicated customer problems were not being resolved within the channels the company provided.
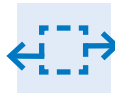
This can be part of a larger trend that indicates your journey is stale. While off-track journeys can be opportunities for companies to meet their customer where their journey takes them, if customers research, shop, buy, and seek service outside of your journey map, then your journey map is not working for them.

The impact of out-of-date customer journey maps can be severe. The CMO Council has found that customers are more willing than ever to ditch a brand for another that offers a better experience. What is more, almost half (47%) of CMOs say they are not realizing the full revenue potential of their customers, and 49% report they need to do more to connect their internal processes with the changing customer experience. Only 16% of these CMOs felt their companies delivered a customer experience that fulfilled their brand's promise.[25]

[24] TCS.com, Omnichannel Banking Customer Experience: Forget What You Thought You Knew about Channels, 2014, accessed July 11, 2016, http://www.tcs.com/SiteCollectionDocuments/White-Papers/Omni-Channel-Banking-Customer-Experience-0414-1.pdf

[25] CMO Council, Predicting Routes to Revenue, January 2016, accessed July 13, 2016. http://www.cmocouncil.org/images/uploads/307.pdf

HOW TO KEEP UP WITH THE ACCELERATING PACE OF CUSTOMER EXPECTATIONS

So what can companies do to keep their customer journeys competitive? The story of a large retailer is instructive here. Earlier this decade, with a customer base composed mostly of women with children, the chain wanted to bring mobile technology and social media into its customer journey. However, it first needed to know exactly how its customers used them. After using CRM, surveys, and social analytics, the retailer realized it was dealing with four unique behavioral segments. We will simply refer to them as Segments A, B, C, and D.

Let us take a look at Segment C. By collecting data on each segment's mobile and social behaviors along each stage of the customer journey, the retailer discovered 68% of Segment C used a mobile device to shop for deals (many also used catalogs), and 73% discussed products with other mothers through social media channels.

The awareness stage was often kicked off by an SMS message from family and friends informing shoppers in Segment C of an upcoming special event (a birthday, a graduation, and so on). She then visited the retailer's mobile website, and searched the catalog. She browsed the store's shelves, used her PC to compare prices on the web, asked family and friends about options and deals, checked out product reviews on her mobile while she was in the store, and on her PC when she returned home. In the selection phase, she filled multiple carts from competitors, but often abandoned her online carts.

Coupons and point-of-sale add-ons were critical to Segment C customers in the purchase stage, and sometimes she would put off a purchase until a better deal emerged.

Based on this level of persona profiling and the associated customer journeys, the retailer invested in more than four dozen digital programs to develop the capabilities for improving engagement with all these moms. These programs included enhancing mobile search capabilities and creating a mobile app with an embedded loyalty program that offered coupons and calendar reminders of special events in the shopper's children's lives. The retailer built out its in-store WiFi. It launched an intense SMS marketing program with SMS coupons, SMS shipping alerts (and SMS abandoned cart alerts), while instituting an easier return program.

All that happened earlier this decade. But much has changed since then: in mobile-social technology, processes, functions, shopper preferences, and behavior. In the Segment C shoppers' 'awareness of need' phase of the customer journey, mobile web and shopping apps have become more popular than SMS. Fewer customers are visiting stores, and more are making purchases from mobile phones. More internet users of all types are on tablet computers and fewer use PCs.

Had the retailer stuck with a picture of its customer journeys taken just a few years ago, it would have had challenges. The lesson here is that companies must monitor their customer experience KPIs as often as needed in their industry to ensure the customer journeys—and the initiatives based on them—are still on track. We say 'in their industry' because our customer research across industries shows us that the pace of customer change varies by industry. You need to begin with test data collection and analytics to benchmark how frequently key decision criteria is changing in your industry's key segments.

Benchmarking your unique Industry Customer Change Cycle will also inform many other aspects of your customer experience efforts: How often can you successfully introduce new features and functions? How often can customers consume new messaging? What is the right timing for new product releases? What changes most frequently, so where should you prepare and operationalize for change? Is it product, messaging, pricing, or service?

DEPLOYING DYNAMIC CUSTOMER JOURNEY MAPS

Understanding the change is the first requirement; building systems, processes, and training people to adapt quickly to customer change is the second. Companies will need to shift to dynamic customer journey mapping and its attendant technologies to adjust them quickly.

A great example of such mapping can be seen at U.K. supermarket giant Tesco. Tesco continually analyzes its 13 million loyalty card customers' purchasing data.[26] Using what it calls Recency, Frequency, Value analysis, it scores customers on how often they shop, the items they purchase, and their spending. With this analysis, Tesco creates personal experiences for different shoppers, customizing offerings for each segment.

While Tesco primarily focused on dynamic loyalty personalization, the end-game is to be able to adjust any aspect, any step in the journey based on customer experience analytics.

Dynamic customer journey mapping should leverage workflow orchestration across functions and systems, with continuous customer experience monitoring that

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[26] Select Statistical Services, How Do Supermarkets Use Your Data? accessed July 16, 2016, https://select-statistics.co.uk/blog/how-do-supermarkets-use-your-data/
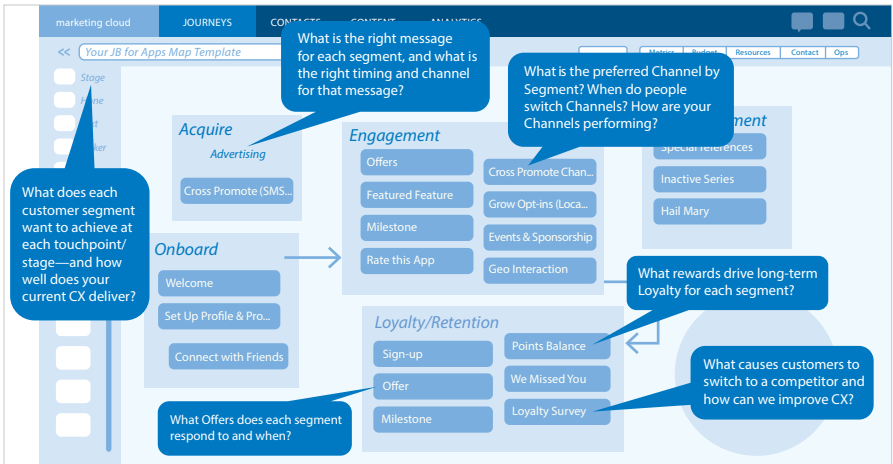
Figure 2: Automatic Responses to Customer Actions Makes for a Dynamic Customer Journey

Salesforce Journey Builder is a first step in Dynamic Customer Journey Mapping and Management. Journey Builder allows automatic responses to customer actions such as purchases, clicks, and email opens. And it is cross channel: It orchestrates email, SMS, push notifications, ads, web, and apps among wireless service providers shifted on a monthly basis.

can trigger adjustments in the journey. Early examples of this capability can be seen in Salesforce and Pegasystems platforms (Figure 2).

Perhaps the most powerful tool available to help companies respond quickly to changes in their customers' purchase criteria will be artificial intelligence and machine learning. For example, a media company with high customer turnover revamped its

analytics using a neural network to predict which customers were preparing to leave so it could address the problem proactively. The analytics accuracy in predicting churn was between 75% and 90%, and every percentage point of churn reduction added millions of dollars to the company's bottom line.[27]

The need for more intelligent applications and advice is nowhere more acute than in customer experience.

[27] Harvard Business Review, Adaptability: The New Competitive Advantage, July-August 2011, accessed July 7, 2016, https://hbr.org/2011/07/adaptability-the-new-competitive-advantage

CREATING AN AGILE CUSTOMER JOURNEY

Companies that can change their messaging, offerings, pricing, and channels at the *speed their customer needs change* will be winners. Companies must take two big steps to establish such agile customer journeys:

STEP 1.
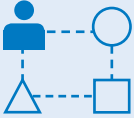
Create an infrastructure—people, process, platform, and data—responsive to the insight you retrieve.
For example, by linking data directly from search to operations, Google can change an ad almost instantly, without human facilitation.

STEP 2.

Monitor behavior at the pace of change and feed insights directly into action.
Google updates ad positioning continuously according to an ads relevance to an individual search. The better the position, the higher the click-through rate, producing more revenue for Google and the businesses buying ads. This is a virtuous circle that creates value for both parties because Google automatically maps its updates to the changing customer journey.

How do you know your customers are changing faster than you are? You are losing customers and market share. That is a dead giveaway that you are not meeting their needs. Do not wait until they have left to make a change.

Perhaps you do not know how often they change, you thought you did, but that was yesterday. They have changed since then, have you?

This a challenge that every business needs to address. If the customer journey it designed yesterday does not meet the customer experience needs and purchase criteria of its customers today, every problem the business has—customer churn, declining market share, falling revenue or profits—will certainly get worse tomorrow.

ACCELERATED CHANGE:
GETTING FASTER AT IMPLEMENTING ENTERPRISE SYSTEMS

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The transition of enterprise apps to the cloud model has moved from an 'if' question to a 'how' question—how to do it quickly and expertly? ERP software leaders such as Oracle and SAP are squarely focused on giving customers the right product and service mix for their cloud transitions and for their digital business transformations. While these are mission-critical applications at the heart of the business, transition speed is of the essence. As businesses transform to digital enterprises, the lengthy ERP software implementations of the past do not fly. Business model changes, product innovations, and customer service improvements have to happen quickly. The company that ignores this reality will watch its rivals, both established companies and nimble up-and-comers, race right by.

For companies to capitalize on cloud-based enterprise systems, they must significantly reduce the time it took in the past to implement traditional enterprise systems. However, one size or approach still does not suit all companies in the cloud environment: many use hybrid solutions that combine on-premises and cloud tools, and even within cloud, companies have the option of public versus private cloud model approaches.

The right tools and techniques help companies ensure successful, fast implementations of cloud-based enterprise systems and harmonize them as needed with existing installed systems.

Among the key elements for companies seeking cloud transition speed—a new approach to gathering requirements and doing testing, a willingness to use automation tools and standardized processes, and a willingness to look at cloud tools as part of a holistic technology strategy that includes mobile and analytics tools. Leaders of today's effective enterprise software projects stay focused on digital business goals and seek out ways to reach them faster.

WHERE TRADITIONAL APPROACHES FALL SHORT

Companies are moving away from the on-premises model for ERP apps and to the cloud model for several reasons, related to business digital transformation. In the past, the best product at the right price typically won the marketplace, but today, speed to market and agility win, as customers press for continuous innovation. Thus companies face unprecedented pressure to transform business processes and business models—and do so at high speed.

This kind of marketplace speed creates heightened business expectations for ERP software tools. At a time when Amazon can make hundreds of changes to its core business systems in a week, business teams want more from their own ERP systems. IT's reputation, as the department of 'no', must evolve for a digital business to thrive.

Companies also have a newfound need for agility. When companies free up cash by shifting from the CapEx-intensive, on-premises IT model to an OpEx model with cloud services, this adds flexibility. In turn, this flexibility can speed a company's time to market for new products and services.

Finally, a digital business seeks to share the newest data (even real-time data) broadly throughout the organization, to enable faster decision-making. Yesterday's ERP tools were not designed with that mindset. However, broad access to data goes hand-in-hand with cloud and mobile technologies. For all these reasons, companies are taking a critical look at which cloud-based ERP tools could help them solve key business problems.

A FRESH APPROACH

How are companies embarking on this significant software transition with an eye to speed? Keys to a successful enterprise software cloud transition include a new approach to requirements, openness to automation, speedier testing, attention to data migration and tool coexistence, iterating during software development work, and taking a holistic technology approach focused on business goals.

For many companies, the solution involves a hybrid cloud approach, for example, involving a customer's private cloud, Oracle-provided cloud services and third-party cloud services. In another example, SAP is making it easier for customers to run its S/4HANA apps on public cloud services. The right planning and tools can ensure cloud-based tools and remaining on-premises tools coexist productively.

Let us delve into the keys to success, starting with a new approach to the requirements process.
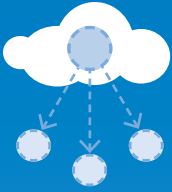
In the traditional, on-premises software world this process starts with gathering requirements from customers and trying to map to the on-premises product to those business wishes. In the cloud world, the requirements process is product-led. Fast companies choose to use best-in-class business processes available via cloud tools, instead of doing tons of customization work.

For example, U.S. financial company TD Bank did a 2015 project to solve HR-related business problems. The company's HR information was too distributed, since regional HR apps kept data siloed. Also, each region had its own HR processes, creating inefficiencies. Seeking to reduce TCO around HR, the company chose to move to Oracle HCM Cloud. The company utilized Oracle HCM's standardized HR processes for workforce compensation, saving implementation time. Embedded analytics helped the company define individual software dashboards for various employee roles.
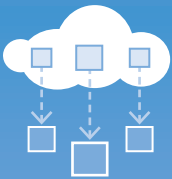
Next, companies should look for opportunities to use automation tools and pre-configured tools wherever possible, for example, business process frameworks for particular industries. Automation can significantly speed the configuration process, doing tasks that once required weeks of hands-on work from IT.

For example, South African telecomm company Cell C transitioned from on-premises Oracle software to cloud-based versions in 2016, with two business goals—enabling an online education curriculum to improve employee engagement and thus decrease turnover rates; and shifting software licensing costs from CapEx to OpEx. For implementation speed, Cell C used a TCS configuration tool to realize a 25% to 30% reduction in implementation time (compared to industry average benchmarks from Oracle) and a 10% business process improvement (as it got rid of extraneous business processes).

Pre-configured transition tools can also assist companies in industry verticals when there is a functional gap between the Oracle on-premises and cloud products. For example, a tool for employee engagement plugs into Oracle HCM SaaS, allowing bi-directional communication with employees. In another example, you may need to add a procurement solution for tasks like comparing products, using information from social media and product websites. For companies moving to a tool like

Oracle HCM cloud, it is important to know where such functional gaps are, in order to address them and keep the project's go-live date on track. (TCS has pre-built solutions to fill in these functional gaps, built on Oracle PaaS.)

ERP implementations involve considerable testing, of course, but automation tools can help here as well. For example, to shorten the testing cycle on Oracle implementations, an automated testing tool can cut a four to six week testing cycle to a few days to two weeks. Another benefit of automated test tools, in a cloud implementation, Oracle offers customers new feature functionality in small drops, every two to three months. With each drop, the customer has to test again to ensure compatibility. Automated test scripts speed up the work. The same is true for Oracle patches.

Data migration and on-premises tool co-existence matter significantly to companies pursuing speedy transitions. Getting data from existing systems into the new cloud-based system is perhaps the most underestimated task in these projects, requiring much time, energy, and effort. Companies should seek opportunities to speed repetitive tasks here in particular. For example, a retailer that was rapidly adding stores in Asia used TCS QuickConfig utility to reduce the time needed to add a new store into the company's SAP ERP system from eight to nine days to a few hours.

Cloud ERP transitions often happen in pieces, targeting focused digital business problems. Companies do not have to tackle all the data at once. In TD Bank's case, mentioned earlier, the company wanted to keep using PeopleSoft 9.2 software for all other HR functions other than workforce compensation. So, the TCS Oracle Cloud Integration Layer was used to integrate the Oracle HCM Cloud tool with PeopleSoft tools, giving the bank a fruitful on-premises/cloud tools coexistence.

