"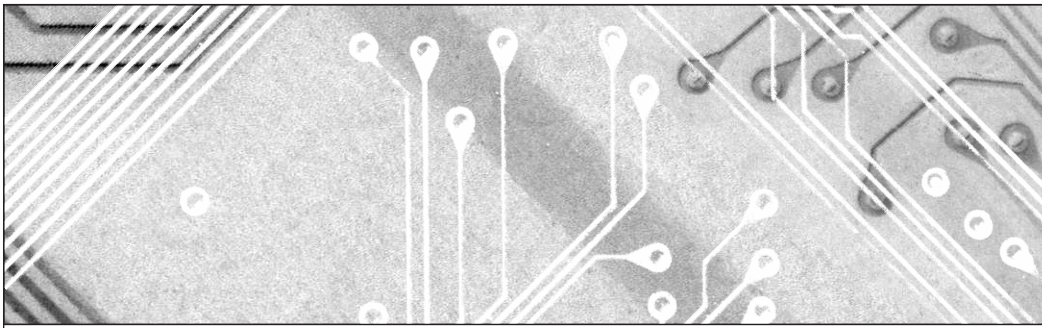The digital economy compels digital leaders to cultivate a profoundly new mindset and invest in new technology-driven capabilities for winning."

— **Stijn Viaene and
Lieselot Danneels,
Guest Editors**

Digital Transformation:
Unlocking the Future

About Cutter IT Journal

Part of Cutter Consortium's mission is to foster debate and dialogue on the business technology issues challenging enterprises today, helping organizations leverage IT for competitive advantage and business success. Cutter's philosophy is that most of the issues that managers face are complex enough to merit examination that goes beyond simple pronouncements. Founded in 1987 as *American Programmer* by Ed Yourdon, *Cutter IT Journal* is one of Cutter's key venues for debate.

The monthly *Cutter IT Journal* and its companion *Cutter IT Advisor* offer a variety of perspectives on the issues you're dealing with today. Armed with opinion, data, and advice, you'll be able to make the best decisions, employ the best practices, and choose the right strategies for your organization.

Unlike academic journals, *Cutter IT Journal* doesn't water down or delay its coverage of timely issues with lengthy peer reviews. Each month, our expert Guest Editor delivers articles by internationally known IT practitioners that include case studies, research findings, and experience-based opinion on the IT topics enterprises face today — not issues you were dealing with six months ago, or those that are so esoteric you might not ever need to learn from others' experiences. No other journal brings together so many cutting-edge thinkers or lets them speak so bluntly.

Cutter IT Journal subscribers consider the *Journal* a "consultancy in print" and liken each month's issue to the impassioned debates they participate in at the end of a day at a conference.

Every facet of IT — application integration, security, portfolio management, and testing, to name a few — plays a role in the success or failure of your organization's IT efforts. Only *Cutter IT Journal* and *Cutter IT Advisor* deliver a comprehensive treatment of these critical issues and help you make informed decisions about the strategies that can improve IT's performance.

Cutter IT Journal is unique in that it is written by IT professionals — people like you who face the same challenges and are under the same pressures to get the job done. *Cutter IT Journal* brings you frank, honest accounts of what works, what doesn't, and why.

Put your IT concerns in a business context. Discover the best ways to pitch new ideas to executive management. Ensure the success of your IT organization in an economy that encourages outsourcing and intense international competition. Avoid the common pitfalls and work smarter while under tighter constraints. You'll learn how to do all this and more when you subscribe to *Cutter IT Journal.*

☐ Start my print subscription to *Cutter IT Journal* ($485/year; US $585 outside North America)

Name   Title

Company   Address

City   State/Province   ZIP/Postal Code

Email (Be sure to include for weekly *Cutter IT Advisor*)

Fax to +1 781 648 8707, call +1 781 648 8700, or send email to service@cutter.com. Mail to Cutter Consortium, 37 Broadway, Suite 1, Arlington, MA 02474-5552, USA.

Request Online License Subscription Rates

For subscription rates for online licenses, contact us at **sales@cutter.com** or **+1 781 648 8700.**

Opening Statement

by Stijn Viaene and Lieselot Danneels

The combination of new digital technologies such as social, mobile, analytics (big data), cloud, and the Internet of Things has given rise to digital disrupters such as Uber, Airbnb, and PayPal. However, an unrealized potential to transform existing businesses and industries persists. Many observers have identified a significant gap between incumbents' recognition of the importance of new digital technologies currently at their disposal and their understanding of how to optimally exploit them. This signals that many questions surrounding digital transformation are left unanswered and even unidentified. The articles in this special issue help us deepen our understanding of what digital transformation means and provide us with practical advice on how to transform organizations to address the digital world.

SAP thought leaders Axel Uhl and Lars Gollenia define digital transformation as:

> ... a specialized type of business transformation where IT plays a dominant role. In the digital age, new business opportunities arise and enterprises transform their strategy, structure, culture, and processes using the potential and power of digital media and the Internet."[1]

This definition remains rather generic, largely because we have barely started to scratch the surface when it comes to understanding the nature of digital transformation. One thing it does highlight is the enterprise-wide challenge that comes with digital business opportunities.

In a 2014 McKinsey global survey article, Josh Gottlieb and Paul Willmott report that "many respondents say their companies must address key organizational issues before digital [technologies] can have a truly transformative impact on their business."[2] They argue that organizations must address three key challenges. First, companies will need to learn to understand what creating digital value means. Offering a truly digital customer experience is profoundly different from digitizing an existing product or service. Second, companies should structure themselves in such a way that they can take full advantage of new digital opportunities and must develop the organizational and technological capabilities required to thrive in a digital world. Third,

to increase their adaptive potential, companies will have to attract and retain people with the right skills.[3]

For a long time, the discussion surrounding digital disruption has focused on "big-bang disruptors," a phenomenon described by coauthors Larry Downes and Paul Nunes in their 2013 *Harvard Business Review* article "Big-Bang Disruption."[4] According to this view, these digital startups could pop up out of nowhere and in no time wipe out entire businesses. Disruption could be coming from everywhere, far beyond your own industry or business model. Unfortunately, incumbents would no longer have the time, nor the capabilities, to rethink themselves. Established recipes for disciplined strategizing, careful product marketing, and innovation would be utterly useless. The advice for incumbents from big-bang champions Downes and Nunes is straight: "Get closer to the exits, and be ready for a fast escape."[5]

Meanwhile, newer research on digital transformation has put these claims into perspective. In a recent *Harvard Business Review* blog post, Didier Bonnet and George Westerman, coauthors of *Leading Digital: Turning Technology into Business Transformation*, argue that there are "many opportunities to do something perhaps less revolutionary, yet still highly valuable — evolving your business models using digital technology."[6] Instead of only being interested in radical industry reinvention, or getting to the exit as fast as possible, Bonnet and Westerman suggest it is often worthwhile to start by thinking a bit smaller in order to prepare for big results. Among other strategies, they emphasize unbundling products and reusing digital assets companies already have in order to reimagine their digital future.

That said, this doesn't mean there's no need for building new capabilities or transforming old ones. The digital economy compels digital leaders to cultivate a profoundly new mindset and invest in new technology-driven capabilities for winning. In a recent Cutter *Executive Update* entitled "Driving Digital: Welcome to the ExConomy," we describe how digital leaders adapt to the digital world by exploiting four fundamental digital-age realities:[7]

1. **Customer _Ex_ perience is value.** Leaders embrace digital technologies as a way to rethink value propositions and relationships with customers, in order to offer truly relevant and appealing customer benefits.

2. **_Ex_ perimentation is necessary.** Leaders deploy information technologies broadly to continuously monitor markets, sense customer needs and track behavior, systematically experiment with value propositions, and respond by swiftly scaling propositions that work.

3. **_Co_ llaboration reshapes strategy and business models.** Leaders reconceive their businesses through the function of ecosystems of digitally connected partners that co-create and share value.

4. **Digital e _Co_ system platforms rule.** Leaders understand that the most valuable digital partnerships are built around digital ecosystem platforms, carefully managed architectures of reusable and integratable digital resources.

Our ExConomy framework describes a changing world and a need for mastering new capabilities, but it does not address how to get from A to B. With this issue of _Cutter IT Journal_, we aim to bring more perspective to the question of how to transform. All the contributing authors agree that digital transformation will be profoundly complex, but this complexity does not prevent them from bringing useful perspectives to the table and suggesting approaches for how to frame and launch transformation. This issue does not glorify startups, big-bang disruption, or Silicon Valley; it does, however, investigate what lessons incumbents can take from digital natives. It also broadens the scope to include historical framing of the challenge, as well as the authors' rich experience and expertise in working with incumbent organizations.

IN THIS ISSUE

In our first article, Cutter Senior Consultant Paul Clermont emphasizes the importance of engaging in mindful and holistic business model transformation,

as opposed to making unfocused, ad hoc innovation attempts. Some of Clermont's most important recommendations focus on getting the customer experience right as a basis for creating a winning business model. He suggests using a customer-centric, needs-based questioning logic: "What is your customer really buying? What do customers find frustrating about your current product or service?" Clermont also advises looking at IT beyond its traditional role of driving internal efficiency. Integrating IT into the fabric of your business model not only allows you to aim higher, but to also aim broader.

In the digital world, all does not have to be thrown away. That is one of the main premises of our second article by Chris Burns and Thad Scheer, who warn against neglecting the possibility of conquering adjacent markets with assets you already own. They argue in favor of a leveraging strategy for monetizing digital assets by creating a powerful digital platform that enables reuse and extensibility, a possible core competitive advantage over new entrants. However, Burns and Scheer also caution incumbents not to think that asset ownership can prevent new entrants from gaining ground. New digital ventures have already proven the success of "sharing economy" business models in which asset ownership is no longer necessary.

Next, Cutter Fellow Steve Andriole seeks to help companies looking to transform internal processes, not disrupt industries. He advocates a revitalization of business process management (BPM) at the level of the enterprise. His five-step process for identifying digital transformation initiatives is inspired by a profound understanding of organizational transformations that used to be labeled "business process reengineering." His approach is disciplined, iterative, and, in his own words, "slow." After all, transformation is complex and takes time. Not only does the approach have the advantage of being deliberate, it also clearly situates where in the process new digital technology considerations come into play.

As in the private sector, questions have arisen in the public sector about the "what" and "how" of digital transformation. In the issue's fourth article, we document how VDAB, the public employment service for the Flemish region in Belgium, used an Action Design Research (ADR) approach to come up with an "opportunity strategy" to help it make sense of what digital-age government entails. The research we present in the article was driven by the need VDAB felt to better understand how it must act differently in view of the changing environment. This questioning led to the creation of a lab to find an answer. The article describes

the ADR process as well as its result for VDAB: a digital opportunity strategy consisting of six simple rules.

In our fifth article, authors Rob Gleasure and Jeremy Hayes start by pointing out how interwoven the digital and physical worlds have become: "First of all, there is a migration of analog activities to online contexts.... More recently, the influx of wearable technologies and smart devices has set in motion a migration of digital activities into the analog space." We are reminded not to underestimate the cumulative and generative power of this relationship. Gleasure and Hayes identify three waves of wearables, with capabilities ranging from the incremental to the radically new and with different levels of market penetration. They urge companies to strategize for all three waves and ask themselves how each might create competitive advantage.

Next up, Peter Korsten, Saul Berman, and Linda Ban of the IBM Institute on Business Value bring us insights from their latest Global C-suite study, representing top executives in a wide range of public and private enterprises. The study investigated how organizations are responding to new competitive disruptions. Most importantly, the interviewed CxOs believe technological advances are driving the shift in the competitive environment. But there is a clear difference between "market followers" and "torchbearers." Torchbearers stand out from the crowd. They actively explore new business models, look forward and outward, listen to their partners, and are capable of ecosystem collaboration. In other words, they have embraced the ExConomy. The article outlines three key steps organizations can take to follow the torchbearers' lead and successfully compete with "digital invaders."

Our next authors, Greg Smith and Carl Bate, observe that "the situation we face as technologists has indeed changed fundamentally," a change they characterize as a shift from the "complicated" to the "complex." While IT *best* practices may have been adequate for dealing with the elaborate yet closed systems of enterprise IT, the challenges of digital IT, marked by "open system interactions, where we need to constantly sense, adapt, and respond to emerging needs" requires *next* practices. Smith and Bate offer next practice guiding principles in four dimensions "to inform and assist decision making within this 'fractal' context."

As important as new ways of thinking are, Munish Gupta concludes the issue by reminding us of the central role technology plays in digital transformation. He explores how new technologies are impacting the enterprise value chain and outlines four technology "levers" — connectedness, data, automation, and user centricity — that make technology "the key enabler that is helping [enterprises] create new business models and processes." Gupta also examines what businesses require in order to build digital capabilities and how they can leverage existing technology investments in their digital transformation journey.

We hope you will enjoy the articles we have compiled for you in this issue. They cover a broad range of discussion topics that will help you put the hype and hysteria around digital transformation in perspective and see the forest for the trees again.

ENDNOTES

[1]Uhl, Axel, and Lars Gollenia. *Digital Enterprise Transformation: A Business-Driven Approach to Leveraging Innovative IT*. Ashgate Publishing, 2014.

[2]Gottlieb, Josh, and Paul Willmott. "The Digital Tipping Point: McKinsey Global Survey Results." McKinsey & Company, June 2014 (www.mckinsey.com/insights/business_ technology/the_digital_tipping_point_mckinsey_global_ survey_results).

[3]Gottlieb and Willmott (see 2).

[4]Downes, Larry, and Paul Nunes. "Big-Bang Disruption." *Harvard Business Review*, March 2013.

[5]Downes and Nunes (see 4).

[6]Bonnet, Didier, and George Westerman. "The Best Digital Business Models Put Evolution Before Revolution." *Harvard Business Review* (blog), 20 January 2015 (https://hbr.org/2015/ 01/the-best-digital-business-models-put-evolution-before- revolution).

[7]Viaene, Stijn, and Lieselot Danneels. "Driving Digital: Welcome to the ExConomy." Cutter Consortium Business Technology & Digital Transformation Strategies *Executive Update*, Vol. 18, No. 16, 2015.

Stijn Viaene is a Fellow with Cutter Consortium's Business Technology & Digital Transformation Strategies practice. He is a Full Professor at Vlerick Business School, Belgium, where he heads the Information Systems Management Cluster. At Vlerick, Mr. Viaene is cofounder of the Centres for Excellence in Business Process Management and Enterprise Architecture Management. He is also a Professor in the Decision Sciences and Information Management Department at KU Leuven, Belgium, where he holds the VDAB Chair of Digital Business Innovation of Public Services. Mr. Viaene conducts research on digital business innovation, IT strategy and governance, and business process management. He can be reached at sviaene@cutter.com.

Lieselot Danneels is a PhD candidate at Vlerick Business School and KU Leuven. She is passionate about digital business innovation and organizational transformation. Ms. Danneels is a researcher for Professor Stijn Viaene, working for the VDAB Chair of Digital Business Innovation of Public Services. Previously, she worked as a systems and process analyst at PwC. She can be reached at lieselot.danneels@kuleuven.be.

Winners, Survivors, & Losers

by Paul Clermont

Natural history shows occasional periods of mass extinction, when as many as 95% of existing species disappeared. Most spectacular was the asteroid crash 65 million years ago that killed off the dinosaurs, huge lumbering beasts whose only extant descendants are the more mobile birds.