In another example, Global Glory, an ATM manufacturer, sought an Oracle cloud-based tool but only for supply chain work. The company uses on-premises J.D. Edwards software tools for all other ERP functions. To save time during this 2016 project, Global Glory leveraged TCS pre-built adapters (built on Oracle's Integrated Cloud Services on PaaS) for on-premises products like J.D. Edwards and PeopleSoft. (Oracle's ICS offering lacks the pre-built adapters.) Pre-built equaled time saved for the company.

Where are the time sinks on your cloud tools migration roadmap? Take a close look at what preconfigured and automated tools exist to conquer those issues.

MAKE WAY FOR ITERATION

Along with these keys to success, companies that achieve speedy transitions to cloud tools use some elements of the agile development approach (not a sequential, waterfall approach). Iteration is central to the agile approach.

As part of this effort, business teams should see the end stage goal for the software very early in the development cycle. (In the old world, months or years of work would happen before business users saw a skeleton of the software interface that they would be using.) Today, business goals change, regulations change, people change, too quickly for that old world development model. The business could get stuck with a big disconnect by the time software development work ends. An iterative approach allows development teams to adjust rapidly to changes.

Looking ahead to the future, companies will have access to additional techniques to further speed such implementations. For example, visualization technology can help companies with testing assumptions about ERP implementations. TCS, in concert with academic researchers, is experimenting with some companies to do simulations of ERP implementations, and gamify the simulations.

Here is how it works: teams use an ERP simulator tool to construct a business model, say for selling a product like cereal. The simulator fast-forwards quarters and years to show how each business model choice plays out for the business. The team that produces the most revenue and profit, and least leftover inventory, wins the exercise. In a short amount of time, a business team can visualize how an ERP plan will succeed or fail. It is easy to envision both startups and established companies finding value from such simulations.

DEALING WITH SPEED BUMPS

Even companies that commit to trying tools and techniques like the ones explored above can face significant speed hurdles during transitions to cloud-based ERP tools.

First, companies can not underestimate the importance of user experience to the success of these projects. Usability can still be a factor with ERP tools. With SAP for example, the user interface for cloud-based tools is still in transition and can pose a barrier for quick user acceptance of the software.

In ERP, the focus traditionally has been on business processes—user experience played a subordinate role. But today, in the age of mobile and handheld devices, we all expect more from software tools and their UI. That is another reason to ensure business users see what they are getting for UI early in the development process.

Second, companies can suffer from a lack of business focus during cloud transition projects. The companies that fail at ERP implementations are typically the ones that try to do everything all at once for the business. The companies that succeed are the ones who know where to focus. TD Bank, for example, zeroed in on inefficient HR processes and siloed HR data and correcting those problems, before they became a competitive, operational, or financial liability.

Companies need a clear roadmap of desired digital business outcomes so the ERP plan can be matched up to it and executed accordingly. This also requires true respect for technology project scope. If you keep the scope fluid, the quick path to the business outcome can vanish.

Third, moving ERP tools to a cloud model requires a great deal of change management inside the organization. Given the mission-critical status of these tools, support from the top proves crucial. The CEO needs to invest time to make sure everyone understands how this ERP software change furthers the company business strategy. Additionally, transitions of this sort may create significant cultural upheaval within the IT department, which cannot be ignored. IT's role changes in the cloud-based model, offloading administration tasks and freeing up time for business innovation work. But what exactly does the new SaaS product handle? What does IT handle? What does your systems integrator handle? For some companies, IT's role is still evolving. Strong executive support for IT's role in the digital business transformation is mandatory.

HOW THREE COMPANIES MOVED TO THE CLOUD

COMPANY	DESCRIPTION	CLOUD DRIVERS AND STRATEGY	BENEFITS
TD Bank[28] *U.S. retail bank*	• One of 10 largest U.S. banks ($272 billion in assets) • Based in Cherry Hill, N.J. • >1,300 retail stores • 8.5 million customers in the Northeast, Mid-Atlantic, Washington DC, the Carolinas and Florida • Subsidiary of Toronto-Dominion Bank in Canada	HR processes, applications and data varied by region, creating big inefficiencies. The bank needed to centralize regional HR applications and data. Decided to centralize the regional HR applications and related data for workforce compensation to Oracle's HCM Cloud. It used HCM's standard HR processes for workforce compensation.	Faster transition from regional workforce compensation applications to a centralized system. Shorter testing cycle for the bank's new ERP implementation.
Cell C[29] *South African mobile phone service provider*	• Third-largest GSM mobile phone service provider in South Africa • 21 million customers	Accelerating new product launches prompted firm to improve training and development of franchisees and customer service agents. Existing training capabilities hampered such training and contributed to employee turnover. Implemented Oracle Taleo Learn Cloud Services.	Shifted software licensing costs from capital expenditures (CapEx) to operating expenditures (OpEx). 25-30% reduction in implementation time. 10% improvement in business process.
Global Glory Solutions[30] *Manufacturer of ATMs and other technologies for handling cash*	• Formed in 2013 from combination of Glory and Talaris businesses • Makes automated teller machines and other cash-handling technologies • Based in the U.K., subsidiary of Japan-based Glory Ltd. • >3,000 employees • R&D and manufacturing in Europe, Asia and North America	Used pre-built adapters to connect its new cloud-based Oracle supply chain system to Global Glory's other ERP systems (on-premises systems).	Faster shift to cloud-based supply chain system. Tight integration with company's other ERP systems (J.D. Edwards on-premises applications).

[28] TD Bank fact sheet and other pages on TD Bank website: https://www.tdbank.com/exc/pdf/company_fact_sheet.pdf and https://www.tdbank.com/aboutus/about_us.html

[29] Two TCS case studies on Cell C. http://www.tcs.com/SiteCollectionDocuments/Case%20Studies/cellc-delivers-seamless-cx-0716-1.pdf and http://www.tcs.com/SiteCollectionDocuments/Case%20Studies/CellC-cloud-learning-management-system-1215-1.pdf

[30] Glory Global website and press releases. http://www.gloryglobalsolutions.com/en-us/Pages/default.aspx and http://www.businesswire.com/news/home/20151109006110/en/Glory-Global-Solutions%C2%A0Beyond-Bank-Pioneer-World-First-Technology

Finally, companies that make this transition quickly fight the urge to customize too much. This represents a big change for managing ERP tools. For decades, business has dictated requirements and customization was widely expected. Now, in the interest of speed, companies opt for more standardized business processes. How do you know where to draw the lines around what still deserves to be customized? Some companies will set limits around customization tied to revenue; for example, setting rules such as "if the business process affects less than $5 million in revenue, we will not customize it. If the business process affects more, we will review it for possible customization." But the bottom line is that any customization requires a strong business rationale.

ACTING ON THE BIG PICTURE

Today's default business model is a digital business model. Thus, to be competitive, companies must take a holistic view of technology and shape a clear roadmap to the digital model. Cloud transitions and cloud strategy should be considered integral to the overall digital business journey. Winning companies consider mobility and analytics along with cloud transitions, and not as an afterthought.

Additionally, business user expectations of enterprise software tools will only grow, and your rivals can and will use their ability to move fast with these tools as a competitive advantage. So it is time to let go of older ideas about the requirements process, testing, and data migration that will slow down implementations. Use automation tools as much as possible and stress an iterative approach.

As you explore where any functional gaps exist between the on-premises and cloud ERP tools, seek out data analysis tools to solve related business problems. For example, during this part of its cloud migration work, chip manufacturer Knowles solved a quality issue where faults on chips were surfacing too late in the production process. By staying ruthlessly focused on digital business goals, companies can make the most of critical software transitions.

WINNING TODAY'S TALENT RACE
HOW TO IDENTIFY, DEVELOP,
AND RETAIN TALENT
BETTER THAN YOUR RIVALS

AUTHOR
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Tata Consultancy Services

The competitive digital business landscape is forcing organizations to become better at recognizing the workforce skills they will need, well before they need them. When companies become reactive in filling key jobs, they have a hard time securing critical talent at the moment of need. The result is they lose out on key hires to companies that have articulated their talent requirements.

However, to keep good people and identify the new crop that companies will need, HR executives will have to let go of many traditional hiring and retention practices–methods established at a time when detailed, up-to-date information on employee value, attitudes and company job needs were either missing or locked up in file cabinets stuffed with paper records.

How can big companies better anticipate the next wave of skills they will need, and retain their rising stars, amidst intense competition for the best people? In this article, I will explain methods that TCS—with more than 350,000 employees around the world today, nearly six times the number of 10 years ago, and other companies have used to retain the best people, as well as hire new ones before there is a run on them.

My advice is that many companies need to rethink traditional ideas about recruiting and hiring, stress the business value of internal training, and make the HR organization more agile. HR executives, in particular, have an unprecedented opportunity to help business unit managers solve two of their biggest talent challenges: retaining their most valuable employees and determining what new skills they will soon need before competitors do.

THE TALENT CRUNCH

Across industries and around the world, big companies have truly been in a war for talent since the great recession began to recede about seven years ago. A key reason for the acute talent shortages in certain domains, in addition to the rebounding world economy, is that digital technologies have been redefining jobs in every business function.

Let us consider the marketing function. Five years ago, many companies did not have marketers heading areas such as social media, search engine optimization, mobile applications, marketing analytics, and online customer communities. Today, those positions are commonplace and often go begging for talent. Ann Lewnes, chief marketing officer at $4.8 billion[31] marketing software firm Adobe Systems Inc., put it this way: "The rise of new digital technologies has caused upheaval for many industries, and the marketing profession has been in the eye of that storm, too." Adobe's 2015 survey of more than 6,000 marketers

[31] Adobe 10K 2015 financial statement, p. 60, accessed Aug. 2, 2016, https://wwwimages2.adobe.com/content/dam/Adobe/en/investor-relations/PDFs/ADBE-10K-FY15-FINAL-CERTIFIED.PDF

and e-commerce professionals across industries, and around the world found they have seen more changes in marketing in the last two years than in the last 50 years.[32] In addition, of the 25 hottest skills of 2015, LinkedIn found four of the top ten were related to marketing: marketing campaign management, SEO, mobile development, and user interface design.[33]

Digital technologies have also created acute skills shortages in the IT function. There has been a run on talent in such hot technology domains as artificial intelligence, Internet of Things, and big data and analytics. The market for a key digital business role—analytics and big data—remains particularly hot, as evidenced by a high number of candidates switching jobs. In 2015, 20% of analytics professionals and data scientists switched jobs.[34] Overall, 32% of U.S. employers and 38% of global employers had difficulties filling job vacancies due to talent shortages.[35]

Many conventional HR tactics and tools were not designed for the pace of digital business. Today's workforce predictive analytics software can help companies cope to an extent. Companies are using it to predict what skills they will need. They can be proactive in talent acquisition and development to plan the basics of recruiting, training, and infrastructure development.

[32] *Fortune*, These are the most in-demand jobs now (and 'hacker' is one of them), March 10, 2015, accessed August 1, 2016, http://fortune.com/2015/03/10/hottest-jobs/

[33] LinkedIn corporate blog post, The 25 Skills That Can Get You Hired in 2016, January 12, 2016, accessed August 2, 2016, https://blog.linkedin.com/2016/01/12/the-25-skills-that-can-get-you-hired-in-2016

[34] Burtch Works blog post, Analytics Hiring Market Vibrant, Many Changing Jobs, Short Tenure, February 2, 2015, accessed July 17, 2016, http://www.burtchworks.com/2016/03/14/analytics-hiring-market-vibrant/

[35] Manpower Group press release, Tenth year of survey reveals 1 in 3 U.S. employers experiencing difficulty filling positions, skilled trades remains the hardest to fill for six consecutive years, May 18, 2015, accessed July 16, 2016, http://www.manpowergroup.com/wps/wcm/connect/manpowergroup-en/home/newsroom/news-releases/manpowergroup+annual+talent+shortage+survey+reveals+u.s.+employers+suffer+largest+talent+shortage+in+skilled+trades#.V36VZXgrfdl

Accurate forecasting, based on predicted attrition rates and business growth forecasts for departments, helps a company prepare for growth and predict future talent needs. But using this software is table stakes, not a competitive differentiator.

So how do large organizations hold onto their best people? How do they identify new skills they will need just over the horizon? The HR practices of one of America's biggest banks, Wells Fargo, are instructive.

HOW WELLS FARGO GOES BEYOND TRADITIONAL HR TACTICS AND TOOLS

Some companies are thinking more critically and creatively about how to apply these tools. Take Wells Fargo & Co., America's third largest bank.[36] While the bank uses analytics to assess the impact of employee turnover, but it focuses on the quality of turnover–that is, who exactly is leaving the organization.[37] "Because all employees are different, we cannot count their turnover the same," said Kathy Doan, vice president of community banking HR insights and analytics, whose team advises senior HR leaders at a unit of Wells Fargo that has more than 100,000 employees.[38] "If you think about it, what will hurt a baseball club more: losing a Cy Young award winning pitcher or losing a designated hitter? We have business leaders interested in applying this quality of turnover concept to identify areas that have high attrition risk."

[36] *The Wall Street Journal*, Wells Fargo became the third largest bank as measured by assets in 2015, January 15, 2016, accessed August 1, 2016, http://www.wsj.com/articles/wells-fargo-surpasses-citigroup-1452910753

[37] *Predictive Analytics Times*, Wise Practitioner – Predictive Workforce Analytics Interview Series: Kathy Doan at Wells Fargo Bank, November 30, 2015, accessed August 1, 2016, http://www.predictiveanalyticsworld.com/patimes/wise-practitioner-workforce-predictive-analytics-interview-series-kathy-doan-at-wells-fargo-bank11302015/6858/

[38] *DataInformed*, From Information to Insight: Human Capital Analysis for HR, February 11, 2015, accessed August 1, 2016, http://data-informed.com/from-information-to-insight-human-capital-analysis-hr/

Accurate forecasting, based on predicted attrition rates and business growth forecasts for departments, helps a company prepare for growth and predict future talent needs.

Doan advises HR executives to use predictive modeling to assess which of their company's valued employees are ready to leave. That, in turn, requires using a range of data—for example, how long they have been in their jobs, their satisfaction score on the company engagement survey, and their job performance. As she wrote, "Would it not be great if you knew that an employee who has been in his or her job for six months has an overall satisfaction score of 3.25 on the engagement survey, and is meeting 80% of their productivity goals has a 75% chance of leaving the company?"[39] Wells Fargo is also exploring the use of text mining of social media to predict when an employee may leave the company.

Despite the turbulence in the banking industry, Wells Fargo was the 10th most valuable American company by market value, and the most valuable bank, at the end of 2015.[40] Clearly, it is succeeding in the digital era. In companies like Wells Fargo, HR has become an invaluable adviser to senior management about talent, especially about who is likely to leave but who must be retained, and the new skills the organization will require next. That requires supplying the necessary data, tools, and executive support.

[39] *DataInformed*, From Information to Insight: Human Capital Analysis for HR, February 11, 2015, accessed August 1, 2016, http://data-informed.com/from-information-to-insight-human-capital-analysis-hr/

[40] Wells Fargo 2015 annual report, p. 4, accessed August 2, 2016, https://www08.wellsfargomedia.com/assets/pdf/about/investor-relations/annual-reports/2015-annual-report.pdf

TALENT APPROACHES THAT WORK

So how can your company get there? Here are several key strategies for winning the talent race.

Developing Your Employees

The best companies we have seen at retaining talent and discerning upcoming skill needs stress internal development and cross-training. The reason is simple: they can kill two birds with one stone. By training the people who already work for them, these companies are more likely to retain valuable employees who are looking for new learning opportunities.

At the same time, they begin the search for people with new key skills internally rather than externally. In other words, these companies check first to see if they can 'groom their own'. Developing new skills in employees is a key employee retention tool. Rotate people from project-to-project, to experience new technologies, vertical industries, and cultural environments. Such an approach develops people in a holistic manner for a digital business. This requires good communication between leaders and their teams in order to understand individual goals and career options.

Exactly how do HR leaders make internal skills development effective? Companies continue to need the traditional classroom style programs. However, more and more, they need to train people through online learning tools. They allow employees to learn around the clock from wherever they are, to address specific knowledge gaps, or emerging technology skills.

Experience is just as important; people need to practice what they have learned. If they will not immediately be deployed to use the knowledge, create an internal project where they can practice the new material. Also, develop partner alliances wherein you can feed talent through the partner's pipeline to practice new skills.

Screening People for Their Ability to Continually Learn and Other Soft Skills

If the efforts described above sound like a big commitment to internal training and development, rest assured that they are. And they are more than just a financial commitment. They also require senior business, and HR executives to shift their thinking about key competencies. That is our second key talent strategy—hiring people for their ability to embrace continual learning.

Today's digital businesses must prioritize hiring people who not only have the right skills and knowledge but also show a proclivity to learn new skills and knowledge. That has become crucial at a time when digital technologies are dramatically reducing the lifespan of knowledge and skills. In other words, much conventional wisdom does not remain wise as long as it used to.

Other soft skills: attitude, emotional intelligence, maturity, and the ability to work in a collaborative environment are more important than ever, at a time when business models shift frequently and new initiatives launch at high speed. Such personal attributes and aptitude should have a greater weight in hiring decisions than specific skills.

Screening More Rigorously

Applying equal screening weight for both hard and soft skills is crucial today. So has conducting more rigorous background checks, which is the third talent strategy. For example, in addition to traditional screening, a growing number of organizations are going online to check out the social media postings of potential employees. In the U.S., nearly four out of ten companies (39%) used social media in 2015 to screen potential employees, more than double the number (18%) in 2011, according to the Society for Human Resource Management.[41]

Bringing Brand Management to Campus

Our fourth strategy is one your marketers will embrace: strengthening your company's brand at colleges and universities. Every company today needs a brand image that makes college graduates want to come and join them. Large companies that have been around for decades compete against venture capital funded firms whose digital products are often the envy of new members of the workforce.

While your company may not be able to tap the 'cool factor' that such startups can offer, you can capitalize on other strengths. One is building a presence on campuses that long predates the days you recruit there. Offer learning materials to the universities for use in class. It is beneficial not only for your future hires to have this knowledge, but also for the industry workforce as a whole. Establishing labs within universities—as TCS has done in India and at Stanford, Carnegie Mellon, and other universities in the U.S.—also builds a company's reputation with the university community, including potential new hires, and their professors and mentors.

[41] SHRM, Using Social Media for Talent Acquisition – Recruiting and Screening, January 7, 2016, accessed August 2, 2016, https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/SHRM-Social-Media-Recruiting-Screening-2015.pdf

Procter & Gamble has long done this with universities in its headquarters state of Ohio to feed its pipeline of talent. So has statistics software company SAS, with North Carolina State University, near its headquarters in Cary.[42] The focus of the SAS/N.C. State research partnership includes cyber security, big data, text analytics, data visualization and sensors, and health monitoring technologies—all highly sought after employment skills.

As companies seek to attract, retain, and continually invest in possible university recruits, raising visibility is crucial. Some companies use hackathons and contests. They are not just for technology recruits. For example, TCS organizes several kinds of hackathons, and contests for predicting product reliability, and constructing business cases. The EngineX contest, primarily for mechanical engineering students, is aimed at solving problems in a factory or in product development.

In the U.S., nearly four out of ten companies (39%) used social media in 2015 to screen potential employees, more than double the number (18%) in 2011.

Gamified learning and hiring processes can also help. TCS has a 'campus commune' portal where students join and can create communities around common interests, as on other social networks, with TCS experts available to discuss topics or case studies. In the TCS Aspire program, new hires get gamified material as they prepare to join TCS, where they earn badges for milestones.

[42] N.C. State University press release, SAS Signs Research Partnership, August 11, 2014, accessed July 26, 2016, https://news.ncsu.edu/2014/08/sas-agreement/

Using Digital Technology to Hire and Screen

Hiring has become a high-tech enterprise. Companies that are digital businesses, or running fast to become one, must root out hiring inefficiencies. For instance, social networks such as LinkedIn will make much of today's human scanning of resumes obsolete in a few years. You cannot only spot industry domain knowledge, but also sense whether a person's history and goals culturally fit with your organization. Is social media a key hiring tool for your company? If not, it must become one.

Additionally, businesses must pay closer attention to using analytics tools. If your company has poor business analytics, it is hard for HR to see how the organization will grow in the future—what skills it has and what skills it will need.

Many HR departments have risen to this challenge. One is the $50 billion U.K. based consumer goods company Unilever. CEO Paul Polman insists that business analytics and HR analytics should be tightly married, given the company's ambitious sales growth targets (doubling revenue). Unilever's chief HR officer, Doug Baillie, sees such alignment as a 'distinctive strength,' as he explained in a recent industry association white paper.[43] "We have spent an enormous amount of time examining whether we have the talent engine to sustain an 80 billion euros revenue business. … This is one of the essential roles HR plays in the business by ensuring any gaps in the skills, talent or culture across the business that might harm our 80 billion euro aspirations are covered."

To Unilever, designing a talent strategy to help execute its growth strategy has been powerful.

[43] ValuingYourTalent.com, Unilever: Through the sustainability lens – leading people authentically, accessed July 23, 2016, http://www.valuingyourtalent.com/media/Case%20study%20-%20Unilever%20-%20PDF_tcm1044-5904.pdf

Marketing the Brand Broadly as a Great Place Work

The college campus is not the only place for companies to create a strong employer brand. They should use other channels as well. Conference speaking is one, and an industry alliance partnership is another. Along the same lines pay attention to the message your own website sends to possible hires. It may be highly attractive to customers. But is it as appealing to future employees?

In addition to traditional hiring techniques such as employee referrals (still an important tool) investigate emerging ones. For instance, can you use a platform where candidates can present themselves, and discuss their interest in a role using a short video clip?

Finally, consider using innovation hubs as a way to draw prized talent, say around robotics or IoT skills. General Motors uses four U.S. innovation centers to draw IT talent, especially from local universities. Part of the lure is the chance to work with emerging technologies and digital business projects.[44]

A decade ago, a number of big companies such as Unilever, P&G, and Shell started focusing as much on their employer brand as they had for years on their customer brand, according to the employer branding firm Universum.[45] Since then, as the firm points out, social media has given employees the ability to broadcast what it is really like to work at a certain company. This means companies must pay far more attention to engaging with employees and making them advocates.

[44] *The Detroit News*, GM bolsters IT ranks in push for more innovation, June 08, 2015, accessed August 12, 2016, http://www.detroitnews.com/story/business/autos/general-motors/2015/06/08/gm-wants-workers-hiring-continues/28720893/

[45] *Harvard Business Review*, CEOs Need to Pay Attention to Employer Branding, May 11, 2015, accessed August 2, 2016, https://hbr.org/2015/05/ceos-need-to-pay-attention-to-employer-branding

BARRIERS TO SUCCESS

What are the common mistakes companies make as they try to improve their talent game? Many companies see the value in doing cross-training; fewer actually execute it well. If you cross-train someone and do not put that knowledge in action, the training becomes useless. Companies must find ways to help employees apply the new skills.

Second, companies need strong executive support for training and tweaking hiring practices. For example, if you are hiring for curiosity rather than for skills, the CEO must stress the value of quick learners as critical to company's digital goals. This helps fight cultural resistance.

Third, many of us have watched companies focus on hiring at the expense of retention. But retention is more crucial than ever. To keep valued employees, companies must offer multiple career paths, along with leadership development opportunities.

Coaching and mentoring are key to retention. The best companies personally connect with talented individuals, empathize with them, and give them exposure to the right levels of leadership to showcase their potential as future leaders. Corporate social responsibility (CSR) programs can help too: participating in social programs such as community development work has consistently proven to boost an employer's brand with employees.

Recruits notice CSR efforts. Some 79% weigh a company's CSR commitments when deciding where to work, according to one study.[46] In-demand analytics and big data professionals are showing an increasing interest in CSR, another study found out.[47]

[46] Cybergrants, 6 Key Findings on the Rising Role of Corporate Social Responsibility (CSR), June 11, 2015, accessed July 26, 2016, http://www.cybergrants.com/blog/corporate-social-responsibility-csr-201506.html

[47] Burtchworks.com, Salaries of Data Scientists, April 2016, accessed July 26, 2016, http://www.burtchworks.com/files/2016/04/Burtch-Works-Study_DS-2016-final.pdf

HR'S FUTURE:
A DIGITAL BUSINESS PARTNER

In the future, while automation tools will help with the transactional aspects of HR, the people aspect of HR will not go away. Today and tomorrow, much HR activity (coaching, critiquing, identifying rising leaders) is done by the business line managers themselves. HR provides necessary training and support for these managers. More than ever, HR should not be seen as an island, but as a partner to the business teams.

Yet HR must also continue to improve its own processes for hiring and retaining valued employees. Take a lesson from the agile, iterative approach at startups. The HR organization of a big company should constantly evaluate itself. Is a particular hiring or retention approach still providing value to the organization? If not, kill it quickly. Constantly question how your HR team's talent strategies benefit the business, and continue to improve or discard them to improve results.

The HR departments that help companies identify, secure, motivate, and retain the talent they need in the years ahead will be considered key engines of growth. In the most successful digital businesses, such HR functions are already playing that role.

ATTACKING UNCERTAINTY
INTERVIEW WITH RAM CHARAN

A globally celebrated advisor to executives at top companies, Ram Charan specializes in practical solutions to the most vexing problems facing industries. For the last four decades, he has worked with CEOs, boards and business unit heads at such companies as General Electric, Bank of America, DuPont, MeadWestvaco, Novartis, EMC, 3M, Verizon, Grupo RBS, and the Tata Group. Jack Welch, GE's legendary former CEO, says Charan has "the rare ability to distill meaningful from meaningless and transfer it in a quiet, effective way without destroying confidences."

Named by Fortune *magazine in 2007 as the "most influential consultant alive," Charan is a prolific author of business books—23 since 1998. They have collectively sold more than 3 million copies in more than a dozen languages. "*Execution: The Discipline of Getting Things Done*" (co-authored with ex-Honeywell CEO Larry Bossidy) was on* The New York Times Best Seller *list for more than 150 weeks. It, and two other Charan books, were* Wall Street Journal *bestsellers.*

Charan's most recent book is titled 'The Attacker's Advantage: Turning Uncertainty into Breakthrough Opportunities' *(Public Affairs, 2015). In it, Charan asserts that structural uncertainty—driven most of all by digital technology—will continue to shake even venerable, long-established companies and industries to their foundations. Leaders and their businesses can thrive only if they know how to spot the very beginnings of change—and harness it to their advantage before anyone else does.*

Charan discussed these challenges in a recent interview with editors of TCS 'Perspectives'.

TCS: *One of the tenets of your book is that taking control of uncertainty is the fundamental leadership challenge of our time. Why is this so important today?*

Ram Charan: Structural uncertainty in every industry is happening much more frequently than ever before. It is quite different from the seasonal and even cyclical uncertainty that companies have learned to manage. Structural uncertainty can come from surprising places. It can explode the existing structure of your marketplace and your industry, and it can eliminate companies that do not anticipate it and deal with it well.

Leaders must expect uncertainty. But even more, they need to know how to take advantage of it.

Human beings create almost all structural uncertainties. And the seeds of that uncertainty are there, in the present and the past, but they are very difficult to detect. You must focus hard to see it and understand who is behind it. You must anticipate the forces that might enable these seeds of uncertainty to take hold and become big and unstoppable.

One of the classic examples of this is the structural uncertainty that Steve Jobs and Apple created for Nokia. In the early 2000s, Nokia was the No. 1 mobile phone maker in the world and had patents on its handsets. Before it unleashed its first iPhone in June 2007, Apple had been filing patents on it, in fact more than 200.

Despite the publicly available information, the Nokia leadership team just didn't believe a computer company could be a threat to their cellphone business. As a result, Nokia didn't prepare itself quickly enough for Apple's onslaught. Had Nokia been prepared, it would have recognized that change was coming and positioned itself to ride the change rather than be engulfed by it.

TCS: *Which structural uncertainty presents the biggest single threat to established companies?*
Charan: Today, the most unstoppable uncertainty for most legacy companies is the onslaught of digital companies that use algorithms. 'Born digital' companies—Google, Facebook, Amazon—are experts in algorithms, which are sets of rules that tell computers what to do with data that has been converted into numeric digits. Algorithms, and their related software, can process huge amounts of data and predict the outcomes of decisions with multiple variables at lightning speed.

This is the new game. What I call the algorithmic revolution is as important to shaking up industry structures as the internal combustion engine was in the mid-1800s. No company will escape it. Companies that have these mathematical capabilities will thrive; those that delay or rail against the new reality will be punished badly, as Nokia, Motorola, and Kodak were.

TCS: *So do legacy firms have an inherent disadvantage over the born digitals?*

Charan: The greatest disadvantage of legacy companies is their mindset and their lack of courage to do what they need to do. They actually have an advantage that born-digital companies lack: domain knowledge and the expertise needed to service the customer. Domain needs are serviced best by legacy companies; it is much harder for born-digital companies to do. Some leaders of legacy companies understand this and use it to their advantage. Others never will.

TCS: *In 'The Attacker's Advantage,' you talk about five skills you believe leaders must possess to be able to see the big bends in the road: perceptual acuity, a mindset to see opportunity and uncertainty, the ability to see a new path forward and commit to that new path, adeptness in managing the transition to that new path, and skills in making an organization steerable and agile. Can you say a little bit about each one, starting with perceptual acuity?*

Charan: Because people create the future and it is easy and inexpensive to access the internet, more than 7 billion people today can express themselves, take action, create innovations, and shake up an industry. This means that all companies must build the ability to see over the horizon, and predict which of the existing seeds of uncertainty will take hold and reshape the future. We have to practice this perceptual skill constantly so it will improve.

TCS: *What about the second skill: the mindset to see opportunity and uncertainty? What kind of mindset is necessary?*

Charan: Uncertainty can be a negative if your mindset is pessimistic. The best leaders see uncertainty as a great opportunity. The smart phone was a great opportunity for somebody, and a problem for somebody else. So the question everybody should ask is: I can see the uncertainty, but if I were not in this business how would I make money from it?

TCS: *Your third element is the ability to see a new path forward and commit to it. What are the most important elements to doing that?*

Charan: A business exists to discover a customer's need, and fill it. Leaders must discover how an uncertainty will reshape that need, and find a new path to filling it—something that will create benefit for the customer and make money for the business. The new path might require designing and delivering a current need in a new way, or filling a different need altogether.