Something like that is happening with digital transformation. Companies have long succumbed to more creative and nimble competitors, but digital transformation doesn't just destroy a company, it can destroy the whole business model that underlies it.

In this article, I examine the scope of digital transformation, what kinds of enterprises are most threatened or helped by it, how to recognize threats and opportunities, and how to become a survivor — or a winner.

A ROLLING TRANSFORMATION

Early IT was invisible to customers, so implementing it badly didn't much matter to them. In the 1980s, online access to data enabled some companies to offer much better service to customers who had questions or problems or wanted to place an order. Customers didn't physically interact with IT, but it made the enterprise easier to do business with. Surely this was an improvement, but it was hardly "transformation." In the 1990s, the advent of the Internet plus Web browsers and search engines let enterprises make themselves known to customers in a far more effective way than through print ads, directories, and direct mail — again an improvement, but well short of transformation.

I would argue that digital transformation really began when products and services, and/or the channels

---

A MAXIM FOR THE TIMES

When a digital innovation that could destroy your current business model becomes economically viable, that business model will be destroyed.

---

through which we procured them, changed in fundamental ways. This happened in the 2000s (and earlier for pioneers like Amazon and eBay). Suddenly, customers could transact business directly with the enterprise's IT, cutting out middlemen. In some areas, customers could obtain the digital equivalent of a product from entirely new sources; for example, recorded music. Most recently, new companies have arisen that provide a form of brokering, matching people with needs to people (small businesses or even individuals) who can meet those needs, as in the cases of Uber and Airbnb.

Vulnerable enterprises that did not roll with these transformations got rolled over by them.

OUR NEW WORLD

Any business model in use exists because it fulfills a need. Destruction of that business model does not mean the need goes away; rather, it is fulfilled by different means.

Threats and Vulnerabilities

Not every business or business model is threatened. If you make things people want at a reasonable price, you will most likely continue to make them, though the channels to the customer may change, and a niche business can prosper by exploiting these new channels. But nobody should be blind to the threat. Characteristics of vulnerability include:

- Being a labor-intensive middleman such as a travel agent. Travel sites that could do almost all an agent could do appeared out of nowhere, and e-tickets eliminated the one area in which Main Street agents had a virtual monopoly — printing paper tickets. Only those agencies proficient in group tours, cruises, or complex international business travel could survive.

- Selling products that could be replaced by near-zero marginal cost digital transmission, such as recorded music and reading material.

- Selling services based on predictable quality, relying on customers' limited knowledge of possible alternatives, such as hotel and restaurant chains.

- Selling anything at a price that could be substantially undercut by a competitor using digital technology.

- Having a legally sanctioned monopoly that could be broken if a new, easy way for providers and customers to find one another appeared, such as licensed taxis now competing with Uber and Lyft.

New Businesses Created

A host of new businesses have emerged to meet customers' needs and, along the way, have expanded the range of possibilities for customers and suppliers:

- A sideline business enabled by a computer company's technology has become the largest purveyor (by volume) of recorded music.

- Amazon started as a bookseller, but it soon became clear that its goal was to be tops with a process — order fulfillment. This new channel threatens the big box retailers who, not that long ago, had decimated Main Street retailers.

- Travel sites democratized travel information, making options easy to find and compare. This in turn prompted the emergence of meta-travel sites such as skyscanner.net, which finds not only the flight options, but also the best prices available directly from the airlines as well as the range of travel sites.

- Brokering the exchange of goods and services brings together buyers and sellers who would never otherwise find one another. eBay is an obvious example for goods; in services, companies like Uber bring together people who have a need with people who have the means and time to fulfill it.

Old Businesses Energized

Digital transformation has been a boon for many small businesses (e.g., non-chain lodging and restaurants) whose biggest challenge had been becoming known and respected outside of a local area. (See sidebar "Transforming the Lodging Industry.")

Other small businesses such as used books, collectibles, crafts, and artisanal products can leverage digital technology to open up a national or even a global market. Common elements are some combination of exploiting a niche and differentiating one's product or service by adding value. In 1985, Michael Porter of the Harvard Business School[1] identified three generic business strategies:

1. Be a low-cost producer.

2. Differentiate your offering.

3. Find a niche.

Of these, low-cost producers are the most threatened by digital transformation. People buy from them because they're cheap, so any enterprise that can supply the commodity for less by exploiting digital technology will profit at their expense.

TRANSFORMING THE LODGING INDUSTRY

Until 1995, hotel chains offered predictable quality and proprietary online reservation systems, for which they were amply compensated. Other facilities such as small hotels, inns, and B&Bs had to rely on word of mouth or recommendations in guidebooks and other media even to become known to potential customers, and such information could quickly go stale as businesses closed or changed hands. Margins were low.

The Internet changed that in two ways:

1. Travel sites like Expedia allowed travelers to see the range of options, including prices, and to book rooms through them. This wrought further havoc in the Main Street travel agency business.

2. Small, unique inns and B&Bs established a Web presence that could include pictures and testimonials. Most then moved on to providing current info on availability, allowing guests to book rooms online, and accepting payment and customer-submitted feedback. The additional guests these innovations brought in enabled higher margins and justified investments in purpose-built properties, as opposed to just renting spare rooms in a house that's bigger than you need.

Now, Airbnb and the like threaten the margins in this business model by enabling people *not* in the hospitality business to rent out spare rooms or whole dwelling units occasionally and opportunistically, without even having to formally create a business. Controlled online feedback about both hosts and guests mitigates perceived risks.

We can see something similar in the car rental business, as the long-standing by-the-day model, with limited pickup and drop-off points, loses business to enterprises like Zipcar, which offers far more numerous locations and card-key access to vehicles, obviating the need for people to check customers in and out. Now we're even getting the first inklings of private car sharing, analogous to Airbnb's renting of private rooms.

Power to the People?

The opportunity for customers to post feedback on the Internet, either directly on a vendor's site or through review sites like Yelp and TripAdvisor, provides a valuable mechanism for potential customers to get unvarnished information … until it doesn't. Customers can make a big deal out of trivial problems or extort unjustifiable discounts and refunds with the threat of negative reviews. Vendors can create favorable reviews of themselves out of thin air, while competitors can do the opposite. Even non-customers could get into the extortion racket: "Nice inn you have here. It'd be a shame if something happened to it..." Some sites offer vendors a chance to respond to reviews, but perhaps the best approach is that of Airbnb. Its reviews are limited to actual guests and flow in both directions, allowing crank guests to be identified and shunned by other hosts as well as helping potential guests avoid bad hosts. Unfortunately, this approach is not practical outside a "closed" set of vendors and customers. Customers need to develop instincts for sniffing out reviews that don't seem real. *Caveat emptor* remains sound advice.

> No enterprise big or small should fail to think about what digital transformation can do for — or to — them.

Not So Fast!

That said, digital transformations will not become universal in every case and indeed may fall well short of that theoretical possibility. For example:

- E-book sales have leveled off. There seems to be something about reading a physical book that a lot of people simply like, even though they may still read some e-books. (They may limit e-books to "guilty pleasure" reading, as opposed to what they'd like people to know they read.)

- Although the once-mighty Tower Records has died, purveyors of used vinyl prosper.

- Some bookshops have expanded into coffee shops that offer lounge space and host authors on book tours. Others act as agents for Amazon, getting a cut of the price without needing to stock as many books.

- Brick-and-mortar retailers with sophisticated products and highly knowledgeable salespeople manage to survive.

IDENTIFYING THE TRANSFORMATION THREAT OR OPPORTUNITY

No enterprise big or small should fail to think about what digital transformation can do for — or to — them. Within commonsense economic limits, current technologies should be exploited. Further, it's important to envision potential technological changes a few years out and think through how to prepare for and exploit them. Obviously, that's not easy. Following are a few pointers.

Understand What Your Customer Is Really Buying

(Hint: It may not be what you think you're selling!)

For the first nearly 100 years, record companies saw themselves as selling (and their customers as buying) media — wax cylinders, vinyl, tapes, and then CDs as the technology evolved. In the literal sense, that was true. But in reality, what customers were buying was the ability to listen to a piece of music when they wanted to (and where they wanted to, once tapes and CDs came on the scene). In the analog world, only physical media could fulfill the customer's desire.

CDs, however, are digital; what is stored on them can be stored on a computer. That didn't matter when data transmission was dial up, but when it became practical to download or stream the music, who needed the media anymore? (The same is true for video, once DVDs replaced analog tapes.) Clearly a major transformation was necessary if the recording industry didn't want an upstart from left field, like Apple, eating its lunch. That didn't happen; the recording industry chose to hire lawyers rather than technologists.

Understand What Customers Don't Like or Find Frustrating About Your Product or Service

(Hint: You may not find this out by asking them, since they may just accept things as inevitable — until an upstart shows them otherwise.)

Since the days of the horse and carriage, taxis in large cities could be found at dedicated taxi stands or cruising the streets. If you weren't near a stand or on a busy street, good luck. Telephones and two-way radios enabled taxis to be ordered to a specific address, but it wasn't possible to know how long it would take for them to show up. Put smartphones and GPS in the picture, like the Hailo app in London, and the customer can see just where the cab he requested is and how long it will take to get to him.

In most large cities, the taxi business is highly regulated. Only medallion taxis can occupy designated

stands or accept street hails. There is usually a fixed number of medallions, well short of peak demand. (Cartel, anybody?) But if a customer with a smartphone can have a car pick her up quickly and predictably from wherever she happens to be, driven by someone with the technology to find her and get to her destination by a nearly optimal route, why take a chance trying to find an empty cab in the street? Thus Uber, Lyft, and others entered the taxi business, or more accurately, the business of meeting people's need for fast point-to-point transportation. The famous London black taxis got in front of this development with Hailo, but their cartel-enabled high prices have still created room for upstarts. The value of the drivers' legendary knowledge of London's thousands of streets has been attenuated by GPS, leaving just the black taxis' ability to use bus lanes — no small matter in rush hour — and their high carrying capacity as differentiators.

Identify Potential Competitors

(Hint: They're not limited to your current ones.)

Could anyone in 1975 have predicted that a computer company started by two kids in a garage would by 2010 be the world's largest vendor of recorded music? Not a chance. By 1985? Unlikely. By 1995? The writing was on the wall for music producers and retailers.

Other competitors may not even exist — yet. A useful thought exercise is to ponder how you could destroy your own business with technology, even if it's technology that doesn't quite exist yet or is still quite expensive.

GETTING TO SPECIFIC ACTIONS

Envision Digital Possibilities

This is a tall order, not only technically but culturally, for an enterprise that has been around for a while and has a still-working business model. Business history to a very large extent consists of tales of once-great companies that needed to transform in some way but did not, due to lack of vision, lack of resources, or just a change-proof culture.

The urgency to identify feasible digital transformations increases if you are enjoying large margins and your price could be drastically yet profitably undercut with digital technology, or if you enjoy a monopoly that a digitally transformed competitor could break. Complacency is the enemy; if you wait for the threat to be manifest, it may be too late, and lawyering up is no guarantee of anything but legal bills.

There is no "by the numbers" way to develop visions of future possibilities. It takes a combination of imagination, critical thinking, and technological awareness leavened with — but not overwhelmed by — practicality in the early stages of thinking. It very much requires a from-the-outside-in perspective on the enterprise, when the daily grind is mostly about the from-the-inside-out. Outside people can help by providing technological expertise and process facilitation. This is where a "laboratory" might come into play, though not necessarily. Labs have pluses but also very serious minuses that I will cover below.

Identify the Core Competencies that Matter in the Future and the Role of IT in Leveraging Them

(Hint: They may have changed since you last looked.)

Not to keep picking on the poor recorded music business, but it does offer a rich lode of examples. Twenty years ago, the relevant core competencies might have included identifying and developing talent, providing top-of-the-line recording studios, promoting product, and managing physical distribution channels. The last item would no longer be on the list, and the second is no longer so prohibitively expensive that talent can't produce music independently. The first and third remain at the core, but how to exercise them has changed radically with social networks.

Assess Your Cultural Resources

(Caution: Diplomacy needed!)

The ability to effect digital transformation requires more than understanding technology, identifying plausible opportunities, and having the technical and financial resources to implement them. Those are necessary, but they are insufficient in the absence of cultural resources like entrepreneurial risk-taking, a collaborative ethic, and independent critical thinking. It's a lot easier to say you are innovative than to *be* innovative. Some clues that the reality may not match the verbiage are:

- Carrots for success are much smaller than the sticks for failure.

- Many people, particularly people in staff functions, can say no to an idea and make it stick.

- Naysayers' misplaced analogies to past failures go unchallenged.

- There's a tendency toward groupthink, either positive or negative.

- There is widespread concern about cannibalizing existing products and services. (If some innovation is going to destroy your business model anyway, wouldn't you rather it be *your* innovation?)

- Organizational silos and rivalries litter the landscape.

Assess Your IT Resources

(Hint: You may not have what you need.)

It's hardly a secret that the IT capabilities that got organizations through IT's early decades, no matter how good, were not attuned to the challenges that emerged in the age of the Internet. Drivers, approaches, criteria, and priorities changed as rapidly as the technology. It's not just technicians that need to reorient, it's their managers, particularly those who earned their spurs in the "traditional" IT world. Table 1 summarizes the differences between traditional IT and digital transformation.

While speed has always been desired in IT (albeit more often promised than delivered), it is absolutely of the essence in transformation. Outside resources are likely needed to make the leaps, because the people who can do this quickly and well are apt to be too expensive to keep on staff, and if they don't seem too expensive, they're probably not the right people.

Time is most important in the first steps in transformation. A subpar but not hopelessly botched initial rollout can be recovered from, but new and supposedly improved versions need to be visibly improved from Day One — no backsliding.

Is a "Lab" the Answer?

The idea that a group of really smart, visionary people could be assembled to generate the killer ideas that not only keep you in business but enable great leaps forward is seductive. Two well-known examples:

1. Bell Labs was a spectacular success, generating ideas that both benefited its parent company and garnered Nobel Prizes for the quality of the scientific work done. It was also, for better or worse, a product uniquely of its time. Before 1984, AT&T (Ma Bell) was a highly regulated and well-run monopoly that generated the kind of margins that could support an organization doing work that would have little or no impact in the next five years, let alone the next quarter, and it became a national treasure.

2. Xerox PARC was also very successful in developing brilliant ideas we all use today, such as the graphical user interface. But PARC, unlike Bell Labs, was far from the parent company's operations and line

	Traditional IT	Digital Transformation
Driver	Internal efficiency	External competition
Approach	Deliberate, methodical	Try stuff and learn
A "Good" Result	10% better	10x better
Cost/Quality/Time Tradeoff Priority	CQT: In theory, C isn't the top priority, but really …	TQC
Expected Lifespan of Work Product	5-10 years	1-3 years
Need for Flexibility	High: You don't want it to be obsolete too soon.	Moderate: You'll likely rework it fairly soon.
Need for Security	Moderate	Very high
Importance of Reliability	Very high	High
Role of Enterprise Architecture	Implicit	Potentially vital tool for planning and explaining

Table 1 — New emphases for managing IT.

management. The upshot was that huge profits have been realized from its inventions — just not by Xerox. Now it's a wholly owned subsidiary of Xerox that does contract work for a variety of companies.