Uncertainty changes the landscape, and that landscape might create a new need, or maybe a different need, or maybe the same need addressed in a different way. A CEO who cannot see this or respond to it will have difficulties.

TCS: *And what about the fourth skill: adeptness in managing this transition to the new path? In your book, you talk about having two tracks: one, to make sure you do not mismanage your current business, but the other, to build your new business at the same time.*

Charan: This is the new challenge for most CEOs. First, they have got to realize how fast their existing business will decline if they do not do digitization and algorithms. If they do not move quickly, they will have nothing left, or will have so little left that they cannot come back. They need to see how quickly they must add these capabilities and figure how they can get the resources to fund it. They also must manage the existing business so they do not accelerate its demise.

Now the positive news is that legacy companies know their customers and have an embedded base. They must simply find a way to create a need that they can satisfy, and redefine the end-to-end customer experience. Before, they needed only to produce a product and use the linear system of distributors, wholesalers and other channels to get it to market.

Now you have got to think imaginatively about the whole experience of the customer and the other players involved from start to finish. The companies that can do that—and that use the power of digitization and algorithms—are going to make it.

TCS: *So let us talk about the fifth skill: making an organization steerable and agile.*
Charan: Here is an analogy: Cars and airplanes are steerable, and they are designed that way. But most companies steer their strategies and goals only once a year, as if the sun rises on January 1st and goes down December 31st; in between is a lot of rigidity, especially when it comes to budgets and people.

Companies must be able to respond more quickly within their yearly strategic planning cycle to changes that take place on the outside—in how they allocate budgets, how they define what people do and design incentives for them, and in the key performance indicators they use. They must have the levers in place that let them steer quickly when needed.

TCS: *You mention in your book that it is a sin that the most talented people in a company often are not allowed to move from their division, product line, or function to other areas of that company that actually need them more, to make the company more steerable. Tell us more about that.*
Charan: This happens a lot. And because of the fast exponential change on the outside, that rigidity is a negative. Big companies should not allow their most valuable employees to be locked up within divisions or business units. Key talent should be seen as a pool, and the CEO must be convinced to put policies in effect that make it easier to move that talent around, using either pull or push incentives.

At GE, under Jack Welch, top management would review their divisions twice a year. They knew where the top performers were, and they moved the talent when necessary. It was not up to the division heads. That policy has been in place for 35 years, and there is not much resistance because if one division head gives up a talent, he or she also gets one. It is not a net loss. They are giving and receiving.

TCS: *Among big global companies, is GE fairly unique about that system and its ability to very quickly deploy talent across geographies and divisions?*
Charan: GE has the best system, but Unilever also does it. They know the value of it.

TCS: *On this topic of navigating uncertainty to uncover breakthrough opportunities, is there anything else we should think about?*
Charan: If you ask people their opinion of another company or industry, they make very good observations, but they cannot see their own that clearly.

All leaders and managers need to look at their world from the outside in. Most of them have grown inside out. If you look at the world inside out, your lens has a very narrow scope. If you look from the outside into your business, your lens is broader. If you do not practice that, you will suffer.

HOW MICROSOFT USES MACHINE LEARNING TO HANDLE WORKLOADS THAT HUMANS CANNOT

For better or for worse, depending on your view about technology's impact on employment, artificial intelligence has long been seen as a technology to help companies do more things with fewer people. That is a key part of making companies 'lighter,' as we refer to it in this issue of *TCS Perspectives*—to run and grow a business without having a geometric increase in payroll.

However, Joseph Sirosh, a Microsoft Corp. corporate vice president of information management and machine learning, believes AI—and more specifically, machine learning—will be essential to helping companies conduct business processes in which there simply are not enough people to do them in the first place. Many of those processes handle enormous and continuous volumes of digital data.

A great example of this is the way big companies defend their computer systems against attacks—hackers trying to penetrate their networks, malware that intrudes their email systems and web browsers, and more. "Every one of those things today are most efficiently detected in real-time and automatically, using machine learning algorithms," he explains. "It is absolutely true that today's machine learning algorithms are what is keeping Microsoft's cyber infrastructure data secure. There are not a lot of human beings [at Microsoft]

poking around trying to find out if there is something bad going on. It just would not scale."

Without automated machine learning models to detect cyber-attacks, Microsoft and other big companies would have a hard time fending them off rapidly before damage is done, he notes. "Without these kind of automated systems, it would be very, very hard for these things to be detected fast enough to stop them," he says. "When people launch a virus in some part of the world that is starting to spread over networks and infect PCs, when you look at the data coming from these machines, you can understand what is going on—*if* there is a machine learning algorithm going on behind the scenes alerting you to the dramatic changes that are happening."

Guarding its computer networks is by no means the only place Microsoft has been applying its large and growing expertise in machine learning technology. Sirosh and others have been hired at Microsoft for several years to inject more machine learning models into the products and services that Microsoft sells. Products such as the Bing search engine and Microsoft's entry

into the digital assistant market (Cortana) are imbued with the machine learning's ability to help a computer system become 'smarter' on its own, without the need for human programmers.

Take Bing, a search engine that in 2009 was a distant third in the marketplace to Google and Yahoo, according to market tracker ComScore. Back then, Microsoft had brought in a data scientist (Qi Lu, now a Microsoft EVP) who recommended the firm's search engineers to build machine learning algorithms that would automatically and continuously refine Bing's ability to summon relevant content. And he also suggested Microsoft build a data storage platform that stored all its search data, a critical piece for machine learning.

The Bing engineers followed his advice, and great things happened. By producing ever more relevant search results for Bing users, between 2009 and 2015 Bing's share of the search market more than doubled to 20%. What is more, Microsoft's search business has grown to more than $1 billion a quarter in revenue and has become profitable.

Microsoft doubles search share
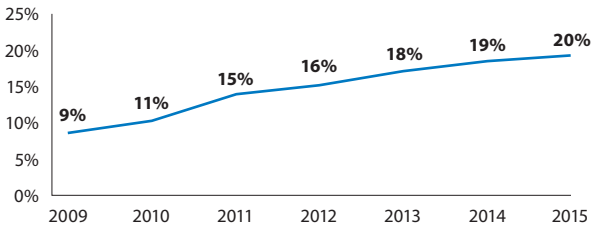
Source: ComScore 2009–2015 Search Report U.S.

"The quality of the ranking results that are produced by the Bing search engine depends entirely on the machine learning models behind it," Sirosh explains. "The machine learning models examine the search queries and what people click on. They then build a very powerful model that is then deployed in a few programmable data for extremely fast querying."

The result is that every search result you get from typing words into Bing is found and ranked by a machine-learning model. "They're producing huge amounts of quality improvements for our search customers," says Sirosh. "That is one example where machine learning is totally built in the fabric of the product and has become one of its biggest differentiators."

This is one of numerous ways that Microsoft has embedded machine learning into its technology products and services. It has a strategy that is central to Microsoft CEO Satya Nadella's initiative to continue to grow the 41-year-old company far beyond the personal computer. As a *Bloomberg Businessweek* article put it earlier this year, Nadella "has been sprinkling machine learning like fairy dust on everything his company touches."[48] Sirosh and many others at Microsoft are there to make that happen.

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[48] Dina Bass, "Inside Microsoft, Where Lie Detection Is a Killer App," Bloomberg Businessweek, Feb. 22, 2016. Accessed June 24, 2016. http://www.bloomberg.com/news/articles/2016-02-22/inside-the-new-microsoft-where-lie-detection-is-a-killer-app

UNDERSTANDING YOUR CUSTOMER PERFORMANCE FASTER
TCS Industry Insights

Pratik Pal is President and Global Head for Retail, CPG, Travel, Transportation, and Hospitality at Tata Consultancy Services.

1. How has the retail industry's idea of superior customer service changed recently?

The retail industry is in the midst of a tectonic change, and the lines between the digital, and physical shopper experience are blurring. Possessing powerful technologies at their fingertips, customers expect retailers to meet their needs, and wants at will, leading to 'anytime, anywhere' commerce. Additionally, customers want a frictionless shopping experience.

This is forcing retailers to make major changes in the customer experience. The story of Katie, a busy mom, illustrates this well.

Meet Katie: A 35-year-old mom who drives to work at 8AM every day after dropping her kids off at school. She frequently goes to a store on her way back home to pick some dine-in menu options from the food section for dinner.

10:00 AM — It's a Wednesday morning, her son Tim has just won the football tournament at school and they want to party at home. She has to plan the party, send invites out, get food, everything done & ready by 6PM. But of course, she has a lot of work in office to finish.

12:00 PM — She makes her list—groceries, balloons, streamers. Everything is available on the website. With a click of a button she buys them online to pick up in store later in the evening.

1:00 PM — Now for the cake, she browses Pinterest and loves the football themed cake. She taps to order it with a personalized message.

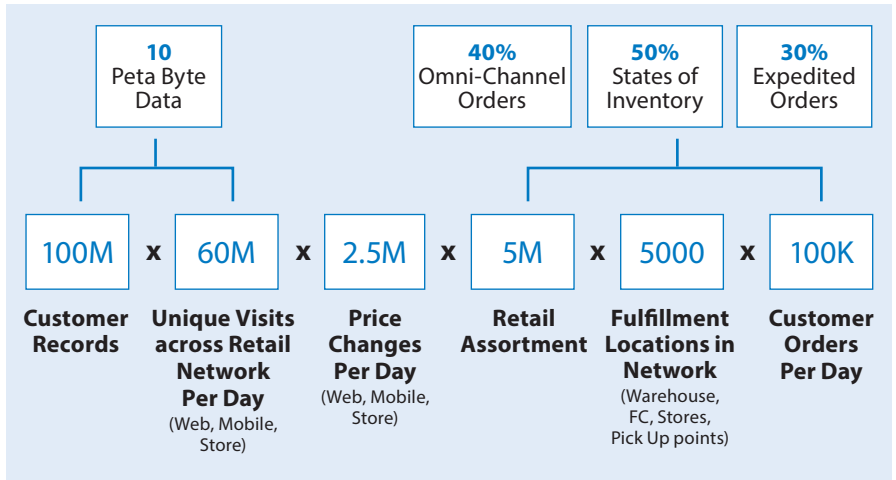**4:00 PM** — She gets a notification that her order is ready to pick up.

Order ready. Counter 3.

5:00 PM — As she starts driving closer to the store, the store associate gets notified automatically that Katie is nearby.

STORE
Reviews
Party Planner
Offers
iBeacon
foursquare

5:05 PM — She enters the store, and gets a notification about where to collect the order.

Order ready. Counter 3.

5:15 PM — She always hand picks apples for Tim. The store associate adds them to the cart and helps her checkout.

TIM & HIS FRIENDS LOVE THE PARTY...
IT'S A HIT...!

While Katie's shopping journey is ideal and simple, the grocery store's responsibility to deliver such frictionless and superior customer service is not at all easy.

10 Peta Byte Data		40% Omni-Channel Orders	50% States of Inventory	30% Expedited Orders

100M	x	60M	x	2.5M	x	5M	x	5000	x	100K

Customer Records — 100M

Unique Visits across Retail Network Per Day (Web, Mobile, Store) — 60M

Price Changes Per Day (Web, Mobile, Store) — 2.5M

Retail Assortment — 5M

Fulfillment Locations in Network (Warehouse, FC, Stores, Pick Up points) — 5000

Customer Orders Per Day — 100K

In this example, customer service is about delivering a seamless experience—the right items present at the right store, and the right recommendations being made, and offered at the right price. Additionally, parts of the retail supply chain—the inventory availability, time of pickup and the last mile fulfillment—are now **more visible** to the consumer and not hidden behind the scenes. What is more, store personnel play a more important role to ensure the last mile of the consumer's process is hassle free.

All in all, the customer experience is becoming personalized, transparent, seamless, and real time.

2. What emerging technologies are most important to giving retailers a fuller, faster picture of customer likes and dislikes?

We first need to explain what fuller and faster means for consumers. Fuller means a seamless shopping experience irrespective of what channels customers use. But it also means knowing customers' likes and dislikes throughout their shopping journey. Faster means instant gratification. That could mean filling an online order the same day, or even within a couple of hours.

With technologies, such as Internet of Things sensors and mobile devices, shopping becomes simpler for consumers, but more complicated for retailers. More consumers are using smartphones or IoT connected devices to place orders from their homes, and have merchants later deliver them. To achieve this, retailers face huge complexities. Their supply chain network has to choose the closest source for each item, while keeping customer preferences in mind. Retailers must also make sure they deliver according to customer expectations and replenish inventory for the next customer.

With the advent of smart robotics, retailers can now program human-like intelligence and learning capabilities into mobile robots, delivery drones, and other machines. That can free up store associates to spend more time on the floor—serving customers—and less time in the back room. Big data, cloud, AI, and social media tools also help retailers deliver truly exceptional customer experiences.

Looking ahead, Internet of Things, smart machines, intelligent automation and real-time data technologies will be crucial for retailers trying to transform this fuller and faster vision into a reality.

3. What is the next frontier for retailers in delighting customers?

It boils down to this—*extreme personalization at every interaction point*. Having a 360 degree view of the customer and using it across the retail value chain will be a key differentiator for retailers. Personalization could mean getting the assortments, pricing decisions, product recommendations, and customized loyalty programs right for every single customer. It could even include designing the customer experience and offering appropriate solutions based on the customer's current context. Delivering extreme one-on-one personalization will be the next frontier in delighting and delivering truly exceptional customer experience and service. Retailers that can deliver extreme personalization at every point of the customer journey will be the true winners in this digital age.

Doing so will also require retailers to involve customers in the design of products and the in-store experience. Design thinking will play a key role here.

4. How important will personalization be to retailers?

Personalization will be crucial. A century ago, when mom-and-pop stores dominated, the store owner knew your name and preferences. He often knew even your anniversary or birthdays. It was an extremely personal relationship. With the rise of mass merchants, warehouse clubs and huge supermarket chains in the last 30 years, personalization moved to the store level but not the individual consumer level. Somewhere in the shift to large-format retailing, we lost the personal touch of the old mom-and-pop store.

Now, we are getting it back. With Big data and advanced analytics technologies, it is possible to establish the same kind of one-to-one personalization. A leading U.S. retailer developed what it believes is one of the world's largest customer intelligence systems. The platform gives it a 360-degree view of customers. This retailer is beginning to use the insights from that system to personalize every point of interaction with their customers.

LIFE SCIENCES
STRATEGY FOR FASTER ACQUISITION AND INTEGRATION
TCS Industry Insights

Debashis Ghosh is President of Manufacturing, Life Sciences, and Energy at Tata Consultancy Services.

1. Do you expect the pace of M&A activity in the life science sector to pick up, slow down, or stay steady in the next five years?

Life sciences companies currently face strategic challenges including a softer sales pipeline, falling profit margins, and regulatory pressures. In the recent past, M&A activity has been driven by portfolio consolidation, cost optimization, market expansions, and tax inversions. However, for pharma and bio-tech companies, acquisitions of mainly European companies for the purpose of tax inversion will slow in coming years. M&A focus will shift to emphasize market expansion, pipeline expansion, margin improvements, and increasing product portfolios. For medical devices companies, the focus will be on access to new and emerging markets, acquiring new technologies, and acquiring vertical integration capabilities, such as the ability to add services onto products.

Look for a shift from mega deals to comparatively smaller transactions, where pharmaceutical companies acquire niche capabilities and focus on transformation. Large M&A activity will center around the U.S. and Western Europe along with other consolidation across the globe.

At the same time, the industry will also see divestitures, as companies shed their non-core assets which lack significant growth potential or synergies with core product or services. As these companies focus on consolidation and infusion of capital to their core businesses, they will strengthen their respective leadership positions, as we have already seen in some recent deals involving Novartis, GSK, Boehringer Ingelheim, and others.

2. How important is M&A expertise to the success of today's life science companies?

Even with the increased focus on M&A in life sciences, some recent deals did not deliver the desired business outcome due to poor planning around integration. To meet business objectives, companies need to do comprehensive M&A due diligence, followed by careful change management to ensure well planned integration across the enterprise, including business processes and IT systems. It is critical that life sciences companies build their in-house capabilities where needed to manage these integration-related business activities more effectively.

3. What tactics do the smartest life sciences companies use to maximize the value of life science startups, after an acquisition?

These companies acquire a startup to gain access to IP, technology, and skills that help unlock new areas of business growth and expansion. This requires preserving and nurturing the startup, while providing added access to the marketplace, partner ecosystems, and company resources. At the same time, the acquirer must continuously evaluate and capitalize on the synergies with the start-up, with an eye to expanding its own products and services.

While traditional M&A approaches have focused on financial values and markets, talent is often the prize today. The people of the acquired business are themselves a key driver of the deal, representing significant business value. The acquired company's leaders or

teams have developed some specific ways of operating, solutions to problems that have been central to their success. Thus, M&As can be used to introduce fresh ideas and break an operational logjam in the larger organization.

4. How would you rate life science companies' expertise in this area, as compared to other industries? From whom could they learn?
Some mature organizations in sectors such as technology and retail have streamlined the M&A integration process, adopting a set of best practices for operational playbooks, change management, and related matters. Within the life sciences industry, select large companies have been fairly successful with M&A deals. Still, considering the high level of deal volume expected in the life sciences sector, life science companies should focus on two lessons from mature companies in other sectors.

First, these companies should build a rigorous pre-deal due diligence process that identifies potential risks and complexities and informs deal decisions. Second, a repeatable integration process can help companies quickly take advantage of acquired capabilities and realize deal synergies. Additionally, life sciences companies should improve their capabilities around change management and the ability to assimilate team members from diverse organizational cultures.

GETTING LIGHTER

THE SURE BUT WINDING ROAD TO THE CLOUD

AUTHOR
By Nidhi Srivastava

Global Head of IT Consulting, Tata Consultancy Services

Even for companies that can afford billions of dollars in IT investments, the economics of putting information technology in the cloud are undeniable. Huge capital expenditures turn into operating expenses, and the headaches and complexities of running secure data centers becomes someone else's responsibility. The testing of crucial but new compute-intensive business capabilities can suddenly be done on the spot, and on the cheap.

This is the reason why The Coca-Cola Company this year has shifted more than 20% of its IT to the cloud and put a for-sale sign on its Atlanta data center.[49] This is also why 207 companies surveyed by JP Morgan with IT budgets of at least $600 million expect to increase their cloud workloads from 16% to 41% in five years.[50] The message is becoming clear—for a growing number of global companies, the default location for their hardware and software will be the cloud. Like the office fax machine and the typing pool, running IT 'on-premises' will soon become a quaint notion for many systems of many companies.

[49] The Wall Street Journal, Cloud Computing Shift Accelerates, Reversing Recent Dip, April 15, 2016, accessed July 15, 2016, http://blogs.wsj.com/cio/2016/04/15/cloud-computing-shift-accelerates-reversing-recent-dip/

[50] Barron's, Amazon Seeing 'Momentous' Change of Guard as Public Cloud 'Booms,' Says JP Morgan, Barron's, April 14, 2016, accessed July 15, 2016, http://blogs.barrons.com/techtraderdaily/2016/04/14/amazon-seeing-momentous-change-of-guard-as-public-cloud-booms-says-jp-morgan

However, transferring a company's computing workload to public cloud vendor facilities promises to be anything but easy. The companies that TCS is helping do so, which include a global chemicals firm, a major business information provider and a large industrial manufacturer, are immediately confronted with two fundamental questions.

1. WHAT EXACTLY SHOULD COMPANIES MOVE TO THE CLOUD FIRST?

2. HOW SHOULD THEY DO SO WITHOUT WREAKING HAVOC ON THEIR DAILY BUSINESS?

This article addresses these two questions, drawing on our experiences and expertise in helping large companies move their IT to public clouds.

1. What Should Move to the Cloud First

The economics of shifting IT to public cloud vendors' data centers are inescapable. Companies that can easily 'lift and shift' long-standing business applications, which consume huge amounts of servers, storage and other data center technology, should be seriously investigating their public cloud options. Cheered on by their CFOs, they will be able to turn much of their big annual capital expenditures involved in running their data centers into operating expenditures.

Unfortunately, many business applications are not easy to simply 'lift and shift'. A company that decides to move a big enterprise resource planning system (ERP) from its data centers to a public cloud runs the risk of significant disruption to its business when it does so, and thus it needs to plan accordingly. The reason for the disruption is that moving on-premises ERP to an ERP vendor's cloud (Oracle, SAP, etc.) essentially is a new implementation of the technology—an upgrade to the latest version. What is more, most ERP systems, especially those installed years ago, have been significantly modified to suit a company's geographic and industry-specific needs. Much of that customized functionality is not likely to be available in a plain vanilla ERP cloud offering. Thus, shifting on-premises ERP to ERP-in-the-cloud may entail significant customization of the type that may have taken months or years to do with the on-premises version.

A major chemical company has nearly 100 versions of an ERP system in its data centers, and each version has been customized to varying degrees. Moving that system to the cloud is likely to be painful given all the customization that would need to be done on the ERP vendor's latest (cloud) version of the system.

Owing to such extensive customization, some companies have decided not to take their ERP systems directly to a public cloud but rather to a privately owned cloud. One example is Qantas, Australia's largest airline. When it was time to upgrade its on-premises Oracle ERP system, the airline turned to a private cloud implementation. Instead of moving to the latest on-premises version, Qantas took advantage of new functionality, enhancing user experience, in the E-Business Suite 12 through a private cloud. "This was a huge opportunity to streamline and improve performance," said Eric Pona, technology manager for enterprise systems at Qantas.[51]

If the plan is to eventually shift your on-premises ERP platform to the cloud, then the least disruptive way is to shift those parts of the enterprise application that adhere more closely to the standard version sold by the ERP vendor—that is, the modules your firm has not extensively customized. In many companies, these modules are in finance and order management.

[51] Baseline, A New IT Model Takes Flight at Qantas, January 6, 2016, accessed July 18, 2016, http://www.baselinemag.com/it-management/a-new-it-service-model-takes-flight-at-qantas.html

ENVISIONING THE CRITICAL NEW COMPUTER WORKLOADS OF THE FUTURE

When many companies think about the cloud, they look only at moving applications and IT infrastructure that currently run in their data centers. What they forget are the whole new applications that suddenly become available because the cost of bringing in the technology to run them has fallen to near zero. If your company wants to offer customers a new IT-intensive product or a new digital way of doing business but hesitates because it requires a huge investment in additional IT infrastructure, you need to hesitate no more. This is possible because the cost of that infrastructure today is no longer an issue. You can buy such computing resources by the hour at affordable prices.

An excellent example is how streaming movie and TV programming pioneer Netflix Inc. was able to scale its streaming video business. After launching the business in 2007,[52] the company decided three years later that it needed to move its existing technology to a company that was in the data center business—Amazon Web Services. "With the shift to streaming, our software needs to be much more reliable, redundant, and fault tolerant," wrote Netflix VP of product engineering at the time, John Ciancutti, in a corporate blog post in 2010. "We could have chosen to build out new data centers, build our own redundancy and failover, data synchronization systems, etc. Or, we could opt to write a check to someone else to do that instead." Running what he said was one of the biggest cloud computing environments in the world, Netflix decided its engineers had to focus on "product innovation for the customer experience," adding "that is what differentiates us from our competitors"— not the increasingly complex and costly data center infrastructure behind it.[53]

A major provider of information to businesses is making a big push to the cloud for a similar reason—to give customers better ways for using its data online. Customers want to rapidly analyze the firm's data and in numerous ways, and not wait for the company to do the analysis for them. This means providing customers with sophisticated online tools, which in turn requires extensive computing power. The company is in the process of re-architecting those systems and putting them on a public cloud so that customers can get what they need.

[52] Forbes, Netflix to Stream Live Movies for Free, January 16, 2007, accessed Aug. 10, 2016, http://www.forbes.com/2007/01/15/netflix-free-video-streaming-tech-media-cz_qh_0116netflix.html

[53] Netflix, Four Reasons We Choose Amazon's Cloud as Our Computing Platformi, December 14 2010, accessed August 10, 2016, http://techblog.netflix.com/2010/12/four-reasons-we-choose-amazons-cloud-as.html

Dramatically improving the customer's online experience is also what drove U.S. based financial services and credit card company Capital One Financial Corp. to the cloud. The company's CIO, Rob Alexander, says the company's online banking experience is becoming the most important one for its customers.

"We really need to be great at building amazing digital experiences for our customers," Rob Alexander, CIO at the $20 billion (revenue) company, said in a conference presentation.[54] "We have to be great at building software and data products if we're going to win where banking is going."[55]

To be sure, Netflix, Capital One and the business information provider mentioned above are not the only companies that now find themselves competing in an online world against ferocious online players. Perhaps the best illustration of this is that Netflix's cloud provider Amazon now competes against the company in the world of streaming TV shows and movies. Those business partners in the cloud are now competitors too.

A growing number of other firms in industries ranging from automotive manufacturing and banking to media and travel compete today on the basis of the online products and capabilities that they offer. In the future, car buyers should be expected to increasingly compare cars on the basis of their telematics and 'infotainment' capabilities. For instance, what one manufacturer's onboard GPS system can do that another's cannot do may become a major influence in the buying decision. Like Netflix, Capital One and the business information company we mentioned, automakers too must have the data center resources to compete in a digital-intensive world of online business.

[54] MarketWatch data on Capital One, accessed August 10, 2016, http://www.marketwatch.com/investing/stock/cof/financials

[55] Youtube, AWS re:Invent 2015 Keynote | Rob Alexander, CIO, Capital One, published October 13, 2015, Accessed July 17, 2016, https://www.youtube.com/watch?v=0E90-ExySb8

2. HOW TO MOVE IT TO THE CLOUD

Once you have determined what existing IT applications and infrastructure your firm should shift to the cloud—and the new IT capabilities that should be built in the cloud from the start—the next big consideration is how to make that shift. Based on our cloud migration work with clients, we believe you are likely to encounter six situations, and urge you to be ready to manage them.

**You will spend at least double the amount of time than you thought to take inventory of your application portfolio.** We call this the 'discovery' phase. To determine what computer applications should be shifted from on-premises systems to the cloud, CIOs must first understand exactly what applications are running in their data centers. From our experience, when a company initially believes it has around 500-600 applications running across its global business, it is often shocked to find out the number is two to three times that many when the audit is done. And we are not including personal applications such as Excel that are housed on PCs or laptops. Many of these extra apps are what are referred to as 'ghost apps' because they are so old that the company that developed them either does not support them anymore or is out of business altogether. Such ghost apps, then, may need to be entirely rewritten to become cloud versions—a major undertaking. Another business information provider that has been shifting to the cloud discovered a ghost app three years ago. The app provided a critical component to managing customer subscriptions. The app vendor had gone out of business long ago. When the information provider began its transition to the cloud, it started with its ERP system and left the ghost app untouched.

Expect to re-architect a good percentage of cloud applications without having updated design and architecture documents at hand. For those applications that you have decided must be revamped for the cloud—a new design and a computing architecture—be ready to find that the original documents that explain their design and architecture are either missing or grossly outdated. This is especially true for custom applications built years ago. Three years ago, according to Forrester, companies were spending about the same amount

on custom applications as they were on packaged applications—about 26% for customer apps and 26% for packaged applications out of total spending on applications software.[56] In determining which pieces of the applications portfolio should move to the cloud and when, companies are likely to find that as much as three-quarters of that portfolio are custom applications. That is because many applications were built long ago before viable packaged versions existed. The problem that such packaged software presents is equivalent to the one that science fiction writer Isaac Asimov warned about in his writing on robots: the machinery still works but nobody knows why. Today's business applications are very much in the same condition. There is no one left in the company who can explain how they work.
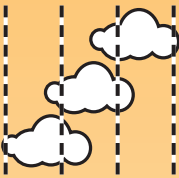
To minimize disruptions to the business, cut over in phases defined by business function rather than by data centers.
The easiest way for many IT departments to shift applications and infrastructure to the cloud is to do it one data center at a time. But that often is not the easiest way for a company's business functions to shift their systems to the cloud. Ultimately, a shift to the cloud should be a shift that strengthens a company's business functions and products or service offerings—not just one that reduces the IT cost structure. A marketing function's applications, for example, may reside in multiple data centers. As a result, shifting to the cloud one data center at a time will force marketers to learn, test, and use new cloud-based systems over a long period of time rather than in a concentrated one. Better to identify all the marketing applications that should be put in the cloud, and then plan their migration in a shorter—not extended—period of time. For the IT organization, the data center is the logical unit of work, especially if a firm's data centers are outsourced to third parties. In cloud migrations however, the unit of work should be the business function.

[56] Computerworld, Forrester dispels 'myths' about software industry trends in 2013, August 7, 2013, accessed August 10, 2016, http://www.computerworld.com/article/2484752/it-management/forrester-dispels--myths--about-software-industry-trends-in-2013.html

In deciding what business functions should go first, determine the connections among applications. Chances are most applications in a business function are connected to other systems in that function rather than to systems in other functions—other than, of course, those cross-functional ERP systems. Ensure applications that are tightly knotted to other applications are identified and moved concurrently in batches. Functional applications that are integrated with ERP systems should be migrated to the cloud together, so that the business function is not disrupted on two different occasions.
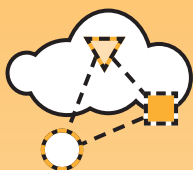
Recognize the idiosyncratic IT needs of different geographies when determining how to batch the cloud migration. Data privacy and other information security laws may vary from country to country, and in different continents too. For example, overlooking Europe's rules on employee data privacy may create problems if that data is not kept in the country where a company's on-premises system was located. If you have country-specific applications, put them into a single batch and do them all at once. The professionals behind cloud migrations must pay close attention to data privacy and security regulations.

Know in advance how you will test your new cloud systems before migrating to them. You need to have a strategy for stress-testing the software early on. A chemical company that is moving to the cloud will have one vendor's responsibilities in testing to end at so-called smoke testing—an initial testing to ensure that the most critical aspects of the system work well. However, more advanced levels of testing should be in place. For example, integration testing (to test how multiple applications work together) and performance testing (which typically include testing an application's connection to a network and its response time for users). It is one thing to have a cloud system operating on AWS or Microsoft's Azure platform. It is a much bigger challenge to have a part of an application on one cloud platform and another running an on-premises system. The networks that link those two systems can become huge performance issues.