The problem with labs charged with innovation is that they are rarely a good cultural fit. They tend to be created with great fanfare. New people with fancy degrees and high salaries come in with a vague charter and no street cred with people in the existing culture. If they're insufficiently conversant with the business, they get tripped up by details and lose further credibility. A great deal of money gets spent before even a glimmer of an idea appears. Too often, they're used as a substitute for the hard thinking that's the job of line managers who want to stay in business.

Labs are especially problematic when they're grafted onto an old-line humdrum business that has not heretofore needed to hire the best and the brightest and does not yet feel seriously threatened. If an enterprise does have a corps of really sharp people, they will feel insulted. Either way, the culture's white blood cells will take care of the alien intruders.

In short, having a lab for innovation is not the same as being an innovative enterprise.

Lest the above cautions seem excessively dismissive, I should note that labs can add value if the circumstances are right. One current example is WalmartLabs. Walmart acquired (and renamed) Kosmix, an existing Silicon Valley firm, in 2011. This meant it did not have to form a team from scratch that might or might not gel. Its aggressive recruiting suggests continuing serious financial commitment. Also, while Walmart's core business of big box stores selling stuff cheap is hardly an innovation, the way it uses technology to optimize its supply chain advanced the state of the art, so innovation is in the company's DNA. All of this bodes well, but will it pay off? Time will tell.

If Not a Lab, What?

Product and service innovation must be the responsibility of line managers. For those organizations that still have them, strategic planning staffs can help. Obviously, the CIO should be a key resource. What about a Chief Digital Officer? Aside from the ludicrous title, which spawns jokes about fingers, there is the matter of how the CDO and CIO would play together. With a less pretentious title, there is a valid role for someone — probably but not necessarily in the CIO's organization — to help line managers think more innovatively and to shepherd outside resources brought in to speed the process I've been describing.

At the risk of sounding self-serving (I'm a management consultant myself), I do believe that outsiders with some grey hair and scar tissue can bring out the wisdom and creativity of an organization, primarily by asking sharp questions and challenging conventional wisdom with what may sound like stupid questions until people try to answer them cogently. Deep knowledge of the existing business model is not necessary, but the intuition to see parallels and analogies outside the industry is critical. Also important is a set of examples and cases that illustrate and explain success and failure. More technically oriented outsiders can provide state-of-the art examples; more seasoned consultants can bring the gee-whiz down to relevance for the situation at hand.

> **Sometimes the biggest risk lies in not taking risks; having a once-successful business model undercut or destroyed is a big penalty for sitting on one's hands.**

Risks and Challenges

Sometimes the biggest risk lies in not taking risks; having a once-successful business model undercut or destroyed is a big penalty for sitting on one's hands. That said, the risks of action need to be acknowledged and addressed. Transformation, digital or otherwise, isn't easy, technically or culturally. Cross-functional teams may not gel. C-level people may get spooked by the costs and demand scope reductions that gut the innovation. Barriers to success can be technical, but the right team can avoid or extricate themselves from most dead ends. Tougher to overcome are the cultural barriers arising from cynicism, complacency, or intramural rivalries. Enterprise Governance, with or without the capital letters, cannot treat transformation as a spectator sport; it needs to hold both line managers and transformation teams accountable. It needs to neutralize naysayers who criticize without offering anything better.

Habits of an Innovator

Since this topic is closely related to disruptive technologies, I have adapted a section from my 2011 *Cutter IT Journal* article on that subject:[2]

- Pay attention to what other organizations, not just competitors but firms in other industries and even governments and not-for-profits, are doing with IT.

- Personally use a wide variety of technologies, platforms, and apps, even those that seem irrelevant to your enterprise. Remember, Facebook and Twitter may have appeared frivolous at first, but they are now well-established platforms for communication. Try services like Airbnb, Uber, and Lyft. Keep up with what teens are doing on their phones and pads, though perhaps not quite *everything* they get up to!

- Think, but don't overanalyze, how your enterprise would use social networking and smartphone apps before implementing a presence. Customers and non-technical employees can generate great ideas you may not think of.

- Do think through how you could incorporate a new idea into the IT base if it starts to look as if it has legs, but don't spend a lot to implement it until those legs actually appear.

The key is to stay aware and flexible, keeping options open rather than deciding things before you need to. The late Yogi Berra once said, "When you come to a fork in the road, take it." Maybe he was onto something more than people give him credit for.

ENDNOTES

[1]Porter, Michael E. *Competitive Strategy*. Free Press, 1980.

[2]Clermont, Paul. "Disrupt This! The (Mostly) Good, the (Occasionally) Bad, and the (Always) Inevitable." *Cutter IT Journal*, Vol. 24, No. 10, 2011.

Paul Clermont is a Senior Consultant with Cutter Consortium's Business Technology & Digital Transformation Strategies practice. He has been a consultant in IT strategy, governance, and management for 30 years. His clients have been primarily in the financial and manufacturing industries, as well as the US government. Mr. Clermont takes a clear, practical view of how IT can transform organizations and what it takes to direct both business people and technicians toward that end. His major practice areas include directing, managing, and organizing IT; reengineering business processes to take full advantage of technology; and developing economic models and business plans. In his consulting engagements, he follows a pragmatic approach to the specific situation and players at hand and is not wedded to particular models, methodologies, or textbook solutions. He has spoken and written and taught executive MBA courses on the challenges of getting significant and predictable value from IT investments.

Before going into individual practice, Mr. Clermont was a Principal with Nolan, Norton & Co., a boutique consultancy that became part of KPMG. Before joining Nolan, Norton & Co., he directed IT strategy at a major Boston bank and launched its IT executive steering committee. His undergraduate and graduate education at MIT's Sloan School of Management was heavily oriented toward operations research. He can be reached at pclermont@cutter.com.

Enabling Supernormal Growth into Adjacent Digital Markets

by Chris Burns and Thad Scheer

Imagine meeting with Roger Goodell, commissioner of the National Football League (NFL), a business whose top line will spike 16% in 2015-16, earning the company US $13 billion. Now imagine recommending a digital transformation that won't elevate the NFL brand, increase attendance, sell more jerseys, sign additional players, build new stadiums, or expand the league. The transformation will, in fact, be totally unconcerned with the NFL's core value delivery and revenue engine. Should Commissioner Goodell, or anyone in his situation, go for it? Would you?

Let's not forget to mention the transformation will create a $15 billion adjacent market that is larger than the NFL itself[1] and can be accomplished using digital assets the business already controls. Now who's interested?

As you likely guessed, such a proposed digital disruption is only hypothetical because fantasy football already exists. Although we will never know how a current NFL commissioner might have responded to such an opportunity if it were previously pitched as a digital transformation, we see businesses today routinely fail to recognize comparable opportunities. Businesses become trapped by present-day concerns and strategies that offer only modest headroom for growth. Staying the course and paying the bills makes leadership blind to low-risk transformation opportunities that enable supernormal growth.

> We had no idea it would explode into the kind of mania that exists today.
>
> — Scotty Stirling, co-inventor of fantasy football

A digital transformation isn't just launching a brand on social media, hosting an electronic storefront, or connecting the enterprise workforce. Nor is it activating big data or analytics to synthesize new differentiators. A digital transformation requires escape from the routine mindset of business strategy to discover adjacent opportunities and strategies that create an asymmetric competitive advantage (i.e., a powerful advantage that denies competitors the use of similar strategies and tactics).

Data is a company's most valuable parked asset. Despite spending hundreds of millions of dollars on information technology, most *Fortune* 500 companies struggle to activate data as capital. Recent trends have prioritized investments in big data, with IT departments adding lakes to their clouds. These priorities are increasingly accompanied by hefty investments in data science. However, when a team of brilliant data scientists works atop a massive lake of proprietary data and solves an interesting problem, the solution rarely gets strategic visibility. These discoveries are seldom recognized and implemented in production despite the elevated priority.[2] On the rare occasion when analytics are implemented in production, the alignment tends to be with current business priorities. This is because established companies get complacent in their strategies, conditioned to rely on processes tuned for slow and steady growth.

The idea of using data asset activation to shape corporate strategy is foreign to most companies. After all, nerds don't belong in the boardroom.

CATERPILLAR AND BUTTERFLY

When contemplating a digital transformation, most executives fixate on "digital" when they should focus on "transformation." A digital transformation is just that: transformative. The imperative isn't for technology to *influence* a business, a trend that was called "data processing" in the 1970s. Today, the conversation must be about leveraging digital innovation to *transform* the "strong center" of a business.[3]

If you aren't implementing a strategic pivot, then you aren't transforming. And if you aren't transforming, then demand for your bread-and-butter competitive differentiators will eventually slacken in the presence of aggressive competition.

A business must emerge from a transformation fundamentally and categorically altered. Think caterpillar and

butterfly. The animal emerging from a digital transformation expresses the same DNA as before, yet it is optimized for a completely different marketplace and becomes unrecognizable as the original caterpillar.

The purpose of an adjacent market strategy is to find new uses for existing assets.[4] An effective strategy activates assets that have long been overlooked because the foundational marketplace has no way to develop their value. The most treasured assets are those linked to a defining characteristic of the foundational business — those that constitute its strong center or DNA. Such assets are unique in quantity, quality, or availability, and when weaponized, they pose a formidable barrier to entry against aggressive competitive imitation.

A digital transformation starts by discovering new value in digital assets already within your reach or control. Whatever value an asset has under current business strategies is only a fraction of the asset's potential in adjacent markets. Recognizing untapped asset conversion opportunities is simple in theory, but this first step is where organizations stumble.[5, 6] A team of brilliant data scientists will toil away drilling holes in your data only to produce two outcomes:

1. They expend their time digging in the wrong place.

2. They discover gold, but nobody notices — not even them.

> **As a savvy digital strategist, you always want to be the one who activates the hidden growth potential of assets under your control.**

RETHINKING STRATEGIC DRIVERS

From the school of business, a belief emerged that the needs of business must drive technology, not the other way around. From the school of engineering, there is a belief that technology should shape the business. Naturally, the school of business typically wins. Yet speaking as digital business strategists, this is a gross oversimplification. Every organization has operational needs and line-of-business (LOB) concerns, all of which advance incrementally on decadal cycles. Such business needs will inevitably drive the technologies that support them, and there's nothing wrong with letting that occur. However, escaping slow-and-steady growth requires new competitive advantages on which to base new strategies.

Invoking strategy without an accompanying advantage is reckless. Thus, despite a bit of chicken and egg, a new competitive advantage must come first, and strategy second. New competitive advantages inspire new business strategies, which in turn compel differentiation. Under this model, technology doesn't merely support business strategy, it shapes it. Elevating the role technology plays in business strategy might upset the school of business caucus — but only until they start cashing larger checks.

A digital transformation begins with a new differentiator, usually a digital asset that has been modified to create an asymmetric competitive advantage. Such assets do not need to belong to the business or even be under the business's control. You can arm yourself with assets that other parties produce and still create growth-oriented positions around asset activation. Of course, when you leverage assets that are entirely under your own control, not only will the asset activation scheme be a marketplace differentiator, the resulting strategy will be inimitable by competitors who find the asset itself difficult or impossible to reproduce.

ENDOGENOUS TRANSFORMATION

As a savvy digital strategist, you always want to be the one who activates the hidden growth potential of assets under your control. It's painful to have an outsider recognize the value of your proprietary assets, establish a derivative digital transformation adjacent to your position, and steal your future. You must "look inside" to recognize passive digital assets that have the potential to energize growth and then act on these opportunities.

A great example of endogenous transformation was GE's creation of its Industrial Internet in 2011.[7] Looking at his company and the competitive environment, CEO Jeffrey Immelt realized the limited growth potential of technologies for power plants, jet engines, hospitals and medical systems, utility companies, oil rigs, rail, and other industrial infrastructure. GE's global cross-industry marketplace was mature and saturated. Instead of complacently accepting this position, Immelt opted to reboot the revenue model and activate a "parked asset"; namely, the streaming telematics that emanate from advanced sensors on GE's fielded industrial products. Rather than simply improve existing products with digital technology, which would only marginally elevate market share, Immelt knew he had to create a completely new digital ecosystem. With this, "outcome-based services" were born.

GE combined telematics with advanced predictive analytics using pooled data streamed from several industrial verticals. GE started selling business outcomes, not just turbines and jet engines. A power plant customer no longer merely buys a turbine from GE, hoping for better performance. Today, a power plant operator can buy increased output and decreased fuel consumption. Such customers pay for specific outcomes in their businesses, outcomes that can only be achieved by integrating the physical product with data and insight. This creates a low-risk opportunity to drive high-margin service and software revenue. GE's new offering has already generated a four-fold increase in sales across its various businesses, and the revenue recognized from the Industrial Internet will go from $1.4 billion in 2014 to $5 billion in the next few years.[8]

EXOGENOUS TRANSFORMATION

An exogenous transformation involves actors who are not the original owners or curators of the digital asset. These are unaffiliated third parties who see an opportunity to activate someone else's data and create a derivative market. Such assets are sometimes produced by the government, but more often they are produced by other companies whose attention is on a foundational market that blinds them to the derivative value of their own assets.

A prime example of this is the explosion of fantasy sports, in particular fantasy football. According to the Fantasy Sports Trade Association (FTSA), fantasy football is expected to exceed $15 billion in direct revenue in 2015, with over 51 million Americans and Canadians engaging in the game. The industry is experiencing a supernormal compound annual growth rate (CAGR) of 55%, and 40% growth in consumers.[9] Moreover, these are direct spending statistics that exclude wagers and the multibillion-dollar ad revenue associated with fantasy sports. The long tail, in fact, may be in the range of $20-$40 billion, depending on how the numbers are aggregated.[10]

The fantasy sports industry was built on data that companies like the NFL freely disseminate as a byproduct of their foundational business. Today, the NFL has pivoted to capitalize on fantasy sports, but it is a late investor in this derivative market and as a consequence is now just one of several fantasy brands. Early movers in fantasy sports saw the opportunity to repackage data produced by the NFL and create an innovative entertainment marketplace; then they made it authentically

digital. Not only did this derivative business strategy energize consumers to spend on a new ecosystem, it overcame the geographic barriers that historically linked fans to teams. Now, fans energetically root for individual players in teams across the country, increasing television viewership and elevating the sport.

> Fantasy players are more interested in sports because of fantasy, with 61% reporting they are watching more live sports because of fantasy, and 60% saying they read more about sports because of fantasy.
>
> — FSTA[11]

With exogenous digital transformations, it pays to be the aggressor. There's nothing worse than having an outside party steal your growth opportunities using your own digital assets. Likewise, there's also nothing sweeter than implementing a strategic pivot that creates a high-growth derivative market around an asset that you obtain for free because the asset producer's attention is elsewhere.

> **With exogenous digital transformations, it pays to be the aggressor.**

There is no prescriptive formula for strategy. Endogenous and exogenous strategies both produce supernormal growth under the right conditions, and both fail just as readily. As with war, business transformation strategies must be purpose-fit and unpredictable. Formulaic decision trees introduce predictability that weakens any strategy. Good strategy requires an honest intimacy with one's own strengths and weaknesses, creativity with respect to secret planning, and knowledge of the competition's market positions, plans, and deceptions. A great many factors feed the selection of transformation strategy.

This aggressive way of thinking is relatively uncommon in modern managers, which is why companies struggle to implement digital transformations. In the years prior to Apple's launching the iPod, despite ideal marketplace positioning, Sony refused to embrace an aggressive digital music strategy because such a strategy would cannibalize its foundational markets. Reluctance to compete against itself prevented Sony from being the digital aggressor. Not only did the company's foundational markets erode anyway, all the gains went to Apple. Sony literally let Apple steal its future out from under it.

SEEING THE VALUE WITH DESIGN THINKING

While 55% CAGR will get everyone's attention, it is important to be realistic about the difficulty in recognizing digital opportunities. Most executives are intimate with their operational data on a daily basis, but what makes a person wake up today and see an existing asset in a different light? What cleaning and manipulation must be performed on data to fully activate it? What does a data activation strategy look like? How does one convince other stakeholders to go along?

The concept of design thinking, made popular several years ago, can be applied to this situation. The underlying assumption is that creative professionals (i.e., designers) see the world differently from business people or engineers and that a creative approach to problem solving matters in the marketplace.

> **What makes a person wake up today and see an existing asset in a different light?**

A company that enjoys a strong position in a mature market will feel pressure to abdicate entrepreneurial risk taking in exchange for strategic linearity and incrementalism, priorities that keep the lights on and shareholders happy. However, it takes nonlinear thinking to recognize opportunities for supernormal growth. As a group, designers don't see the world through formulaic business practices. A good designer examines the available raw materials and then asks, "What interesting, creative thing can I do with these materials"? After much experimentation and ethnography, the designer will have tried lots of stuff and kept what works.

This isn't an argument for recruiting designers into strategy-level positions, but rather an argument for embracing the designer mindset. A successful digital transformation depends on creative nonlinearity. This requires open-mindedness to allow corporate strategy to be shaped by discoveries closest to a company's digital assets.

Data scientists are often guilty of doing great work boring holes in data but ultimately digging in the wrong place. A good digital business strategist will reorganize data science priorities so every advance is a step closer to a new data production "pipeline."

A pipeline is an important secret to success. For data science to be strategically relevant, there must be a data production pipeline. Such a pipeline often includes elaborate stages for cleaning, enrichment, pattern matching, prediction, and optimization. While the stages themselves make interesting papers for presentation at data science conferences, it takes a visionary and complete pipeline to transform a company's passive digital assets into active capital.

DIGITAL TRANSFORMATION: WHOSE JOB IS IT?

Should a digital transformation be led by the CIO, the CTO, the chief data officer, the chief analytics officer, or a LOB executive? We suggest none of those. A digital transformation should be led, and funded, by the CEO. Deciding how a business pivots from a foundational market with 7% CAGR to an adjacent or derivative market with sustainable 30% CAGR is not a job for subordinates.

Executive incentives tend to reward strategic linearity and incremental advancement — again, keeping the lights on and shareholders happy. Though in charge of technology, CIOs are not charged with visualizing future business strategy; they are incentivized to provide reliable technology that empowers strategy. Other C-level positions lack control over the necessary ingredients of budget, political influence, vision, and corporate incentive.

A good CEO will devote a significant amount of his or her time to discovering adjacent markets in which the company can exploit a natural and asymmetric competitive advantage. Leave managing 7% growth to the linear thinkers in the organization while the CEO focuses on recognizing supernormal opportunities. When business area mangers complain that the new digital transformation will cannibalize their market base, it takes the strength of a CEO to stand firm in the boardroom and seize the future.

ENDNOTES

[1]Heitner, Darren. "The Hyper Growth of Daily Fantasy Sports Is Going to Change Our Culture and Our Laws." *Forbes*, 16 September 2015.

[2]Roberts, Greta. "Stop Hiring Data Scientists If You're Not Ready for Data Science." Talent Analytics (blog), July 2015.

[3]A "strong center" is an expression of wholes that defines the business, making it distinct in the marketplace. It is an architectural design construct advanced by Christopher Alexander,

a civil architect, to describe the gestalt wholeness that emerges by harmonizing elements of a complex system. Strong centers are extensively covered in Alexander's four-volume work *The Nature of Order: An Essay on the Art of Building and the Nature of the Universe* (The Center for Environmental Structure, 2002).

[4]Zook, Chris, and James Allen. "Growth Outside the Core." *Harvard Business Review*, December 2003.

[5]White, Sarah K. "Study Reveals That Most Companies Are Failing at Big Data." *CIO*, 10 November 2015.

[6]"Seizing the Information Advantage." PricewaterhouseCoopers LLP and Iron Mountain, September 2015.

[7]Iansiti, Marco, and Karim R. Lakhani. "Digital Ubiquity: How Connections, Sensors, and Data Are Revolutionizing Business." *Harvard Business Review*, November 2014.

[8]Clough, Richard. "GE Sees Fourfold Rise in Sales From Industrial Internet." Bloomberg Business, 9 October 2014.

[9]"Fantasy Sports Participation Grows Dramatically; Hits New Milestone, Reaching Nearly 57 Million in US and Canada." Press release, Fantasy Sports Trade Association (FSTA), 23 June 2105.

[10]Goff, Brian. "The $70 Billion Fantasy Football Market." *Forbes*, 20 August 2013.

[11]FSTA (see 9).

Chris Burns is a Digital Business Strategist at Sphere of Influence, where he crosses multiple public and private sector verticals. Mr. Burns is an experienced IT technical advisor and an expert in leveraging advanced data science teams to deliver growth. He can be reached at cburns@sphereoi.com.

Thad Scheer is a Managing Partner at Sphere of Influence and oversees the digital business strategy portfolio. Mr. Scheer is a regular speaker and thought leader on topics ranging from software engineering to product design and technology strategy. He can be reached at tscheer@sphereoi.com.

Five Steps to Digital Transformation

by Steve Andriole

WHAT IS DIGITAL TRANSFORMATION?

Digital transformation (DT) is aspirational. Everyone wants to transform their business, and every business person who's alive knows that transformation now primarily depends upon leveraging the right digital technology at the right time on the right processes and business models at the right cost. Everywhere I go I hear about "amazing," "fabulous," "terrific," and "incredible" transformation projects underway, projects that will "disrupt" and "revolutionize" companies. When I ask transformation teams about specific projects, though, I often get blank stares. Sometimes it feels as if transformation projects are ordered (like burgers) by outsiders (like financial analysts who cover public company stocks) and not insiders, who are often threatened by change, especially major change. In my experience, the most "sincere" transformation initiatives are launched because of the perception and reality of external competitive threats — Blockbuster, Borders, and Research in Motion (RIM) demonstrate the necessity — not because someone wakes up in the morning and decides to "transform."

In the 1990s, we called all this "business process reengineering." Yet many of those reengineering initiatives failed spectacularly. Thus, digital transformation, like all major corporate initiatives, must be well planned and exquisitely executed.

Every consultant on the planet today has a suite of products and services that enable digital transformation. When well managed, consultants will help you save money and make money by leveraging digital technology. Some of them will also help anticipate the impact that emerging digital technology will have on your industry and your company. But only the really good ones can predict the future: clairvoyance is still an elusive competency.

So what *is* digital transformation?

Forbes contributor Jason Bloomberg talks about digital transformation ignorance in no uncertain terms:

Altimeter Group released their new report on *The 2014 State of Digital Transformation* by Brian Solis earlier this week. The central conclusion of the report, which is available for free download: "Only one-quarter of the companies we surveyed have a clear understanding of new and underperforming digital touchpoints, yet 88% of the same cohort reports that they are undergoing digital transformation efforts." In other words, the vast majority of people Altimeter interviewed for this report claimed they are undergoing Digital Transformation, even though most of them don't know what it is.[1]

For the record, and with the help of Wikipedia, let's think about digital transformation like this:

Digital transformation refers to the changes associated with the application of digital technology in all aspects of human society. Digital transformation may be thought as the third stage of embracing digital technologies: digital competence → digital literacy → digital transformation. The latter stage means that digital usages inherently enable new types of innovation and creativity in a particular domain, rather than simply enhance and support the traditional methods. Digital transformation affects both individual businesses and whole segments of the society, such as government, mass communications, art, medicine, or science.[2]

THE FIVE STEPS OUTLINED

With all this in mind, let me suggest five steps to successful corporate digital transformation. These have emerged from the DT efforts we've seen over the past few years *and* from the cumulative understanding of enterprise program management that has evolved over the past 50 years. Some of these steps are obvious, but some are not. Put another way, not every company can — or should — be digitally transformed. So before setting up an "Innovation Lab" or funding huge DT projects, do some homework. Remain aware, though, that you may or may not have the competence to actually transform business processes and models. You may also suffer from disinterest and disaffection. Digital transformation is not a software upgrade or an RFP to find a new supplier. It's a shock to what may be a

pretty functional system: digital transformation turns on the extent of functionality and dysfunctionality at your company. If things are going pretty well — defined crassly as employee wealth creation — then your chances of transforming anything meaningful are very low. You are much better positioned for digital transformation when the company's revenue and profits are falling.

Note also that the best practices described here do not begin with long lists of "cool" technologies that everyone's talking about. Obviously *digital* transformation assumes the optimization of digital technology, but before companies can cherry-pick technologies from pundit-proofed lists, they must fully understand what the technologies do, how they do what they do, and the degree of possible optimization-through-transformation — regardless of the transformation approach. In other words, transformation can occur by simply tweaking a simple process by eliminating some steps or adding some personnel, *or* it can be enabled through existing and emerging digital technology. While the focus here is clearly on digital transformation, note again that the steps I describe — especially Steps 1, 2, and 3 — can be leveraged toward any transformational effort. The fourth step is where technology is the most relevant to digital transformation. Figure 1 depicts the DT roadmap.

Step 1: Model and Simulate

In order to initiate any transformation process, it's necessary to formally model your business with tools — such as business process modeling (BPM) tools — that enable creative, empirical simulations. If you cannot model your existing business processes and your overall business model, you cannot transform your business. In order to map processes objectively, use external vertical industry consultants to model the processes and invite internal subject matter experts (SMEs) to participate in the development of transformation hypotheses. Run the hypothetical models over and over again, changing the variables to see which combinations are likely to produce transformational outcomes with the most impact.

The best practices here are complicated, which is why so many DT initiatives fail. BPM and simulation require subject matter expertise, discipline, tools, *and objectivity*, which is why external consultants are best suited to modeling and simulation. The models are the infrastructure upon which digital transformation is built. If the infrastructure is weak, the DT process will collapse.

Figure 1 — The DT roadmap.

BPM efforts are also expensive, time-consuming, and iterative, so don't expect overnight transformation results, or even a transformation plan, until all your business processes are identified, described, catalogued, and simulated. If the DT and senior management teams are unwilling or unable to accept the size and persistence of DT investments, the organization should not launch a DT initiative (see more on this in Step 5 below).

It's essential that powerful modeling tools be implemented. There are a variety of descriptive tools on the market, but DT initiatives need predictive and prescriptive capabilities. Make sure the modeling/simulation tools you deploy are current and powerful. They must be capable of modeling, simulation, and outcome analytics.[3] This means that processes should be empirically predictable. Alternative "transformed" processes should be simulated and analytically validated. When all is said and done, it should be possible for hypothetical, alternative, transformed processes to be modeled and simulated with empirically measurable outcomes.

Step 2: Identify High-Leverage Opportunities

Some of your processes are broken. You've known about them for years. The cost-benefit calculations around replacement, though, have always been challenging. So nothing has changed. But by engaging in a serious, formal BPM process followed by detailed simulations of alternative processes, there's an opportunity to identify — with empirical evidence — the processes likely to have greatest transformational impact. This should be the outcome of Step 2.

Identify these leverage points in your business models and processes. Do this by collecting empirical data

about the costs and benefits of the existing processes and models and performing what-if simulations of alternative improvements. You should also look at what your direct competitors are doing, as well as companies in adjacent industries. If simulation results fall short of measurable, meaningful transformation, stop testing. Not every company, process, or business model will benefit from transformation.

The outcome of this step in the transformation process is a list of high-leverage opportunities for transformational change. Since this list will be "political," use as many outsiders as possible to develop the list.

Step 3: Prioritize Transformation Targets

What is the transformation goal? Is it to save money, increase market share, increase profitability, retain employees, disrupt a company and industry, or … what? You must know where you're going to get there. You also need to reality-check your prioritized objectives according to budget, time, talent, and market constraints: use outside consultants who have no vested financial interests in their recommendations to screen transformation alternatives. Never rely on internal professionals to adopt or reject transformation options. Their recommendations will be influenced by too many vested human and financial interests. From the options list, identify and integrate specific transformation projects to be led by outsiders: insiders may sabotage transformation processes.

This step is complicated because it's the first one that addresses resource constraints. Some opportunities will not be pursued. Others will be placed on hold. The result of the exercise will be a short list of transformation targets, which should be pursued with all kinds of solutions in mind. Some of the solutions will rely heavily on digital technology, and some will rely upon other methods, tools, and approaches. That said, it's safe to

assume in 2015 that digital technology–driven transformation will likely have the most impact.

Step 4: Identify Digital Opportunities

This step begins with the identification of operational, strategic, and emerging digital technologies and the roles they play. All these technologies can transform business models and processes. Digital transformation turns on your awareness and understanding of these technologies. Table 1 presents the range of digital technologies that enable transformation.

Once you identify the range of available operational, strategic, and emerging technologies that might enable the prioritized transformation options, you should simulate the current and expected technology capabilities to the prioritized transformational functions. Enlist the smartest consultants you can find to describe future technology capabilities. Bet on a suite of transformational operational, strategic, and emerging technologies. Note demographic trends here as well as behavioral trends, especially with regard to customer journeys and buying processes. Note also the manufacturing, distribution, and service processes enabled by emerging technology and how integrated processes and technologies can be optimized.

Step 4 is the essence of what most professionals think digital transformation actually is, and most of them believe that digital transformation leverages *emerging* technologies (more than operational or strategic technologies), such as the ones that appear in Table 1.

The truth is that most of transformational leverage comes from operational and strategic technology rather than emerging technology. This is because many business models and processes are antiquated, as evidenced by the relative ease with which, for example, Uber and Airbnb cut directly into the taxi and hotel markets. Of

Operational Technology	Strategic Technology	Emerging Technology
Shared applications, such as accounting, budgeting, database management, and ERP	Applications that connect to customers, suppliers, and partners	Technologies that will improve and disrupt operational effectiveness
Shared services, such as networks, security, risk management, and email	Business unit (BU) applications that differentiate the BU in the marketplace	Technologies that will improve — and disrupt — business models and processes
Shared databases, such as customer, manufacturing, and supplier databases	Applications and databases that are BU- and vertical industry–specific	Emerging technologies like big data analytics, social media, and wearables
Shared "standard" devices, such as laptops, printers, and phones	Sourced or customized applications and databases with short expected lifespans	Emerging operational and strategic digital technology trends and optimal pilots

Table 1 — The range of digital technologies.

course, there are countless ways emerging technology can improve — and even disrupt — processes and even whole industries, but the real leverage lies with operational and strategic technology, especially when they are leveraged together.

Does this mean that there's no possibility for true "disruption"? No, it does not, but it does mean that true disruption almost never happens in established companies with consistent revenue streams. Instead, the technologies shown in Figure 2 are used by startups to disrupt well-established markets. The reasons for this trend are many, but suffice it to say that established companies are "established" because they've reached some level of revenue generation driven by relatively well-understood processes that together compose an ongoing business model. They are therefore unable or unwilling to disrupt anything. Startups, on the other hand, are completely unencumbered by revenue streams — usually because they have no revenue. Their mission is to invent, so they're much more likely to disrupt old processes and models or create whole new ones.