TAKING THE LIGHTER PATH

The number of companies moving down the path to the cloud has risen from a trickle to a torrent. Every company now needs to evaluate the opportunities of public clouds. Big reductions in IT capital expenses and the availability of enormous amounts of online computing power—all without significant capital costs. The meteoric rise of Netflix in the world of streaming video, and Capital One's moves in the fast-evolving landscape for online banks, show what happens to companies that read the tea leaves early. The public cloud becomes a key competitive tool. Even upstart taxi icon Uber was reportedly looking this spring to put some of its extensive technology infrastructure into a public cloud.[57]

To determine an effective path to the cloud, companies must have solid answers to the questions of what to move to the cloud, and how to do so without upending the business.

Their answer to the first question needs to factor not only what current systems should be ported over to the cloud, but also what new, previously impractical digital capabilities are now possible—as the computing infrastructure for it can now be rented, not purchased.

[57] Business Insider, Amazon, Google, and Microsoft might be going to war to win Uber's cloud business, May 9, 2016, accessed August 10, 2016, http://www.businessinsider.com/uber-outsourcing-infrastructure-to-public-cloud-2016-5

With a cloud strategy in hand, the next step is about anticipating the bottlenecks of taking inventory of a potentially massive application portfolio. The cloud strategy should also include re-architecting many cloud applications, minimizing disruptions to business functions, understanding the connections among applications, knowing how IT needs may vary by geography, and determining how to test new cloud systems before cutting over to them.

Companies that are well prepared for these challenges will make a smooth transition to the next great world of computing.

Our thanks to Kent Sanders, Managing Partner for Cloud Consulting and ERP Architecture at TCS, for his contribution to this article.

TRAINING FOR THE M&A MARATHON

AUTHOR
By Dave Jordan
Vice President of Business Consulting, Tata Consultancy Services

A few years ago, two airlines announced a merger they said would bring tremendous synergies and increases in flights for customers. With a doubling of flights, the extra coverage came quickly, but the synergies did not. That is because they were difficult to secure—crucial decisions on which pricing and other key business systems to choose, how to reduce duplications in business processes and their supporting IT infrastructure, and how to merge staffs. The integration took months longer than the companies expected, and mistakes were made—a superior pricing system was discarded for an inferior one, valuable employees left in droves, and more.

Unfortunately, stories such as this one are still common today. Companies that merge with others are unable to rapidly integrate IT-intensive business processes, systems and functions. They wind up paying a steep cost.

Global M&A activity
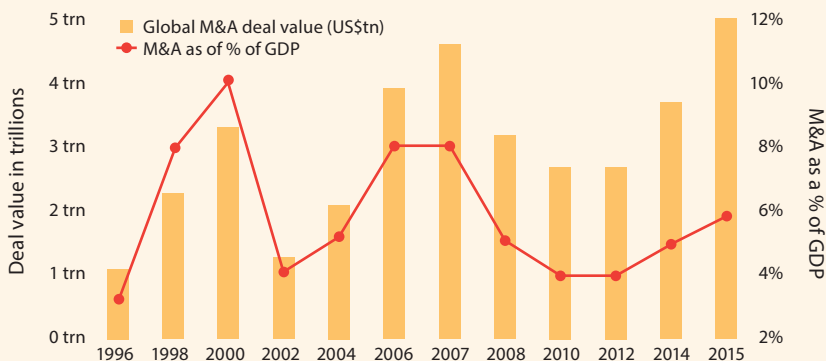
Source: J.P. Morgan, Dealogic as of January 8, 2016; M&A as of a % of GDP is rounded to the nearest whole number

To be sure, mergers and acquisitions have always been, and will always be, a powerful tool for companies to get lighter—to generate more revenue at less proportional cost. And the most successful mergers are ones in which the efficiencies happen quickly. The pursuit of such synergies is a core reason why global M&A has continued to race along at a breakneck pace since 2010—from 3% to 6% of global GDP.[58]

It is no surprise then that acquiring companies increasingly are scrutinizing the potential synergies, before and after the acquisition. Those include business processes that are IT intensive and which can be combined (such as online marketing), data centers and IT infrastructure, and the professionals to keep the processes and systems going. Given that information technology spending is one of the single largest categories of costs nowadays, achieving the synergies can do much to improve the bottom line (and sometimes even the top line) in the first year.

[58] J.P. Morgan Chase and Co., 2016 M&A Global Outlook, accessed July 7, 2016, https://www.jpmorgan.com/global/insights/maglobaloutlook

In fact, McKinsey & Company estimates that 50% to 60% of post-merger synergies are related to combining such IT-related activities. In healthcare, it found 15% of synergies come directly from lowering IT infrastructure expenses, reducing IT personnel, and gaining bigger volume discounts from IT suppliers. But in financial services, the prize is even bigger—25% of the synergies can come from combining two companies' IT activities. Another 35% can be achieved from what McKinsey called 'IT-enabled' moves: for example, reducing finance and HR expenses through connecting their systems, cutting logistics costs through optimizing distribution routes, and more cross-selling by integrating customer data.[59]

But doing all this in a short period of time can be a nightmare with unintended consequences. McKinsey's research found most IT-related merger issues were not fully resolved even in the early stages of post-merger planning.

Another study, conducted in 2007, found IT integration to be ignored in four out of five acquisitions. More than a third of the companies surveyed did not think they would integrate the IT functions within two years after their mergers.[60]

This is not at all a surprise to us. Recently, a multibillion dollar electronics company that was about to make several acquisitions turned to us for advice. It was not sure what to do with the IT functions and IT-intensive business processes of those firms, and whether and how to combine them with its own IT staff.

Combining business processes and IT departments post-merger can be fraught with hazards, unless both companies have prepared for it long in advance. It is like training to run a marathon—if you are about to run your first one after only a few of weeks of training, you are unlikely to finish the 26.2 miles. Preparing your organization for a merger—just like preparing for a marathon—requires extensive planning and preparation months before the event begins. This applies to the parties on both sides of the deal.

[59] McKinsey & Co., Understanding the strategic value of IT in M&A, January 2011, accessed June 24, 2016, http://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/understanding-the-strategic-value-of-it-in-m-and-38a

[60] CIO, Mergers and Acquisitions: What do CIOs Need to Know? January 22, 2008, accessed July 5, 2016, http://www.cio.com/article/2437291/mergers-acquisitions/mergers-and-acquisitions--what-do-cios-need-to-know-.html

If you are not prepared, three major problems can ensue:

- Much longer times to generate synergies
- Better business processes, systems, and technologies (typically, those of the company being acquired) being discarded in favor of inferior systems—even when the superior systems provide distinct competitive advantages
- An exodus of highly valuable business process and IT people

This article provides an overview of the preparation that will be necessary for companies that make multiple acquisitions. CIOs of both companies involved in the M&A must understand this process if their systems and staffs are to survive. The two CIOs must thoroughly understand their departments' assets, costs, and performance.

WHY DUE DILIGENCE OFTEN FALLS SHORT

Why are the business process and IT implications of acquisitions too often underappreciated in deal planning? From our experience, it is because the parties responsible for identifying acquisitions (investment bankers) and making them work (management consulting firms) are focused elsewhere. In due diligence, the focus is on two companies' operating models, products/ services, markets, and distribution channels. The finance departments are looking at numbers. Yet all too often, no one is looking closely at IT-intensive business processes and IT operations, and the IT leaders at these companies are rarely involved.

But that is changing now. In fact, some of the best companies at integrating businesses after mergers—private equity firms—are paying close attention to combining IT-intensive business processes and related systems post-acquisition.

Companies that merge IT-intensive processes effectively make IT a core competency of the overall M&A plan, not a muscle that they develop and exercise only when a new deal is at hand.

Rather, they train for M&A as if it is a marathon they will run for the foreseeable future. It enables them to finish the race every time there is a deal, and quickly.

To accomplish this, companies need to possess strong capabilities in evaluating a target acquisition's IT-intensive processes, infrastructure, and business process and IT professionals. And, ironically, they need to have an even stronger understanding of their own capabilities. Otherwise, when asked to make apples-to-apples comparison between their infrastructure and a target companies' infrastructure, they will not know which one is better.

Companies that best integrate their business processes and IT after a merger also possess an overall philosophy about the best ways to manage such operations, especially the steps that make integration faster, less risky and less expensive. Those that do this right can integrate these operations in six months or less, rather than the twelve to eighteen months it often takes.

THE SIX PRACTICES THAT ACCELERATE M&A

From helping a number of companies make such merger integration work, we have found six practices to be crucial.

1 **Building an M&A center of excellence.** Large companies have built centers of excellence (COEs) for many functions and activities—finance, supply chains, and customer support operations. For example, industrial manufacturer 3M has supply chain COEs that help it manufacture and distribute its products in new international markets.[61] Such COEs employ a core staff that works full-time on continually honing their skills and a playbook that defines the elements and steps of their COE's topic focus. Few COEs exist today in big companies for M&A in general, much less the IT-related operations that are merged. But to become highly accomplished at doing it quickly, companies need a COE that continually refines its practices based on the latest acquisitions.

2 **Creating stringent and demanding metrics for synergies.** Time is the great killer of potential synergies—from cost savings, new revenue from cross-selling, and so on. In merging IT-related operations, moving fast is key to getting such benefits. But this means setting an aggressive timetable for deciding which IT-intensive business processes, applications, infrastructure, and personnel to keep for merging the systems and reducing the data center footprint. One global chemical company has conducted studies to determine best practices in M&A integration, especially to understand how fast such operations of two companies can be merged. All this is analogous to the best marathoners—they always pay careful attention to their race times and practice times. Software companies like Oracle and SAP that have made many acquisitions over the years have become skilled at merging other software companies' business processes and systems onto their platforms quickly. Just five years ago, Oracle could integrate most acquisitions in six months or less.[62]

[61] Nasdaq, 3M's Model for Global Expansion, December 31, 2013, accessed July 2, 2016, http://www.nasdaq.com/article/3ms-model-for-global-expansion-cm315314

[62] McKinsey & Co., Understanding the strategic value of IT in M&A, January 2011, accessed July 3, 2016, http://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/understanding-the-strategic-value-of-it-in-m-and-38a

3 Intimately knowing your operational infrastructure.

In the merger of the two airlines mentioned at the beginning of this article, the IT function of the airline that was purchased put itself at a huge disadvantage after the deal closed because it had not thoroughly documented its performance. This was unfortunate because the company had a superior pricing system. But it was not prepared to have a bakeoff with the acquirer for this pricing system—or any other system. The acquirer was known for its cost-driven culture. The acquired company, in contrast, was famous for a culture of service excellence. Shortly after the deal closed, the CEO of the acquirer asked his two CIOs to benchmark their departments' IT performance and evaluate each one's pricing systems. The acquiring company had an inferior system, but because the CIO was well prepared—having done rigorous analyses of his function and its systems, including his pricing system—that system won. Despite having a better system, the acquired company lost out because its CIO could not answer important questions, such as how many systems would be affected in the merger. An answer of 'hundreds' was not nearly precise enough.

Having an in-depth and documented understanding of a company's infrastructure (business processes, systems, core data, their performance, dependencies on other systems, etc.) alone can save 35% to 40% of the time it takes to integrate two big IT departments. When it is in hand, the analysis—the bake off—should be able to happen in a month. When that data is not there, it can take many months to pull it together. Possessing all the pertinent facts about your infrastructure will greatly reduce the chances that superior systems and people go by the wayside, the victims of political decisions based on whose leader is the superior storyteller.

4 **Adhering to a philosophy of standardized enterprise systems and the business processes they support.** Much has been written in the past for the need for global corporations to implement standard enterprise systems—ERP, CRM, supply chain management, and HR. Yet far too many companies still use a mishmash of enterprise packages or even contort software from the same company in order to please local interests. This is a huge impediment to rapidly integrating IT in a merger. It is much easier to integrate the enterprise systems of a company with a standard Oracle or SAP system than it is to merge five to ten flavors of those systems.

Being prepared for the M&A marathon requires companies to harmonize their own enterprise systems, to fall back on one standard in each business process. Standardizing the way data is collected and formatted, and the way business processes are run, will also go a long way to make integration easier. This also makes documenting and benchmarking your operations far easier. For example, if you have only one sales planning system, and the same version of it across your company, it is much easier to document its performance. With different flavors of the system, or (to be sure) ten different packages altogether, the complexities of evaluating and integrating them just went up by a factor of ten.

5 **Maintaining a narrow integration focus.** A large company can have dozens, even hundreds, of business processes and supporting information systems. But rest assured that they all do not have the same value in keeping customers happy and competitors at bay. Companies that announce shortly after a merger that they will benchmark 100 or more business processes and systems across two organizations are asking for mountains of trouble. That work will require dozens or hundreds of analysts, months of time and lots of money.

Moreover, only a few processes truly matter to a company's marketplace performance. The pricing system of the aforementioned airline company, for example, is what distinguished its financial performance, as well as its customer service. In most companies, 70% to 80% of their processes and systems are commodities—infrastructure that does not distinguish the company. Only 20% to 30% are core to competitive differentiation. During a merger, both parties need to focus their integration efforts on that 20% to 30%.

Being prepared for the M&A marathon requires companies to harmonize their own enterprise systems.

Going back to the airline example, had the acquiring firm focused only on the pricing systems at the outset, it would have had more time to determine whose systems should prevail. But it did not focus on pricing—it evaluated dozens of systems and processes concurrently. The result was a hasty decision that led to choosing the wrong pricing system. The lesson—decide which of your processes and systems are in the core 20% to 30% that really matter, then spend 70% to 80% of your time deciding on how to integrate them.

6 **Embracing M&A as a fact of life and continuous M&A improvement as a core competency.** Many executives regard the time spent to make a merger work as a negative experience. But for many companies, especially those in mature and fast-consolidating markets, M&A is unavoidable. In these firms, the mindset must change— M&A is a necessity to keep them competitive. At the global chemical company mentioned earlier, the CIO and

his boss recognized the firm had to make a near steady stream of acquisitions and divestitures. That helped their staffs view their M&A activities as a positive and a competence they had to keep improving. That leads to the second point here. After your company has established its M&A center of excellence, it cannot sit back and let that knowledge become static. The world of information technology changes more quickly than most imagine. Better technologies emerge, requiring a fresh look at how they can help a company market, sell, and manufacture its offerings, new business process and IT skills are required, and companies now have many more options in building IT-intensive capabilities. For example, many companies still do not understand the growing capabilities of public clouds as they are still pondering how many servers and other IT infrastructure they will need for their computing workload. More of such infrastructure is becoming available outside your data center. If you are basing your technology budget on an on-premises model, it is likely to become outdated at some point.

ONLY THE HIGHLY PREPARED WIN THE M&A RACE

Experienced marathoners train for race day. After the race is over, they soon begin preparing for the next marathon. Companies that make M&A a key growth strategy need to take the same approach. They need to prepare rigorously for the day when they buy another company and hope to reap the substantial benefits from streamlining their IT-intensive operations. Companies that rise up to this challenge will have a powerful advantage in a world driven by scale and cost advantages.
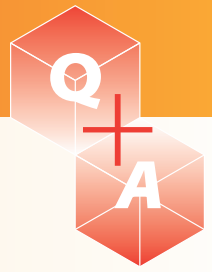
INCREASING SPEED IN THE DIGITAL ERA
INTERVIEW WITH JEANNE ROSS

Jeanne Ross *serves as research director and principal research scientist for MIT's Center for Information Systems Research (CISR). She has researched and written extensively on digital strategy and digital business and co-authored three books, most recently, "IT Savvy: What Top Executives Must Know to Go from Pain to Gain" (2009).*

According to her research, companies pursuing successful digital strategies need to build both an efficient, integrated operational backbone, and a more fluid digital services backbone—a technology environment where small experiments can come and go. She also stresses the value of ongoing organizational redesign.