Step 5: Find Courageous Leaders

The search for courageous leaders could easily have been the first step in the DT process. One could argue that without courageous leadership, it makes no sense to take any steps at all. At the same time, the business case for digital transformation is generally what leaders need to see before they agree to support a serious transformation initiative. So the search for courageous leaders could certainly begin before, during, or after transformational program planning. I decided to make the search for courageous leaders Step 5, as the ultimate filter through which solid ideas should pass.

Courageous leaders are hard to find for all sorts of reasons. If an organization has taken Steps 1-4, we can assume there's a healthy appetite for change, but that change must be tested with widespread, public support for digital transformation *and* multiyear financial support. Without open leadership and big budgets, nothing will change. Leadership should also be demanding: if the ROI on transformation projects is negligible, the projects should be killed. If results achieve or exceed expected ROI, the projects should be accelerated.

I have already mentioned consultants several times. I've argued that they can help avoid some of the political landmines that surround corporate change. I've made the case that consultants can be more objective than employees worried more about their annual bonuses than their company's long-term survival. But can consultants lead DT projects and whole programs? Absolutely.
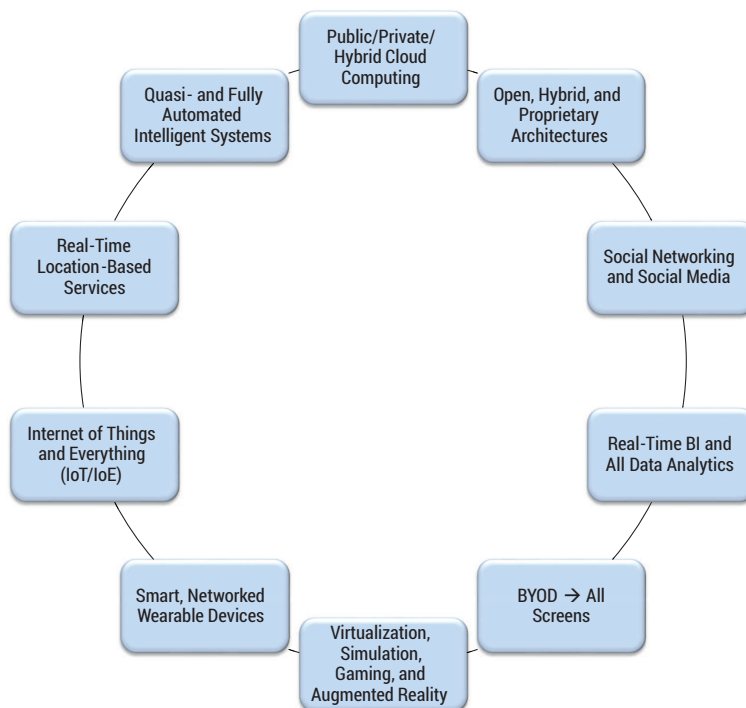

Figure 2 — Emerging technologies for digital transformation.

In fact, DT consultants can define and manage all sorts of DT projects and programs. Just make sure they have deep subject matter expertise and no vested financial interest in the outcomes.

GRANDIOSE TRANSFORMATION

The number of corporate executives, especially in public companies, who really want to transform their companies is relatively small. The major exception to this rule is the strong correlation between the desire (D) for transformation and falling revenue and profits (FP), or $D + FP = DT$.

This means, for example, that IBM's *younger* management team should be screaming for transformation.[4] Why younger management? Because older executives have already made their money at IBM (and elsewhere) and therefore have no financial incentive to change anything, let alone completely upset the rhythm to which they've become accustomed, the same rhythm that made them rich. The younger ones, however, have a choice: transform or leave.

When younger executives see revenue and profit falling, they seek change. But what kind of change? The idea that even early-stage — let alone late-stage — companies can dramatically transform their processes, people, and overall business model is insane — unless, again, there's a financial gun to their head. The whole idea of disruption is an external abstraction: how many companies have we seen that have, without duress, successfully transformed their business model? Change is expensive, time-consuming, and inexact. It's also a political target: in spite of what best-selling business books and pundits-speaking-for-huge-lunchtime-fees tell us, most human beings despise change, which means that transformation is by definition constrained.

This is all another way of saying that prospects for grandiose transformation are small — especially when financial times are good. In fact, when financial times are good, prospects for grandiose transformation are nonexistent. Of course, one could argue that it's precisely when things are going well that DT programs should be launched. After all, there's time and money galore. Yet when the competitive skies are blue and the vacations are to die for, there are generally no takers. As I noted above, the most grandiose disruptive digital transformation will likely come from startups. Grandiose *corporate* transformation is as unlikely as grandiose *industry* transformation is likely.

CONCLUSION

Some of you will see the five steps discussed here as obvious. Some will see them as necessary but not sufficient for DT success. The essence of success, at least in my view, is organization, structure, and measurement. There's also that nagging requirement to disrupt everything all the time. If only Blockbuster had become Netflix and Borders had become Amazon. If only. But these are anomalies.

Digital transformation, as I suggested above, is slow and iterative: industries do not transform themselves overnight. Facebook, for example, was founded in 2004, Airbnb was founded in 2008, and Uber was founded in 2009. (Industries are seldom transformed by established market leaders either.)

The above five-step process is best implemented by companies looking to transform internal processes, not disrupt their companies or entire industries. Step 4 of the process is the key to digital *process* transformation. It, along with Step 1, is also the key to *industry* disruption by entrepreneurs.

The five-step process will help a lot, but remember the importance of Steps 1 and 5. Step 1 is about discovery, and Step 5 is about support. Without taking both of those steps successfully, you will never have the opportunity to determine what digital technologies might actually transform your business processes or models.

ENDNOTES

[1]Bloomberg, Jason. "Digital Transformation by Any Other Name?" *Forbes*, 31 July 2014.

[2]"Digital transformation" (Wikipedia).

[3]Cauberg, Katharina, and William Thomas. "BPM and Simulation: A White Paper." Signavio, Inc., November 2013 (www.signavio.com/resources/white-paper/bpm-and-simulation). See also: "10+ Free Open Source BPM Platforms," Butler Analytics, 2 December 2014 (http://butleranalytics.com/10-free-open-source-bpm-platforms); and "Top Business Process Management Software Products," Capterra (www.capterra.com/business-process-management-software).

[4]Andriole, Steve. "IBM's Makeover: A Buy-or-Die Strategy for Big Blue." *Forbes*, 3 August 2015.

Steve Andriole is a Fellow with the Cutter Consortium and the Thomas G. Labrecque Professor of Business Technology in the Villanova School of Business at Villanova University. His most recent book is Ready Technology: Fast-Tracking New Business Technologies. *He can be reached at sandriole@cutter.com.*

Transforming Government for the Digital Era:
A Simple Rules Strategy
by Lieselot Danneels and Stijn Viaene

In a recently published article,[1] we analyze the digital transformation of VDAB, the public employment service for the Flemish region in Belgium. Collaborating closely with the agency, we created a digital strategy for VDAB using a novel method called Action Design Research. In this article, we present VDAB's approach to digital transformation, together with its digital strategy, the "boundary-breaking rules." Coining these rules was an important first step in VDAB's digital transformation, as they show the "boundary-breakingly" different ways in which VDAB will have to work.

EVOLUTION FROM NEW PUBLIC MANAGEMENT TO DIGITAL-ERA GOVERNANCE

As in the private sector, public sector actors are raising questions related to digital transformation:

- What does "digital-era" government look like?

- How fundamentally different is this digital government organization? What should a digital strategy look like in this context?

Many government agencies used to apply a management paradigm known as New Public Management (NPM). According to NPM, the public sector should borrow private sector concepts such as competition, performance measures, and a focus on efficiency. Unfortunately, NPM has not realized its promises. London School of Economics professor Patrick Dunleavy and his coauthors[2] have shown that it has led to greater complexity in dealing with several fragmented agencies, resulting in lower service quality. Furthermore, its internal focus limited government agencies to producing only incremental innovations. Dunleavy and his colleagues therefore propose a shift toward Digital-Era Governance (DEG).[3]

DEG rests on three pillars:

1. Reintegration of the siloed agencies created by NPM

2. Reorganization based on the needs of the citizen

3. Digitization of the way government and society interact

Moving from NPM to DEG constitutes a digital transformation. This move not only implies an IT-intensive change, it also requires new business models that can cope with DEG's three pillars.

CHALLENGES AND OPPORTUNITIES AT VDAB

VDAB is an autonomous agency that was founded in 1989 and offers employment services, training, and career guidance to society at large. As a public sector organization, VDAB is publicly funded, and its policy priorities are determined by government ministers. It is still accountable to the Flemish government, and every five years, VDAB's missions, objectives, and resources are defined in a management agreement. The agreement of 2011-2015 encourages the development of innovative services, using new technologies to promote individuals' self-reliance and self-management (see Table 1). It foresees an extension of VDAB's target audience and its value proposition. In the past, VDAB only addressed unemployed citizens and job seekers. In its new role, VDAB also wants to serve working citizens, employers, and labor market actors. VDAB wants to expand its value proposition and complement services related to job security with all kinds of labor market services. The new management agreement also clearly states that VDAB's service delivery has to become proactive, flexible, multichannel, 24/7, and self-reliant.[4]

Fons Leroy, CEO of VDAB, explained the fundamental change of mindset needed to realize this new role:

> In the past, we could afford to stay put behind our desks. People depended on us, which put us in a dominant position. Things change dramatically if you aspire to facilitate people's careers. All of a sudden, the individual is in the driver's seat. So far, most of our efforts have been focused on the supply side of the labor market, providing training and job placement for job seekers. The role of conductor requires expertise and credibility in both the supply and

	Old VDAB Role	New VDAB Role
Target audience	Unemployed citizens and job seekers	Unemployed citizens and job seekers Working citizens Employers Labor market actors
Geography	Regional (Flanders)	Regional + inter-regional
Value proposition	Job security	Labor market services
Service delivery	Reactive Rigid In office only Regular business hours Handholding	Proactive Flexible Multichannel 24/7 Self-service, -reliance, -management

Table 1 — VDAB's challenge. (Source: Viaene & Broeckx.)

demand side. It's only recently that we've started to actively involve employers in our processes and activities.[5]

To adapt to these changes, VDAB started a program that will consist of a number of projects to develop a digital platform composed of several new services. In a first project, "Vick," VDAB aims to fulfill its new role by developing services for a segment it hasn't targeted before. Project Vick targets young people, who are very receptive to digital innovation, from two years before they enter the labor market until one year after.

> **The digital era is so new that it is perhaps easier to experiment with what digital could mean by using an agile strategy to grasp opportunities as they pass along.**

For the organization of this project, VDAB was inspired by Harvard Business School professor Clayton Christensen's theory of disruptive innovation.[6] Christensen recommends separating disruptive innovation from the existing organization. He also stresses the need for CEO or other senior manager support. To these ends, VDAB set up an independent lab with its own planning and budgeting processes and put it under the direct supervision of the CIO and CEO. The lab's team was given the mandate to create their own way of working and to experiment with what would work best.

WHICH STRATEGY TO USE?

This research was driven by VDAB's need for a better understanding of "how it must act differently." In other words, VDAB was looking for a digital business strategy. Strategy professors Christopher Bingham, Kathleen Eisenhardt, and Nathan Furr distinguish between three different types of strategies (see Table 2):[7]

1. Position strategy

2. Leverage strategy

3. Opportunity strategy

Choosing which strategy to use depends on the environment in which you operate and the duration of the competitive advantage you seek. The choice of strategy also has an impact on the relationships among resources and the challenges that lie ahead.

In a digital context, organizations can choose to leverage the assets they already have in a digital way. However, VDAB purposely chose to apply an opportunity strategy. The digital era is so new, both to the public and the private sector, that it is perhaps easier to experiment with what digital could mean by using an agile strategy to grasp opportunities as they pass along. As noted above, VDAB applied this opportunity strategy in a lab context, separated from the existing organization. This approach allows personnel to unlearn the ways of working and thinking in the existing organization, which is necessary for accommodating disruptive innovation.

THE RESEARCH METHOD: ACTION DESIGN RESEARCH

The method we applied to design VDAB's boundary-breaking rules, Action Design Research (ADR), was developed by Maung Sein, professor of information systems at the University of Agder, Norway.[8] ADR allowed us to simultaneously build the boundary-breaking rules in an organizational context and learn from the way in which they were built for other contexts as well.

	Position Strategy	Leverage Strategy	Opportunity Strategy
	Build mutually reinforcing resource systems with many resources in an attractive strategic position and deepen their links	*Build strategically important resources for current markets and leverage them into attractive new products and markets*	*Pick a few strategic processes with deep and swift flows of opportunities and learn simple rules to capture opportunities*
Environment	Slowly changing, well-structured markets	Moderately changing, well-structured markets	Rapidly changing, ambiguous markets
Duration of advantage	Sustained	Sustained	Unpredictable
Impact on organizing	Tightly link all resources, consistent with the positioning strategy	Complicated, routine organizational processes	Simple or semistructured organizational processes and simple rules that guide the capturing of opportunities
Challenge	Change in the environment	Insufficient individual and organizational ability to build new core resources or abandon old ones	Maintaining an optimal level of structure in the organization

Table 2 — "Which strategy when?" (Adapted from Bingham, Eisenhardt and Furr.)

ADR consists of four stages, in which practitioners and researchers strongly collaborate:

1. **Problem formulation.** During the problem formulation stage, a problem that practitioners encounter is informed by theories the researchers identify.

2. **Building, intervention, and evaluation.** Together, the practitioners and researchers design an artifact to address the problem formulated in the previous stage. Typically this is an IT artifact, such as a program or a tool, but it can also be a method, such as a process or strategy. This artifact is immediately put to use in the organization as it's being designed, and the researchers and practitioners further adapt it to better fit the context during an iterative design process.

3. **Reflection and learning.** In parallel with the previous two stages, the researchers reflect and learn from the situated problem and apply their learning to a general class of problems.

4. **Formalization of learning.** In the last stage, the researchers articulate general design principles.

ADR APPLIED TO VDAB

Problem Formulation

As we mentioned earlier, the research on which we report in this article was driven by VDAB's need to better understand "how it must act differently." To help VDAB formulate its digital strategy, we worked with them to develop the boundary-breaking rules (i.e., the artifact) by providing recommendations from the DEG, strategy, and innovation literature.

Building, Intervention, and Evaluation

Together with the strategic steering committee overseeing Project Vick, we designed a first version of the boundary-breaking rules. These were immediately used in the steering committee for overseeing the project work. In the steering committee meetings, the boundary-breaking rules themselves were evaluated as well. Did they truly represent the fundamental tradeoffs to be made in the project? The rules were revised several times; for example, the term "boundary-breaking rules" itself was introduced to emphasize the fundamental departure from the past.

Reflection and Learning

By designing the boundary-breaking rules in an iterative way, new requirements resulted in important revisions.

Formalization of Learning

In this last stage, general design principles were formulated such that the research can be applied and generalized to other contexts.

> **Simple rules help the organization to adapt quickly while safeguarding the most profound strategic choices.**

THE ARTIFACT: THE BOUNDARY-BREAKING RULES

VDAB's digital strategy is expressed as a strategy of simple rules. Simple rules are concise statements of how an organization believes it should reach its strategic objectives. They are not broad, vague, mindless, or stale. Simple rules help the organization to adapt quickly while safeguarding the most profound strategic choices. VDAB's boundary-breaking rules are:

- **From "digital support" to "digital first."** VDAB has to be able to deliver personalized services in a flexible and proactive manner. This means that digital needs to become the reference point for new service concepts instead of an afterthought or a support function.

- **From service provision strategy to ecosystem strategy.** Instead of providing services in a closed supplier-customer business model, VDAB aspires to become a labor market orchestrator or keystone in an open ecosystem. This represents a huge shift in strategic focus and value proposition. Most importantly, VDAB will have to learn how to delegate service provision to ecosystem partners and will have to make sure that these ecosystem partners can thrive.

- **From offering services to coordinating dynamic service journeys.** VDAB's new role implies a shift from providing job security to unemployed candidates to providing and enabling support for a wide variety of labor market services to parties on both the demand and the supply side all along the career lifecycle. Employer servicing and partnerships have to be included. From the customer's point of view, the focus on job security is extended to career security.

- **From "have to" to "want to" partner involvement.** Broadening VDAB's target audience (from unemployed citizens and job seekers to working citizens, employers, and labor market actors who do not necessarily need to work with VDAB) means that the agency needs to develop a business model rooted in "want to" rather than "have to" engagement by external ecosystem parties.

- **From plan-driven to agile projects.** VDAB decided to enter a new space of serving and supporting a labor market defined by a heterogeneity of parties; unknown, diverse, and evolving customer needs; and novel, continuously evolving digital technologies. Projects and programs operating in such a dynamic, complex environment need to adopt an agile way of managing project work.

- **From "ad hoc" initiatives to developing organizational capabilities.** Instead of focusing only on the delivery of separate digital innovation projects, VDAB wants to develop organizational capabilities to support all previous boundary-breaking principles, step by step, and project by project. Developing this set of organizational capabilities demands a commitment to learn across initiatives.

These boundary-breaking rules provided an awareness of how different VDAB's new role is. The rules were not only actively discussed at critical evaluation moments, but also guided the agenda of topics to be discussed in steering committee meetings. In sum, they helped drive the sought-for transformation.

GUIDELINES FOR DIY RULE MAKING

For contexts where these rules are not immediately applicable, we also share some guidelines for developing your own strategy of simple rules:

- Make the rules specific, differentiating, and future-oriented by linking to both an agreed-upon view of the future and the current state of affairs, with the difference between the two representing a fundamental shift.

- Make the simple rules transparent by employing familiar wording and using colors for easy reference.

- Make the simple rules actionable by tracking project progress ("how different are we really?") according to how well the simple rules are applied. This includes assessing whether the way of working is closer to the agreed-upon view of the future or the current state of affairs, as explained in the first guideline.

CONCLUSION

In this article, we focused on the digital strategy associated with VDAB's digital transformation rather than on the digital technologies used or the products developed. In so doing, we hoped to show that digital transformation comes with many organizational implications. For VDAB, crafting the boundary-breaking rules helped agency personnel realize how they must act differently. Although the boundary-breaking rules were developed by and for VDAB, we believe that these rules could be inspiring in other contexts as well. Other government agencies, or even other private organizations, might be struggling with the same issues in aiming for digital transformation. The boundary-breaking rules assist in identifying areas that will need to change for transformation to succeed. Finally, the guidelines provided above can help organizations develop their own strategy of simple rules.

ENDNOTES

[1]Danneels, Lieselot, and Stijn Viaene. "Simple Rules Strategy to Transform Government: An ADR Approach." *Government Information Quarterly*, Vol. 32, No. 4, October 2015.

[2]Dunleavy, Patrick, et al. "New Public Management Is Dead — Long Live Digital-Era Governance." *Journal of Public Administration Research and Theory*, Vol. 16, No. 3, July 2006.

[3]Dunleavy et al. (see 2).

[4]For a broader overview of VDAB's context and how it uses IT to enable business model innovation, see: Viaene, Stijn, and Saskia Broeckx. "How IT Enables Business Model Innovation at the VDAB." *Journal of Information Technology Teaching Cases*, Vol. 3, No. 2, December 2013.

[5]Viaene and Broeckx (see 4).

[6]Christensen, Clayton M. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Harvard Business School Press, 1997.

[7]Bingham, Christopher B., Kathleen M. Eisenhardt, and Nathan R. Furr. "Which Strategy When?" *MIT Sloan Management Review*, Fall 2011.

[8]Sein, Maung K., et al. "Action Design Research." *MIS Quarterly*, Vol. 35, No. 1, March 2011.

Lieselot Danneels is a PhD candidate at Vlerick Business School and KU Leuven. She is passionate about digital business innovation and organizational transformation. Ms. Danneels is a researcher for Professor Stijn Viaene, working for the VDAB Chair of Digital Business Innovation of Public Services. Previously, she worked as a systems and process analyst at PwC. She can be reached at lieselot.danneels@kuleuven.be.

Stijn Viaene is a Fellow with Cutter Consortium's Business Technology & Digital Transformation Strategies practice. He is a Full Professor at Vlerick Business School, Belgium, where he heads the Information Systems Management Cluster. At Vlerick, Mr. Viaene is cofounder of the Centres for Excellence in Business Process Management and Enterprise Architecture Management. He is also a Professor in the Decision Sciences and Information Management Department at KU Leuven, Belgium, where he holds the VDAB Chair of Digital Business Innovation of Public Services. Mr. Viaene conducts research on digital business innovation, IT strategy and governance, and business process management. He can be reached at sviaene@cutter.com.

Breaking Waves: Wearables and the Future of Digitization

by Rob Gleasure and Jeremy Hayes

THE MARCH OF DIGITIZATION

In 1960, J.C.R. Licklider wrote a paper entitled "Man-Computer Symbiosis."[1] In that paper, he detailed his vision for a world in which humans handed over mundane, routinizable behaviors to computers, thus allowing these humans to focus more on the delivery of insights, creative thinking, and strategic decision making.

Licklider's predictions have proven partly true. Increased datafication and digitization have allowed humans to routinize and automate many supporting tasks that would otherwise have consumed significant human capital. Yet what Licklider underestimated (or at least underdiscussed), was the cumulative and generative aspect of this symbiosis. A digitized world is not merely one in which selected activities are isolated and surgically removed into neat layers of supporting technological strata. Rather, technology is woven into the fabric of day-to-day life, intersecting different behaviors, practices, and social relationships at different points. This creates new linkages between these behaviors, practices, and social relationships, leading to new capabilities that actively influence the types of decisions human beings are required to make. These new decisions gradually form new patterns of behavior, feeding

Figure 1 — Migration of capabilities between physical and digital settings.

forward into a continuous cycle as practices, social relationships, and technologies form an intractable Gordian knot, often referred to as "sociomaterial" systems.[2, 3]

This idea that technology and human action become cumulatively and generatively entangled is not really controversial to contemporary thinking. Most people can look a back at a string of initiatives that sought to introduce new IT systems and appreciate the co-evolutionary nature of what occurred. Things happened that weren't anticipated; things didn't happen that were. However, where many organizations are less cognizant is in appreciating that digitization is not the story of the recent past, but rather the immediate future.[4] Further, this digitization is taking place on two fronts (see Figure 1).

First of all, there is a migration of analog activities to online contexts, including customer-facing activities such as sales and marketing, partner-facing activities such as the acquisition of infrastructural resources, and inward-facing activities such as administration and HR. In some cases, the assumption among organizations and established businesses is that despite their new setting, these activities remain qualitatively the same. Such an assumption, however, fails to recognize the generative power of digital technologies and the snowballing and unpredictable set of new possibilities they present. Digital customer engagement, for example, has blurred organizational boundaries, giving rise to practices such as open innovation, social question-and-answer sites, and crowdfunding. More recently, the influx of wearable technologies and smart devices has set in motion a migration of digital activities into the analog space. These devices bring new capabilities, some of which are incremental extensions of existing systems, others of which are radically and profoundly new.
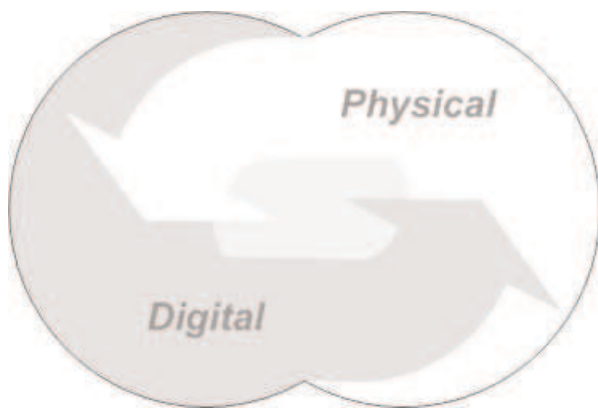
THREE WAVES OF WEARABLES

When we talk about wearables, most of us have one or two specific devices in mind that we use to add tangibility to our thinking. Yet the examples that occur to us

most readily are typically those that require the least effort, rather than those that lend themselves to thorough consideration.[5] This means that, for many organizations, discussion of wearables is centered upon those devices that have reached critical mass in mainstream markets (e.g., smartphones, smartwatches, fitness trackers). These devices represent a *digitization and mobilization of existing capabilities*. Emails and documents can be accessed continuously, meetings and planning can be coordinated on the fly, and notifications can be received both instantly and discreetly. These devices also possess some novel capabilities, such as measuring heart rate and steps walked. However, little evidence exists that these capabilities are being assimilated into organizational practices (personal health and fitness applications being the exception). We argue these devices can therefore be considered part of the first wave of wearables, wherein the novelty of capabilities they possess is incremental, and uncertainty around their impact is low (see Figure 2).

The second wave of wearables presents a set of *capabilities that are new to the physical world but not the digital one*. Most notably, this includes virtual reality (VR) and augmented reality (AR) technologies that allow digital content to perceptually superimpose itself on the physical world. The ability to layer content such as text, multimedia, and hypermedia on displays is a fundamental feature of the Web. However, augmented reality means this content could be layered onto an individual's interaction with the outside world, potentially allowing digital information to penetrate into every waking moment

of that person's life. Further, with AR technologies, users do not have to proactively search for this information or disengage from the physical world.

Equally important is virtual reality, which allows individuals to use consumer-ready headsets such as the Samsung Gear VR to enter a fully immersive virtual space at a moment's notice. Research on virtual worlds has demonstrated the power of such spaces in terms of shaping relationships between individuals, not to mention those individuals' sense of self and identity.[6, 7] At the very least, the immersive nature of virtual reality promises to disrupt the traditional concept of distributed or "virtual" teams.[8] More likely, VR environments will become the setting for an increasing array of both intra- and inter-organizational interactions.

The third wave of wearables is the most radical, offering *capabilities that are completely new to mainstream business practices and consumer markets*. Examples of this can be found in consumer-facing electroencephalography (EEG) headsets (e.g., Emotiv's EPOC+, Neurosky's Myndplay) and eye-tracking technologies (e.g., Tobii's EyeX, SMI's Eye Tracking Glasses 2). These technologies capture unspoken — even involuntary — information to which digital systems can respond. The mainstream application areas of these technologies remain relatively niche, having been developed mostly for special cases of people with injuries or disabilities. More recently, though, there have been proposed applications in the video game industry[9] and even for EEG controls to pilot drones.[10] As with many radically new technologies, the
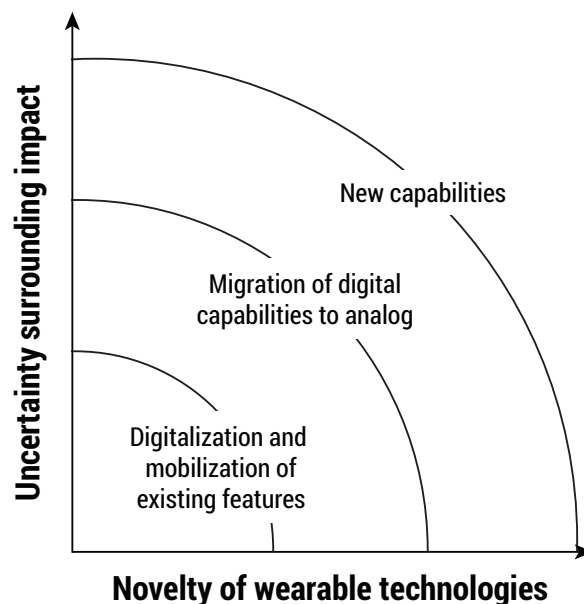

Figure 2 — Three waves of wearables.

broader business implications of these capabilities are not yet clear. What is clear, however, is that the digital world is not only set to become more embedded in our social lives, it is actually on course to integrate itself into our underlying psychophysiology — a powerful and challenging idea.

The sheer disruptive power of these increasingly radical wearable technologies means that predicting their exact impact is difficult, if not impossible. So what to do?

> **Companies like Facebook, Airbnb, and Uber have already demonstrated that legal frameworks are not always equipped to cope with some business model innovations, potentially creating scope for abusive practices.**

LEARNING FROM EARLY MARKET FEEDBACK

While the each wave of wearables has achieved different levels of market penetration, several products have demonstrated significant early promise. These products identify a number of issues and opportunities that are likely to become more prominent as the space matures.

One interesting product that has made use of first-wave features (digitization and mobilization of existing capabilities) is the Humanyze Sociometric badge, a discreet wearable designed to monitor employee behavior with a view to increasing productivity. The badge contains Bluetooth, an accelerometer, and a microphone, and it can measure movement, interaction with other employees, and tone of voice. The idea of analyzing employees' movement to increase their level of interaction is not new. In the late 1970s, Thomas Allen's seminal work at MIT on organizational connectedness measured the physical distance between engineers (using simple tools like a measuring tape) and their interactions. The resultant "Allen Curves" showed a strong negative correlation between increased physical distance between engineers and frequency of communication. However, Humanyze's digitization of this principle creates opportunities of scale that did not previously exist. The company notes that clients in industries such as banking, healthcare, and education have used the smart badge to become more data-driven and increase productivity, as well as to discover areas for implementing new formal and informal innovation management techniques.

Early success has also raised some challenges for the Sociometric badge, particularly as regards to employee privacy. Humanyze works on an opt-in system, where employees have to give permission to have their movement and interactions recorded. So far, the opt-in rates are high (with as many as 90% of staff in some organizations willing to wear the badge), but it does raise the question as to what sanctions might exist for a conscientious objector. Companies like Facebook, Airbnb, and Uber have already demonstrated that legal frameworks are not always equipped to cope with some business model innovations, potentially creating scope for abusive practices.

In terms of second-wave features (the migration of digital capabilities to analog contexts), the most obvious example has been Google Glass, which was released with considerable fanfare to developers in early 2013. Having underperformed in mainstream consumer markets, Google Glass has made a pivot in recent months toward being an enterprise product. One example of this is the introduction of a more durable, foldable headset for use on factory floors, such that digital information can be superimposed on employees' view of specific machines and production processes. Indeed, there have been interesting use cases for Google Glass to improve healthcare training and in financial services to provide traders with a continuous stream of up-to-date information.