TCS spoke to Ross about those concepts and what she believes established companies that were not 'born digital' can do to increase speed in the digital business era.

TCS: *What organizational factors feed into a speed disadvantage for companies that were not born digital?*
How can they move more at the speed of digital natives?
Jeanne Ross: I do not think they can move as fast as newer, smaller companies. But I do not think that is a big handicap because they bring different strengths to the table. That said, they do need to move faster than they have historically. But they have a base of capital—and an ability to scale—that the fledgling digital companies do not have yet.

For a big, established company the question is how do we derive enough value from our heft? How do we draw advantage from our size, our experience, and our relationships? Simultaneously, how do we get a lot faster than we are?

TCS: *What are the biggest roadblocks for these companies once they decide to get faster?*
Ross: The number one limiting factor is they have not fully become IT-enabled. They have not automated to the extent they can. They still have legacy processes that hold them back.

For a well-managed company that has automated, the new challenge is to make digital innovation happen all over the company. These companies' tradition is focused innovation, often in an innovation unit. In a digital world, you want as many people innovating as you can. You start distributing innovation to more people, in more places, at more levels of the organization. In the course of doing their jobs, they introduce innovations that lead to better outcomes. A lot of the big old companies do not have a culture or governance process that would allow this, without chaos.

TCS: *Do digital businesses take a fundamentally faster approach to building–and improving as necessary–their operational backbone, their mission critical systems?*
Ross: Frankly, most digital start-ups are not thinking about their operational backbone. They are focused on building digital products and services, and they build a digital services backbone for that purpose. But as they grow, they will struggle with scale, completing transactions, and back office processes. The exceptions to that rule are companies like Amazon, Facebook, and Google. As they have grown, they have built an operational backbone, and it has facilitated their growth. But even those companies have turned out a little different than they imagined when they started.

Digitally born companies had an advantage because they did not have some of the older systems, but they definitely have faced the challenge of speed–creating inefficiencies and challenges to building an operational platform.

First, you are moving so fast you cannot fix things that did not fit. You can create chaos in your systems and processes. Second, you are incredibly profitable, which makes it less important to introduce the efficiencies that your operational backbone offers. When you are older and your growth slows, you have a financial incentive to focus on efficiency and processes.

TCS: *You note the value of ongoing organizational redesign to a digital business. What strategies can leaders of companies not born digital use to build team support for this idea?*
Ross: The more you introduce an environment in which jobs are continually changing, the better. I think of USAA [the Fortune 500 financial services company]: every time you talk to them, people's jobs have changed. What that starts to do, is give people

a much broader sense of what the company is trying to accomplish. People are constantly learning and they are constantly challenged.

The idea is 'We are going to change tomorrow. Come in expecting to change.' That is the culture you want to foster–and it is not typical.

Move people around a lot, and then give them clear assignments and a clear idea of what the business needs to accomplish. In an environment like that, people do not worry about job security because this is the norm. It is important to get accountability and empowerment right if you want to succeed in establishing a culture of change.

TCS: *That is a big leap of faith for employees to make, it is it not? How do the companies pull it off?*
Ross: Yes. The hardest part is where to start. The first few people you tap, you pick people who are not risk averse and have energy for this kind of thing. If you have had a stable environment, this

will be disarming for people. You want senior executives saying "We need to do this", and asking "what do we not know." What do we not know about a given customer, product or technology and how do we learn it?

That is the kind of culture companies will have to adopt. It is what startups do without realizing it. As people grow, their jobs change, and it is very natural. You are trying to create excitement for identifying the next opportunity. That will be hard. Start with a few people you have confidence in, and it will grow.

As a rule, companies are not good at this, but you have to keep trying.

TCS: *In the digital business age, the traditional 'divide and conquer' approach to organizational design is being replaced with more horizontal teams, where processes and roles flow across business units. Is this a 'nice to have' or a 'must have' for companies seeking speed?*

Ross: It is a must have. The thing that is causing the biggest problem is the need to integrate data. You cannot just put a fancy front end on something and go. Mobility is so critical to digital. If the data is not integrated, people must insert themselves into what ought to be automated processes.

Divide and conquer allows people to operate in silos. Each function or line of business figures out what must be done and divides up the necessary tasks to achieve that. To integrate across those silos, you rely on hierarchy—push issues up and instructions and information will trickle back down. With digital, there is no time for that.

TCS: *What traits prove important for leaders of 'fast' digital companies?*
Ross: The single most important thing is they can shut out the noise. They say "What is our biggest issue today and let us get it resolved". I am thinking about the CEO of Lego. In 2004 he recognized that their biggest problem was supply chain, and he formed cross-functional teams to solve it. Within a year, it made a difference. Within three years, it was really good, and the company's performance had turned around.

These leaders understand that this is our biggest problem, and solving that problem will facilitate immediate improvements and long-term capabilities. Meanwhile, other things will not get fixed. The important thing is to get started, to create capability that leads to more capabilities. It is about being able to leverage multiple parts of your organization. Get on the road. Once you get going, it is easy to pick up speed. The way you are reducing the noise is focusing on the more fundamental problem and going after it.

TCS: *Why is a digital services backbone—a technology infrastructure area where companies can develop digital offerings that may be highly valuable for only short periods of time—key to speed?*
Ross: The digital services backbone is what makes you fast. It lets you try something and then say "skip that, I have a better idea". It is not an upgrade to your operational backbone. Think about the app store model here. There are many apps that are not any good; the bad ones go away organically. With your digital services backbone, you really can say "We are going to do this app or UI today, and if we come up with a better one tomorrow, the old one goes away".

Lately we have been talking about the digital services backbone as a coral reef. It builds and builds, mostly through small organic additions. Little parts decay.

This digital services backbone lets you grow in unpredictable ways. Lego was the first one that described this to me. Lego's goal, its vision, is to inspire and develop the builders of tomorrow. That means they want Lego fans to collaborate with anyone who is building. So Lego decided, "We should let them design their own interface. There are so many ways to engage Lego fans and builders. We want these ideas to grow organically."

TCS: *You have noted that a digital service backbone and the teams designing and using it will require new skills–some of which are not clear yet. How do smart companies address this tough talent challenge?*
Ross: They are really struggling with that. What we have learned so far is that people are probably overreacting to the talent concern. I would focus first on how we equip and develop the people we have.

It is absolutely true that the kind of talent we need is changing. But we should not panic and hire people with fancy titles without a clear understanding of what we need them to do. Start by making your people more evidence-based. Give them problems to solve and make them figure out what they need to solve them. Be sure you know what problem you are solving before you hire people to solve it. It is easy to hire a chief digital officer, for example. But it is hard for that person to succeed if the company has not been explicit about its digital strategy and convinced everyone to get on board with the transformation.

Start by looking at your operations: Are metrics clear? Are business rules clear? Can we test them? It is about assigning new accountabilities. Break things up so people know what they are accountable for, and have what they need to pull it off. If you start at the bottom of the company, it is very doable. We are seeing some companies that have got their heads around this. They are dividing an end-to-end process into services. They look for constant improvements as a result.

The talent issue is a bit of a red herring. We have not designed our companies to make the most of talent and develop it.

TCS: *That sounds like it will require big changes in the hiring process. Are companies capable of doing it?*
Ross: It is very addressable. Only a few people have to really understand this.

For example, Google talks about people operations not HR. In a lot of the startups, you have a manager and a coach. Those kinds of things are being adopted. I imagine it moves into recruiting pretty quickly. How long will it take and how good at it will companies get? Good question.

TCS: *Are many companies still too focused on operational backbone, to the detriment of their digital services backbone?*
Ross: A lot of companies talk about, "We built our platform for supply chain, but now we have to have a platform for manufacturing". And they go on and on with these platforms. Those platforms can add value to a company but they lead to incremental improvements to the operational backbone, which only offers efficiency not innovation.

You do not help the company grow if you focus only on your operational backbone because you grow through innovation. There is a risk of just doing more of what you are good at. It will generate diminishing returns. It must be complimented by a digital services backbone. That has been a real issue for big companies that like control and order. It is not that they will not get value, but it does not take them into the digital economy.

CLOUDERA:
THE MIND OF
THE NEW MACHINE

Mike Olson abhors the term *artificial intelligence*. As co-founder and chief strategy officer of Cloudera, he has seen first-hand the advances that computers have made in recent years. But they are not, he believes, intelligent yet, in any meaningful sense.

Founded in 2008, Cloudera is the first provider and supporter of Apache Hadoop for enterprises. They have experienced hyper-growth as a business on the back of an explosion in big data of their customers. With funding of $670 million to date and 1,200 employees worldwide, Cloudera offers customers open source software that handles the thorniest big data challenges, from storage to analysis.

Artificial intelligence (AI), says Olson, is an inaccurate descriptor. We still do not know enough about how human intelligence works to replicate it artificially any time soon. For another, AI conjures up scary images of the eerily sentient HAL 9000, from *2001: A Space Odyssey*, or autonomous Terminators making creative, spur-of-the-moment decisions, to execute their program of human destruction. Thankfully, machines like those remain in the realm of science-fiction.

"I am not worried that the Matrix is going to wake up one day and decide to eliminate humanity," Olson says.

What Olson is witnessing instead is the rapid development of machines capable of learning—perhaps to a lesser extent than AI promises, but enough to hold out great and real possibilities right now for enterprises and for us.

"The computer algorithms we're building now are really good in the narrow domains in which they work, but they are not human in character," Olson explains. They are not generalists, as we are. Companies can teach a neural network to recognize faces—often better than a human can. But the machine will be face-specific; it will not recognize a pizza.

"These are special purpose-algorithms trained on a specific set of input data, great at noticing patterns, and great at recognizing those patterns in new data," Olson says. Over time, these systems advance within their domains. "These machines do ingest data and use the data to build models on which they make predictions," he explains.

"And the more data you show them, the better they are at doing that. In that sense, they are learning."

Olson predicts that these learning engines will proliferate rapidly. "We are going to be surrounded by these agents that are good at very narrow, predictive applications. And rather than some massive, global, artificial intelligence developing, we are going to be surrounded by special-purpose systems that we interact with on a day-by-day basis. That is going to be a huge change in the way that we work."

Organizations have had the ability to teach computers for decades by inputting data. But only recently have they had the large volumes of data, huge compute capabilities, and real-time analytics platforms that are necessary for these systems to teach themselves. "Now, at places like Google, Facebook, and elsewhere, those systems are easy and cheap to get," says Olson. "The result is that these relatively mature algorithms are suddenly effective in ways they never were before."

Machine learning is proving very powerful in industries as varied as healthcare, finance, energy, and retail. Cloudera uses machine learning to predict when its own customers' computing clusters may be about to experience a problem, and then the company solves it for them before they ever have to call customer service. One Cloudera customer, a U.S. financial regulatory authority, uses machine learning to look at complex patterns in trading to spot illegal collusion between banks. Electronic medical records company Cerner is working with Cloudera on algorithms that can notify hospitals when a patient is likely to become septic. This system has already saved hundreds of lives.

"We have gotten really good at deploying these algorithms against specific problems and getting shockingly good results," Olson says. "Computers now are better at vision than people. If you have got a diagnostic image or an x-ray, you would actually rather have a computer look at it and give the doctor its interpretation than rely on a human radiologist who may be tired, or may simply miss something."

Olson believes it is critical for Cloudera, now an established tech player, to continue to explore the many technologies emerging around machine learning. He worries that companies often fail to recognize or properly value disruptive innovations because they are focused on protecting their existing business models.

These companies, says Olson, "are operating at the very peak of their markets, and emerging technologies that look to be of lower value, but solve different kinds of problems, are consistently missed."

As Cloudera's chief strategy officer, Olson does not need a machine to recognize that pattern, nor an artificial intelligence to tell him about its risks. So he plans to keep his eyes wide open and focused on the future.

MANUFACTURING
HOW TO LIGHTEN UP
BUSINESS MODELS
TCS Industry Insights

Milind Lakkad is Vice President and Global Head
of Manufacturing for Tata Consultancy Services.

TCS: *What are the key ways in which manufacturing
companies have simplified their business models in the past
few years?*

Milind Lakkad: Several distinct models are visible in the
marketplace, the first on the product side. Companies
have dramatically reduced the total cost of managing
multiple products, for example in the car industry, by
designing platforms that they apply across models. This
lets companies simplify product lines as well as supply
chains. Supplier consolidation and harmonization of
components contributes significantly towards this
effort. Similarly, in the customer-facing areas of sales and
services, companies have made it significantly easier for
customers to do business with them by integrating all
potential touch points. Offering a complete range of parts
and services online, with customer-friendly self-service
options, reduces the total cost of conducting business
and enhances customer satisfaction. Changes like these
bring manufacturers closer to the ideal paradigm of
'design anywhere, build anywhere, and sell anywhere'.

TCS: *How are manufacturing companies lightening the business model and generating new revenue streams by solving additional customer problems?*

Lakkad: New age technology is enabling manufacturers to explore and exploit new business models. Two examples come to mind. The first, a large industrial power equipment manufacturer, seeks to generate services revenue secured via long-term contracts, by offering what matters most to its customers—equipment up-time. By monitoring and predicting the behavior of the installed equipment, using cloud-based big data analytics, the company heads off equipment problems for customers and quickly addresses any issues. These exclusive services are offered at a premium.

Elsewhere a diversified manufacturing firm has started its journey to become a 'software-centric enterprise,' by monetizing insights gleaned from data that resides on its products in the field. These insights can be shared with the customer for performance enhancements, for example, tuning airplane engine performance for specific, and dynamic, flying conditions in order to save on fuel costs. The manufacturer takes a share of the savings accrued.

TCS: *What stands in the way of further simplification of business models for manufacturing companies?*

Lakkad: Companies face both internal and external barriers while adopting simpler business models. From an internal perspective, years of capital-intensive investments limit a company's ability to exit current business models and embrace new ones. Manufacturing companies typically carry over significant costs from the past. Nevertheless, companies are trying various 'CapEx to OpEx' models, including contract manufacturing, divestitures, and the like.

From an external perspective, joint venture and merger and acquisition deals, which are frequent in the industry, can create new barriers as companies strive to harmonize business operations. Ambitious 'convergence' initiatives, designed to harness the core strengths of both organizations, will fail without strong executive sponsorship and strategic focus. Whether a company faces internal or external barriers, managing change across a diverse workforce poses its own challenges.