As with the Sociometric badge, the challenges facing Google Glass relate (at least partly) to privacy. The ability to film other people surreptitiously in public places meant many restaurants, cafes, casinos, and movie theatres went so far as to ban customers from using Google Glass in their premises (though this may have been as much about grabbing headlines as privacy concerns, given the fact that the product was not available in widespread release). What makes these complaints interesting is they are also more or less applicable to commonly accepted devices such as smartphones. Whitney Erin Boesel of Harvard University's Berkman Center for Internet & Society argues that much of the negative reaction to Google Glass is due to foregrounding, which is "when a new technology makes some preexisting aspect of society more visible and, in so doing, is mistaken for having caused the phenomenon in question rather than having brought it to increased attention."[11] Thus, objections to Google Glass can be interpreted as a spillover of frustration with an increasing digitally fueled lack of anonymity.

Finally, the most mature application of wearable devices with third-wave features (capabilities that are completely new to mainstream business practices and consumer markets) can arguably be found in marketing and usability research. For example, companies such as SimpleUsability use technologies like EEG, eye tracking, and galvanic skin response to gauge consumers' responses to new products, particularly users' excitement, engagement, and frustration. Similarly, Noldus offers emotion-recognition software that determines how positively or negatively different user groups respond to different offerings. These products work because individuals are often unaware of or disinclined to acknowledge the influence of subtle emotional cues or affective biases, suggesting they are unable to report them via dialogue alone.[12, 13] This implies that without these technologies, any attempts to open this black box of human decision making are heavily dependent on guesswork and abstract theorizing.

Given the lack of consumer-market penetration for third-wave devices, it is difficult to determine in advance the challenges they will face (other than affordability and reliability, which can be assumed to improve in coming years). Yet there is reason to believe that privacy-related concerns may be most powerful for this wave of devices. The fact that individuals can't (or won't) self-report the types of emotional or affective processes being studied means they are being engaged on a level over which they have little or no discretionary control. If a website knows its users' emotional states better than those users themselves, it is free to interact with them on a level that bypasses their conscious filtering. Similar controversies were encountered when subliminal images in advertising were discovered several decades back.[14] The sophistication of the third wave of wearables is likely to bring these issues once again keenly into focus.

THE ILLUSORY POWER OF THE HIGH GROUND

In the history of northwest Europe, stories of Irish and Scottish rebellion against English rule are common. However, one of the most fascinating (though less well-known) rebellions was undertaken by a Welsh force, specifically that of Owain Glyndwr. Following a series of strikingly successful military campaigns against Henry IV in Wales, Glyndwr advanced into Worcester in the English midlands, then proceeded to set up a seemingly impenetrable defensive position on a 900-foot-high hill (consistent with his reputation as an excellent defensive strategist). Glyndwr then waited

for Henry's army to attack. It did not, choosing instead to wait for Glyndwr's army to run out of resources, at which point Glyndwr had no choice but to retreat back to Wales, effectively ending the rebellion.

What makes the story of Glyndwr's rebellion so compelling is the paradox between the strategic brilliance of his campaign in Wales and the strategic naiveté of his subsequent advance into England. With the benefit of hindsight, it appears that he made two fundamental mistakes. First, he assumed he could replicate a strategy that was successful in his homeland in another location where the conditions were fundamentally different. Enemy forces were under pressure to engage him in Wales, so he could build a strategy based on the ability to counterattack. This was not the case in England, meaning that he appropriated a new (and strategically fatal) vulnerability. Second, his invasion into England separated the aggressive, expansive part of his army from the rest of the country, effectively creating a resource-hungry island in a foreign land.

> **If organizations are to retain some central position in emerging markets, they should devise strategies for all three waves of wearables and consider how each type might provide competitive advantage.**

The uncertain nature of wearables (particularly second- and third-wave technologies) makes it easy for organizations to fall prey to each of these mistakes, even those seeking to be proactive toward them. The temptation is to create working groups and pilot projects with the autonomy to explore new capabilities and bring the power and infrastructure of an established organization to bear in emerging markets. Yet this only works if the landscape stays fundamentally unchanged and there are forces that demand emerging markets engage with those groups and pilots. Each wave of wearables makes these conditions unlikely, as both analog and digital contexts are presented with capabilities that did not previously exist there (or anywhere, in the case of the third wave). This suggests that if organizations are to retain some central position in emerging markets, they should devise strategies for all three waves of wearables and consider how each type might provide competitive advantage. Which brings us to the interesting question: how?

STRATEGIZING ON A WAVE-BY-WAVE BASIS

When organizations are developing their strategies, they should take into account the distinction between *improvement* (applying new solutions to existing problems), *exaptation* (applying existing solutions to new problems), and *invention* (applying new solutions to new problems).[15] We propose that each of these approaches can be loosely mapped to the three waves of wearables.

First-wave successes appear to result from a strategy of *improvement*, whereby long-standing problems can be addressed more efficiently through digitization (e.g., sharing information, documenting collaboration, and coordinating resources). Therefore, if organizations are to identify opportunities for first-wave wearables, they should *analyze areas where a lack of visibility or connectivity is inhibiting new practices*. This visibility or connectivity can often be introduced with comparatively low-cost devices, such as smartwatches and RFID- or Bluetooth-equipped wearables, thus achieving near-term benefits with minimal investment.

Second-wave successes appear to result from *exaptation*, whereby useful existing practices from digital contexts are brought into conventional environments, such as the ability to display peripheral panels of information or create local discussion among remote participants. These capabilities require a different outlook that, rather than seeking out obviously problematic analog practices to digitize, demands that organizations *identify digital practices that outperform comparable analog practices in some way*. Once these practices are identified, organizations may consider whether elements of the digital practice can be emulated using virtual or augmented reality, for example.

Third-wave successes appear to result from *invention*, whereby previously intractable problems are reconsidered in light of new capabilities. This includes a range of unconscious behaviors, such as attentional biases, involuntary emotional responses, and subconscious decision making. The third wave of wearables makes it increasingly possible to capture and respond to such behaviors, based on accessible psychophysiological signals. This means that organizations that wish to explore the long-term possibilities of such devices should *identify unconscious activities that could be improved or integrated more mindfully into system design*.

All three waves of wearables present significant concerns with regard to privacy. This is not surprising; digitization often threatens privacy by creating the potential for a "panopticon" in which individuals feel under constant surveillance.[16] Such concerns are likely to become more relevant than ever before, as second- and third-wave technologies raise the issues of foregrounding and subliminal interaction. Further, the merging of digital and analog spaces suggests that individuals' ability to maintain separate identities in each space may decrease. Preempting these issues is difficult. However, there is evidence that privacy concerns are less of a deterrent when sensitive data is used to improve a product, service, or practice, as opposed to when such data is shared with third parties or used to create targeted marketing.[17] For this reason, we recommend that organizations wishing to introduce new wearable technologies focus on improving the user experience and avoid exporting or sharing data externally.

CONCLUSION

Wearables are coming, and their impact will fundamentally change the business landscape. Organizations need to get in front of this change by proactively engaging with the three waves of wearables. Strategies based on mitigating the arrival of these new technologies, rather than leveraging them, are doomed to failure.

ENDNOTES

[1]Licklider, J.C.R. "Man-Computer Symbiosis." *IRE Transactions on Human Factors in Electronics*, Vol. 1, March 1960.

[2]Orlikowski, Wanda J. "Sociomaterial Practices: Exploring Technology at Work." *Organization Studies*, Vol. 28, No. 9, September 2007.

[3]Ambrose, Grace J., Paul Ambrose, and John D. Chenoweth. "Entangle the Wearables: A Sociomateriality Approach to Design." *Cutter IT Journal*, Vol. 28, No. 9, 2015.

[4]Kane, Gerald C., Doug Palmer, Anh Nguyen Phillips, and David Kiron. "Is Your Business Ready for a Digital Future?" *MIT Sloan Management Review*, Vol. 56, No. 4, Summer 2015.

[5]Kahneman, Daniel. *Thinking, Fast and Slow*. Farrar, Straus and Giroux, 2011.

[6]Bainbridge, William Sims. "The Scientific Research Potential of Virtual Worlds." *Science*, Vol. 317, No. 5837, July 2007.

[7]Cahalane, Michael, Patrick Finnegan, and Joseph Feller. "Collaborative Development in the Virtual World: Discourse, Digital Artefacts and the Construction of Intersubjective Meaning." *ECIS 2011 Proceedings*. Association for Information Systems, 2011.

[8]Townsend, Anthony M., Samuel M. DeMarie, and Anthony R. Hendrickson. "Virtual Teams: Technology and the Workplace of the Future." *The Academy of Management Executive*, Vol. 12, No. 3, August 1998.

[9]Liao, Lun-De, et al. "Gaming Control Using a Wearable and Wireless EEG-Based Brain-Computer Interface Device with Novel Dry Foam-Based Sensors." *Journal of NeuroEngineering and Rehabilitation*, Vol. 9, No. 5, January 2012.

[10]Kosmyna, Nataliya, Franck Tarpin-Bernard, and Bertrand Rivet. "Towards Brain Computer Interfaces for Recreational Activities: Piloting a Drone." In *Human-Computer Interaction–INTERACT 2015*, Part 1, LNCS 9296, edited by Julio Abascal, et al. Springer, 2015.

[11]Boesel, Whitney Erin. "Google Glass Doesn't Have a Privacy Problem. You Do." *Time*, 19 May 2014.

[12]Loos, Peter, et al. "NeuroIS: Neuroscientific Approaches in the Investigation and Development of Information Systems." *Business & Information Systems Engineering*, Vol. 2, No. 6, December 2010.

[13]Astor, Philipp, et al. "Integrating Biosignals into Information Systems: A NeuroIS Tool for Improving Emotion Regulation." *Journal of Management Information Systems*, Vol. 30, No. 3, Winter 2013.

[14]Dixon, Norman F. *Subliminal Perception: The Nature of a Controversy*. McGraw-Hill, 1971.

[15]Gregor, Shirley, and Alan R. Hevner. "The Front End of Innovation: Perspectives on Creativity, Knowledge and Design." In *New Horizons in Design Science: Broadening the Research Agenda*, LNCS 9073, edited by Brian Donnellan, et al. Springer, 2015.

[16]Whitaker, Reg. *The End of Privacy: How Total Surveillance Is Becoming a Reality*. The New Press, 1999.

[17]Morey, Timothy, Theodore "Theo" Forbath, and Allison Schoop. "Customer Data: Designing for Transparency and Trust." *Harvard Business Review*, May 2015.

Rob Gleasure is a Lecturer at University College Cork and an Adjunct Lecturer at the Irish Managerial Institute. Dr. Gleasure's teaching includes a range of undergraduate, postgraduate, and executive education courses relating to digital business and online crowd behavior.

His research focuses on design science, the psychology and neuropsychology of computer-mediated interaction, wearable technologies, and crowdfunding. Dr. Gleasure has published work on these topics in many leading international journals and conference proceedings, including Journal for Strategic Information Systems, Journal of Information Technology, International Journal of Electronic Commerce, International Journal of Human Factors and Ergonomics, International Conference for Information Systems, *and* European Conference for Information Systems. *He has also served in administrative roles for a number of academic outlets specializing in IT design, open phenomena, and neuro-information systems (or "neuroIS"). Outside of research, Dr. Gleasure performs consultancy work in the areas of interaction design, design thinking, and business process design. He can be reached at R.Gleasure@ucc.ie.*

Jeremy Hayes has worked as lecturer and researcher in business information systems at University College Cork since 2001. Dr. Hayes's research interests are in the area of business models and innovation management, and his research has been published in leading international journals and conference proceedings, including Information Systems Research, Journal of Strategic Information Systems, European Journal of Operational Research, Journal of Database Management, Journal of Information Technology and People, Information Resources Management Journal, European Conference on Information Systems, *and* International Conference on Information Systems. *He has worked on research projects such as the EU-funded Co-ordination Action for LIBRE software engineering for open development platforms for software and services and the Irish Research Council Project on Open Code, Open Content and Open Commerce, and he is Principal Investigator on the EU-funded ScienceSquared project.*

Mr. Hayes works as a consultant and trainer with client firms to help them to innovate their business models. Organizations he has worked with include the Vietnam Chamber of Commerce International, the Bank of Ireland Business Accelerator Programme, Trend Micro, EMIT Solutions, Big Red Cloud, CMSE Engineering, Aerospace Valley Toulouse, Supply.ie, and the International Energy Research Centre. Mr. Hayes is Associate Faculty in the Irish Management Institute. He can be reached at J.Hayes@ucc.ie.

Redefining Boundaries: Insights from the IBM Global C-suite Study

by the IBM Institute for Business Value, with Peter J. Korsten, Saul J. Berman, and Linda B. Ban

How are top executives positioning their organizations to thrive in a period of huge disruption? IBM's new C-suite Study has in-depth answers on how organizations are responding to new competitive disruptions. Between January and June 2015, the IBM Institute for Business Value surveyed 5,247 business leaders from 21 industries in more than 70 countries. Interviews were conducted across six key roles in the C-suite: CEOs, CFOs, COOs, CIOs, chief human resources officers (CHROs), and chief marketing officers (CMOs). All respondents — most of whom were interviewed face-to-face — represent a wide range of public and private enterprises. In these interviews, the executives shared their thoughts on how they are making decisions that shape their companies and industries (see Figure 1).

> Disruptive technologies could change the fundamentals of our business and cause totally unpredictable effects, if they become widespread.
>
> — Kazuo Hirai, CEO, Sony Corporation, Japan

CAN YOU SEE THE COMPETITION COMING?

A few years ago, CxOs could see the competition coming. Now, the competition is often invisible until it's too late. CxOs are acutely aware of how industry convergence is creating new forms of competition. New permutations are emerging as companies from "old" industries combine forces and form sometimes unlikely liaisons. Take, for example, agrochemical giant Monsanto morphing into an IT firm with "data-driven farming," helping farmers through real-time technology to maximize their crop yields. Or the marriage of consumer electronics and healthcare, with gadgets like Apple Health or Fitbit. These combinations were not obvious 10 years ago.

It is not only industry convergence that creates new competition. Digital invaders with totally different business models are also entering the arena. Two kinds of invaders can be very damaging to entire industries:

1. "Digital giants" such as Google or Amazon are dangerous because they have such huge resources and can easily overtake existing structures.

2. At the other end of the scale are the "ankle-biters": small, smart, and agile, with little to no legacy infrastructure. They can be equally dangerous in large numbers.

> The biggest threat is new competitors that aren't yet classified as competitors.
>
> — Piotr Ruszowski, CMO, Mondial Assistance, Poland
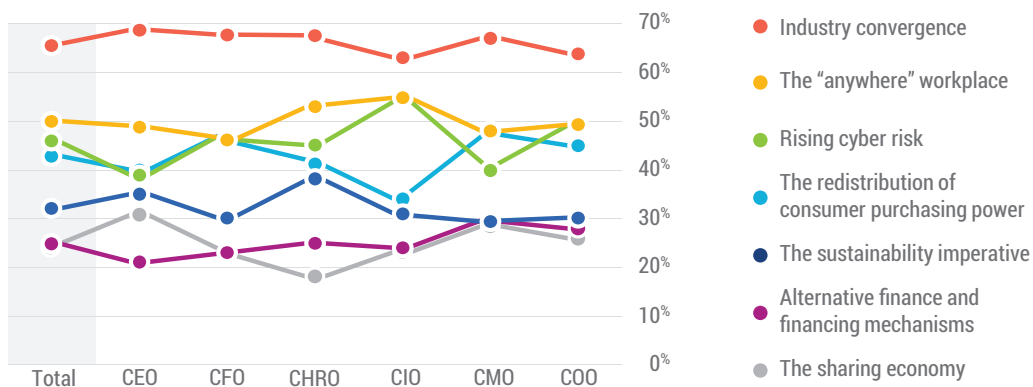
©2015 IBM Corporation   IBM Institute for Business Value

Figure 1 — Breached walls: CxOs expect far more industry convergence in the next few years.