TCS: *How different will a typical manufacturing company's business model look five years from now?*

Lakkad: The advent of the Internet of Things changes the picture significantly, enabling the production of smart, connected products that let manufacturers be in touch with customers throughout the entire life of the product. First let us look at business model change driven by this phenomenon. Connected products let the manufacturer disintermediate the channel and transform from being a business-to-business (B2B) player to a business-to-business-to-consumer (B2B2C) player. This paradigm shift allows manufacturers to work on new business models, especially around services. For years, distributors and intermediaries captured the services revenue, while the manufacturer capitalized only on the sale of the asset. Now the manufacturer can gain annuity revenue from services, which also cushions against cyclical business downturns. In five years, one can expect the manufacturing business model to be a mix of diversified services businesses, driven by a software-enabled enterprise.

The other big model shift is the concept of 'extended mobility' driven by connected cars. The emergence of the shared car concept is creating a new business model, which will require auto manufacturers to establish new ways to engage customers. In five years, we would not be surprised to see a significant portfolio of auto manufacturer revenues coming from this new channel, which a few years ago was unimaginable.

CONCLUSION

WHY EXECUTIVES MUST CONTINUALLY UPDATE THEIR WISDOM

AUTHOR
By Krishnan Ramanujam
Vice President and Global Head, Consulting & Enterprise Solutions,
Tata Consultancy Services

Companies today must get smarter, faster, and lighter at ever-increasing speed. This challenge will weigh most heavily on top management at big organizations, both at the corporate and divisional levels. They risk making their firms, and themselves, obsolete if they cannot learn new business models, new strategies, and new ways to organize work—even new ways of thinking—more quickly than in the past. The half-life of business knowledge is quickly diminishing—accelerated by game-changing technologies that enable companies to transform themselves quickly as the world changes.

Last year, when asked about the most important trait of a successful leader, General Electric CEO, Jeff Immelt, answered that it is the ability to learn new things. "You need to be a learner," he told Fortune magazine. "If you want to be successful, you have got to have an antenna up all the time, and you have got to be open to new ideas. You have got to be grabbing every new thought you can come up with. And you can never feel like you are safe in anything you do." That is why GE spends $1 billion every year on education and training.[63]

[63] GE, accessed July 10, 2016, http://www.ge.com/au/careers/why-ge/training-and-development

It is also why other companies are now upping their commitments to more regularly updating the mindsets of their top people. Executives who believe their biggest learning days are in the past will be in for a rude awakening, as an increasing number of leading academics, business magazines, and CEOs like Immelt are saying.

So how must executive learning change to keep executives and their companies competitive? It needs to go beyond developing the skills that are relatively timeless: project management, personal communications, time management, etc. It also requires a clear understanding of the current shape of the business, the future trends that will reshape it, and most importantly, executives' ability to challenge and change how they think.

2.3 billion consumers today actively use social media and 2.1 billion use smartphones

Before examining how executive learning needs to change, let us first look at why today's prevailing business wisdom will not have the shelf life of the wisdom that preceded it.

THE RAPIDLY DECLINING HALF-LIFE
OF BUSINESS KNOWLEDGE

Many companies today are under unprecedented pressure to become smarter, faster, and lighter. However, if senior executives operate under obsolete notions about how to achieve those goals, their initiatives will fall short. They could even fail altogether.

How so? Consider the world of consumer products marketing. Given that 2.3 billion consumers[64] today actively use social media and 2.1 billion use smartphones,[65] marketing strategies and tactics have undergone a sea of change. Renowned global brand builders such as Procter & Gamble, Nestle, and Unilever have dramatically altered the ways they create awareness and demand in the last 10 years. They, and other big consumer firms, have deep partnerships with companies that were not around at the turn of the 21st century (or were in their infancy): Facebook, Google, Twitter, and Alibaba, to name just a few.

Just consider how fast the world of Nestle's senior marketers has evolved. In investor presentations today, the $87 billion food, water, and chocolates giant uses terms that would have mystified both Wall Street and Madison Avenue in the 1990s: 'global mobile app consumer engagement platform', 'end-to-end eContent lifecycle', and 'digital acceleration team', to name a few.[66] In fact, $3 billion of Nestle's business in 2015 came from selling directly to consumers online, a business whose revenue has grown an average 16% annually since 2011.[67]

Business functions outside of marketing could tell a similar story of rampant alterations in the ways they work, especially customer service, R&D, and sales. The cost to a company of a top management team that operates with an outdated picture of the world can be severe.

Yet it is perfectly understandable how it happens: the world is shifting under executives' feet far faster than ever, but some do not feel it.

[64] Wearesocial.com, January 27, 2016, accessed July 20, 2016, http://wearesocial.com/uk/special-reports/digital-in-2016

[65] eMarketer Worldwide Internet and Mobile Users, Cindy Liu, August 2015, p. 15, accessed July 20, 2016, https://insights.ap.org/uploads/images/eMarketer_Estimates_2015.pdf

[66] Nestle, Investor Presentation, 2016, p. 40, accessed July 20, 2016, http://www.nestle.com/asset-library/documents/library/presentations/investors_events/investor-seminar-2016/nis-2016-11.pdf

[67] Ibid

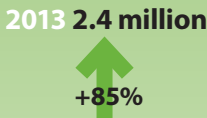**Yet the signs are everywhere. Here are three of the most significant ones:**
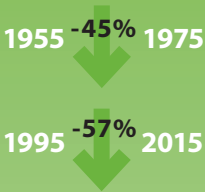
1 The shrinking fortunes of very big companies.

We all know that thousands of small companies disappear every year. But even the biggest companies are succumbing, or at least falling off their lofty perches, faster. Between 1995 and 2015, 57% of the companies on the Fortune 500 list disappeared, up from 45% that fell off the 1955 list by 1975. What might make even more than 57% disappear by 2036? The acceleration of technology. In a 2015 survey, the magazine asked Fortune 500 CEOs about their companies' biggest challenges. They rated the rapid pace of technological change as No. 1. What is more, 94% said that in the next five years, their firms would change even more than they had in the last five years.[68] Why do so many large companies lose their way? They lose touch with the world around them.

Articles published in
academic journals

2013 **2.4 million**

+85%

2003 **1.3 million**

Number of
academic periodicals

2015 **230,000**

+200%

1985 **95,000**

2 An explosion of better ideas about how to run a business.

So many more ideas are out there today about how to optimize a business, especially ideas based on academic research. Unlike less tangible signs of tumult, this one is easier to measure. The total number of articles published in academic journals jumped 85% between 2003 and 2013, from 1.3 million to 2.4 million.[69] In the last 30 years, the number of academic periodicals (including business) has more than doubled, from 95,000 in 1985 to over 230,000 a year ago.[70] More knowledge means more theories and more approaches to how businesses should work, how diseases should be addressed, how social issues should be tackled, and so forth. With so many more competing ideas about how business should be conducted, it is becoming much easier to be guided by obsolete concepts.
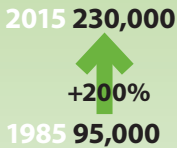
[68] Fortune, 5 things you didn't know about the Fortune 500, June 4, 2015, accessed July 20, 2016, http://fortune.com/2015/06/04/fortune-500-facts/

[69] STM, The Stem Report: An overview of scientific and scholarly journal publishing, Fourth Edition, March 2015, P. 28, Accessed July 11, 2016, http://www.stm-assoc.org/2015_02_20_STM_Report_2015.pdf

[70] Proquest, How We Used to Build the Future: 30 Years of Collection Development Trends, citing statistics from Ulrich in a May 28, 2015 SlideShare presentation, slide 9, accessed July 12, 2016, http://www.slideshare.net/NASIG/nasig2015-30-years-of-collection-development
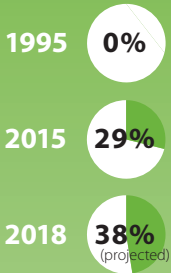
3 Far-reaching changes in virtually every profession.

You only have to look at marketing to see how prevailing practices are becoming obsolete faster in every business domain. Twenty years ago, internet advertising was largely a foreign concept. Print and broadcast media were where chief marketing officers and their advertising agencies spent the marketing dollars. Fast-forward to 2015, and that picture changes drastically. Online advertising (seen on desktop and mobile devices) commands 29% of the global advertising pie, and is projected to snare 38% by 2018. If that happens, the Internet will top TV as the largest advertising medium. Advertising executives who think they are still largely in a *Mad Men* world of print campaigns and TV jingles should think again.[71] In many ways, the world has changed even faster in fields such as IT, manufacturing, research & development, and customer service.

Along with these three signs, many other signs tell us that a great deal of today's business knowledge is not likely to be right next year or the year after. But whether you believe them or not, many companies have already acted as if they are a fact of life.

Over the past three decades, the data shows that companies—worrying that their executives' knowledge may go the way of the dinosaur—have built their own places of higher education. In 1985, only 18 U.S. companies had corporate universities, or places where they could educate employees and develop skills. General Motors was among the first of these, developing its in-house program in 1920. By the 1970s others had followed suit, such as Fiat. By 1997, that number grew to 1,000, and then it doubled again to about 2,000 by 2007. Today, an estimated 4,000 companies around the world have their own formal universities.[72]

[71] ZenithOptimedia, Executive summary: Advertising Expenditure Forecasts March w2016, March 2016, accessed on July 27, 2016, http://www.zenithoptimedia.com/wp-content/uploads/2016/03/Adspend-forecasts-March-2016-executive-summary.pdf

[72] Boston Consulting Group, Corporate Universities: An Engine for Human Capital, accessed July 12, 2016, https://www.bcgperspectives.com/content/articles/human_resources_leadership_talent_corporate_universities_engine_human_capital/?chapter=2#chapter2

Percentage of business schools worldwide with non-degree executive education programs

Year	Percentage
2005–06	38.9%
2006–07	38.7%
2007–08	40.1%
2008–09	39.1%
2009–10	40.4%
2010–11	42.5%
2011–12	42.4%
2012–13	44.1%

Source: AACSB International, Business School Questionnaire

Companies that are not building college campus-type buildings are sending their executives off to accredited business schools in large numbers. To meet the voracious demand for executive education programs, more business schools are offering them. The percentage of business schools worldwide with non-degree executive education programs has risen steadily, from 34% in 2003 to 44% in 2013.[73]

All of this demonstrates that companies are worried their executive teams may be operating under outdated beliefs about their markets, customers, competitors, and how to do business. The worries are valid. It is natural for highly successful executives at highly successful companies to rest on their laurels and believe they have all the answers.

Bill Taylor, co-founder of *Fast Company* magazine and author of the new book 'Simply Brilliant: How Great Organizations Do Ordinary Things in Extraordinary Ways,' explains it this way: "Why is it so hard to make deep-seated, meaningful, long-lasting change in long-successful companies? The longer you have been in a discipline and the higher up the ranks you go … it becomes hard to open your eyes and minds to new ways of solving longstanding problems. … It takes a real act of leadership willpower to make sure that what you know does not limit what you can imagine."[74]

As Taylor believes, "leaders should take a gut check to understand whether they are learning as fast as the world is changing."

[73] AACSB International, Exec Ed Rise Continues, This data was based on a controlled set of 409 business schools accredited by AACSB, August 21, 2013, accessed July 12, 2016, http://aacsbblogs.typepad.com/dataandresearch/2013/08/exec-ed-rise-continues.html, The 2003 data was based on an AACSB blog post on April 2, 2011, accessed July 12, 2016, http://aacsbblogs.typepad.com/dataandresearch/2011/04/exec-ed-on-the-rise-1.html

[74] Business Model Sandbox, Bill Taylor: We Must Learn As Fast As The World Is Changing, accessed July 11, 2016, http://sandbox.businessinnovationfactory.com/podcasts/bill-taylor

FIVE WAYS IN WHICH EXECUTIVE LEARNING NEEDS TO CHANGE

Is your team that fast? And, if not, how can you help them stay current with the fundamental changes in the way your industry, customers, and competitors operate? First, help them understand that learning does not end after graduation or after a promotion to the C-suite. In fact, one could argue that learning today must be accelerated for those people who are shaping the destiny of a large company.

Here is some other advice based on the practices of companies that are ahead in the game of keeping executive worldviews current:

1. **Get the best educators from the best sources.** Companies such as Unilever, Apple, and GE sought out prominent business school professors to lead their executive education initiatives. Unilever went to professors at business schools such as Cambridge University, INSEAD and others to design and teach the programs on its two campuses (one in London, the other in Singapore). Apple hired the dean of Yale's business school (Joel Podolny) to run its little-publicized executive learning program, Apple University.[75] Getting the very best experts in each field will mean cherry-picking them from multiple institutions, not just one.

2. **Make the learning immediately applicable, not theoretical so executives use the new insights right away.** Course content should draw heavily on real examples that illustrate key lessons, and provide questions that prompt executives to begin applying the lessons to their situations. The corporate university at German airline Lufthansa continually revises its curriculum so that it is in line with the company's strategy.[76]

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[75] The Economist, Keeping it on the company campus, May 16, 2015, accessed July 12, 2016, http://www.economist.com/news/business/21651217-more-firms-have-set-up-their-own-corporate-universities-they-have-become-less-willing-pay

[76] Boston Consulting Group, Corporate Universities: An Engine for Human Capital, accessed July 12, 2016, https://www.bcgperspectives.com/content/articles/human_resources_leadership_talent_corporate_universities_engine_human_capital/?chapter=2#chapter2

3. Create education that is irresistible—and not optional. Continual learning is no longer a luxury that executives can do when they 'find the time'. But consider highlighting the carrot rather than the stick. Executives should know that a growing body of leadership research ties 'the ability to learn' to 'promotion potential'. For example, research from executive recruiter Korn Ferry has found that people with high learning agility get promoted much faster— twice as many promotions over 10 years as managers with low learning agility.[77] Learning agility refers to someone's interest and ability to grow from experience and use that learning to succeed in a new experience.

4. Make learning illuminating, not dreary. Executives have short attention spans. They also have day jobs. It is hard for them to learn often radical-sounding ideas about the business and their area of expertise if the course content is arcane, boring and not visual (i.e., mostly text). What is more, it needs to be presented in shorter, more digestible chunks. Expecting executives to learn about the A to Z of digital strategy in six months of courses is unrealistic. That learning, at the least, needs to come in smaller but highly informative and highly useful pieces. Overall, corporate educators must make sure the learning content passes the 'wow' test: Does it make sense? Is it interesting? Does it provoke? And does it instruct on what to do next?

[77] Korn Ferry, Assessment of Leadership Potential guide, 2015, accessed July 11, 2016. http://static.kornferry.com/media/sidebar_downloads/KFALP_Technical_Manual_final.pdf

5. Ensure it's convenient. If executives are to continually learn important new things about their field, the education must be highly accessible. Expecting managers to go offsite or even just into the next building for days or weeks at a time is not realistic. The rapid rise of online learning—so-called Massive Open Online Courses—shows it is indeed possible to educate executive's right at their desks or on their smartphones. More corporate education has to be delivered that way, rather than at a monthly visit to the corporate training facility.

As digital competition continues to force established companies to re-think their business models and how they operate, they will have to treat executive learning as a necessity, not a luxury. Doing so will increase their ability to win at the now-perpetual game of getting **smarter, faster, and lighter**.

ABOUT PERSPECTIVES

Perspectives is Tata Consultancy Services' management journal. We publish it for senior business and technology executives who lead major organizations worldwide. Since 2009, *Perspectives* has provided the best and most practical thinking of TCS experts—consultants who have helped many of world's most successful companies solve key business challenges. The journal also publishes interviews with leading authorities on business, management and economics, as well as case studies on companies at the leading edge.

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