So how should executives respond? The IBM study identifies three key steps they can take:

1. Prepare for digital invaders.

2. Create a panoramic perspective.

3. Be first — and best.

Analysis of all survey responses shows there's a small group of highly successful enterprises — the "Torchbearers" — that are more cognizant of the threat. Torchbearers account for 5% of the survey population. They enjoy a strong reputation as leading innovators, and they surpass their industry peers in terms of revenue growth and profitability. IBM compared this elite group with the Market Followers, most of which are much less financially successful, to find out what makes Torchbearers so effective.[1]

PREPARE FOR DIGITAL INVADERS

So how do CxOs feel about the future, and where do they see things happening?

They're nervous, for one thing. A few years ago they thought new rivals were just as likely to come from their own industry as from others. Today they are more worried about outsiders coming in as opposed to facing competition from within their own industry.

CxOs believe technological advances are driving the shift in the competitive environment. But there are marked differences in how they're preparing to take on digital invaders and attackers from other industries. CxOs increasingly leverage new technologies to focus on customers as individuals. And they see a need to collaborate more, with more external parties, for innovation. A full 70% of CxOs plan to expand their partner network in the next three to five years.

Although many organizations acknowledge the need to get closer to the action, Torchbearers are exploring new opportunities in adjacent spaces. They do not try to emulate everything a digital invader would do, but they do have a keener sense of how the competitive arena has shifted. Torchbearers are more likely to be looking forward and looking outward to entering new markets and embracing a more decentralized management style. Torchbearers are poised to strike back (see Figure 2).

In general, in order to prepare for digital invaders, there are three actions CxOs can copy from Torchbearers:

1. Delegate all but the most important decisions to the people who are closest to your customers. With a decentralized decision-making model, you will have more scouts on the front lines, more freedom of action, and the ability to make decisions much more quickly.

2. Look for enterprises with a strong record of innovation and skills that could be combined with your own to create new opportunities. You can start by defining what you can share, what kind of partner you want, and how you can do that, so you can collectively learn and grow together.

3. Become the linchpin in a virtual network via which other companies reach their customers. By seizing the middle space, you can own the customer relationship and, with that, the path to the customer.

CREATE A PANORAMIC PERSPECTIVE

The more nebulous the competition is and the faster the pace of change, the wider and further organizations need to look. Most CxOs believe they can see the big picture, but few have a truly panoramic perspective. Many CxOs freely admitted that they find it hard to see beyond the horizon at what might be coming next.

13% more	21% more	38% more
59% / 52%	69% / 57%	62% / 45%
More competition expected from other industries	Greater focus on new markets	More decentralized decision making

● Torchbearers ● Market Followers

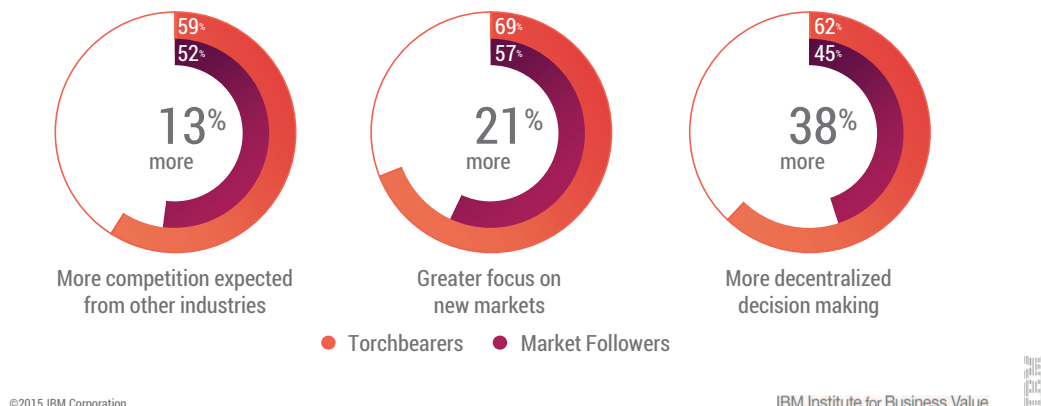©2015 IBM Corporation

IBM Institute for Business Value

Figure 2 — Gearing up: Torchbearers are better placed to take on the disruptors.

The technologies that CxOs expect to revolutionize business tomorrow are already in play today. Most CxOs were fairly consistent in their view that cloud computing, mobile solutions, and the Internet of Things (IoT) are likely to predominate in the coming three to five years (see Figure 3). However, cognitive computing — computing systems that learn and interact naturally with people and help them make better decisions — lie next on the horizon. Many believe cognitive computing can be the bridge to new levels of personalization and insight.

However, with these emerging technologies comes a downside. In 2013, when the previous C-suite Study was conducted, executives hardly mentioned security concerns. Today the majority of executives indicate that IT security is their top risk (see Figure 4).

Torchbearers are much better placed: they are looking more forward and ahead by listening more carefully to their customers, whereas other enterprises are looking sideways or even behind themselves and pay more

attention to their competitors (see Figure 5). Torchbearers also use more analytical techniques to uncover new trends and technologies, such as cognitive computing, and they are willing to invest in emerging technologies with higher entry costs and higher payoffs.

To create a panoramic perspective, follow the Torchbearers' lead:

- Although there is no one technology that can fathom the future exactly, use predictive and cognitive analytics to generate what-if scenarios and risk assessments to gain a perspective on different outcomes before they occur.

- Set up a specialist forecasting team equipped with the right technologies and skills. This will increase the odds of predicting the future more accurately.

- Take an ecocentric view of the world: assess the caliber of all the enterprises in the ecosystem and leverage all contacts, skills, and assets to the fullest.
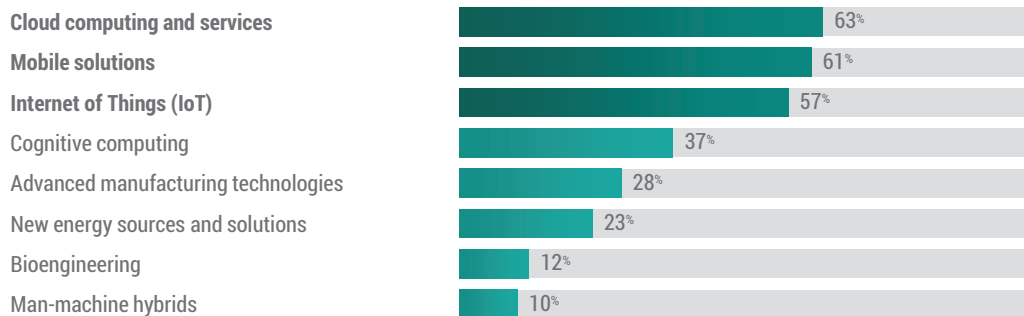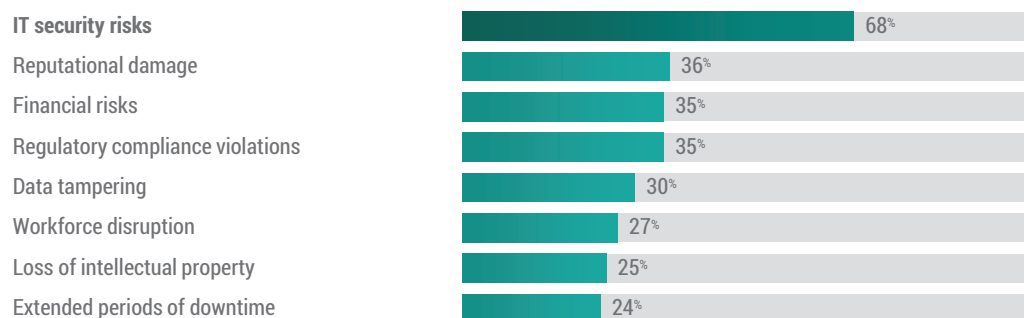

©2015 IBM Corporation   IBM Institute for Business Value

Figure 3 — Star tech: CxOs think three technologies will be particularly important in the near term.

©2015 IBM Corporation   IBM Institute for Business Value

Figure 4 — Red alert: Security is rising to the top of the agenda, as more things become connected.

BE FIRST, BE BEST, OR BE NOWHERE

Getting to market second or third is a luxury few enterprises can now afford, but being a market pioneer is risky. Torchbearers are better able to identify future trends because they look forward and take an ecocentric perspective, drawing on the insights of their customers and ecosystem partners to project the landscape.

Again, Torchbearers stand out from the crowd. Where 80% of all CxOs indicate they are experimenting with different business models, or thinking of doing so, Torchbearers actively implement new revenue models such as "open" and "platform" business models, recognizing that whoever controls the gateway to the customer wins the battle. Torchbearers are more concerned about having the right business model to bring products and services to market. They're also focusing on new customer types and seeking alliances to help them fulfill their customers' expectations.

And this comes as no surprise — whatever they do, Torchbearers prefer to be first to market (see Figure 6).

To be first, or best, Torchbearers are taking a different approach than others:

1. Torchbearers investigate unfamiliar territory by listening to their customers and partners and actively collaborating with them.

2. They set up innovation centers outside their current organizational structure for incubating and piloting new business models and offerings.

3. By moving fast — and by being prepared to bet big — Torchbearers make sure to capture the moment.
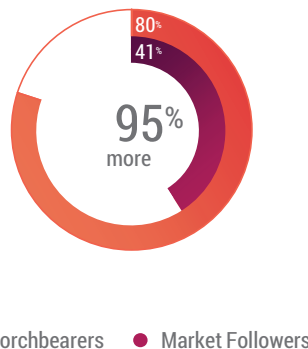
What can *you* learn from the Torchbearers?
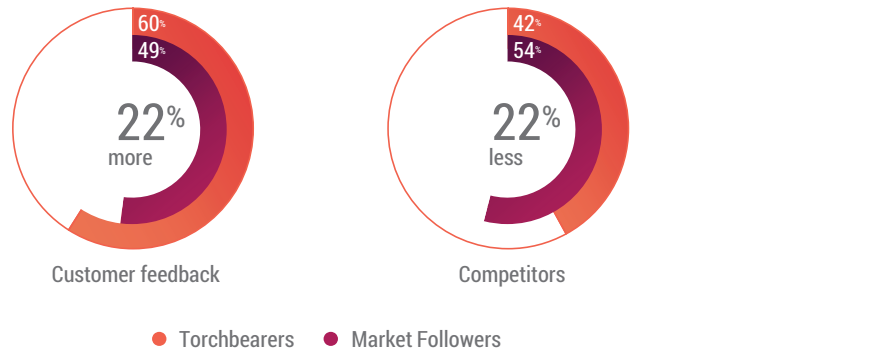
©2015 IBM Corporation

IBM Institute for Business Value

Figure 5 — Eyes ahead: Torchbearers pay more attention to their customers than to their competitors.

©2015 IBM Corporation

IBM Institute for Business Value

Figure 6 — First thirst: Most Torchbearers want to be market pioneers.

ENDNOTE

[1]In this article, we touch on some of the study's highlights. For more information, see the full study: "Redefining Boundaries: The Global C-suite Study." IBM Institute for Business Value, 2015 (http://ibm.com/csuitestudy).

Peter J. Korsten is the global leader of the IBM Institute for Business Value (IBV). Founded in 2001, the IBV develops fact-based strategic insights for senior business executives around critical public and private sector issues. Mr. Korsten recently published an article with Prof. Phil Kotler and was selected as one of the world's top 25 consultants by Consulting Magazine.

Saul J. Berman is Chief Strategist, VP, and Interactive Experience Partner for IBM Global Business Services (GBS). He was previously Global Lead Partner for the IBM Strategy & Transformation team within GBS. Dr. Berman has more than 25 years of consulting experience advising senior management of large corporate and startup organizations. He is the author of Not for Free: Revenue Strategies for a New World *from Harvard Business Review Press.*

Linda B. Ban is global C-suite Study Director, leading the C-suite Study program within the IBM Institute for Business Value. She is a subject matter expert for the industrial sector industries, including automotive, A&D, electronics, chemicals, and petroleum.

Moving from "Best Practice" to "Next Practice" to Drive Effective Digital Transformation

by Greg Smith and Carl Bate

We are constantly bombarded with the message that we are living through a period of unprecedented change; that technology is rewriting the rule book across all industries; that any organization that fails to fully master technology will become commoditized, obsolete, or extinct; and that the only possible solution to these challenges is to implement the latest technological miracle cure.

While we can discount the inevitable hyperbole — and, all too often, the self-interest — at the heart of these opinions, there is undoubtedly a foundational shift occurring in the information technologies that underpin our businesses and organizations. We have not yet found a consistent way to articulate this foundational shift; perhaps the closest we have come to a widely accepted definition is the categorization of business technologies into "digital" and "enterprise IT." Digital has become synonymous with customer-facing technologies that embrace the world of social, mobile, cloud, big data, and emerging technologies such as AI, while enterprise IT remains the de facto term for back-office and enabling technologies.

These two categorizations extend to different worldviews and ways of working, with their respective practitioners adopting a tribe-like mentality to self-identify. The internecine battle between these technology tribes is a pointless distraction for most large-scale organizations. For these businesses, the new digital technologies and approaches will need to leverage and exploit the over 20 years of investment in enterprise IT if they are to fully realize their transformational potential. New digital capabilities will need to build upon existing IT-enabled operational capabilities.

In this context, the scope of digital transformation needs to be widened to incorporate both the harnessing of emerging technologies and patterns and the genuine exploitation of legacy technologies and services. However, we should be careful not to confuse exploitation of legacy technologies with the application of so-called IT "best practices." Simply replacing old enterprise IT with new cloud enterprise IT by itself may not cut the mustard. We find this approach can often add to enterprise IT complexity (as not everything gets switched off as expected), and even the successful programs need to interact effectively with digital.

In this article, we will argue the past is a poor playbook for the future when it comes to delivering real business value from technology. Whilst successful exploitation of legacy technologies is critical, the best practices that the IT industry has promoted and applied for the last 20 years have little value in this endeavor.

In a fundamentally changed world, technologists will need to embrace and adopt "next practices"[1] if they are to be successful. Before moving on to this challenge, though, we first need to establish that the situation we face as technologists has indeed changed fundamentally.

COMPLICATED VERSUS COMPLEX

Through the Cynefin[2] framework, knowledge management expert Dave Snowden has created a useful typology for describing the different contexts within which all organizations and their associated technology functions operate. Snowden defines and describes four primary domains:

- **Obvious.** The relationship between cause and effect is clearly identifiable and understood by all.

- **Complicated.** There is an identifiable relationship between cause and effect, but the relationship needs to be discovered through analysis or investigation.

- **Complex.** A relationship between cause and effect can be identified in retrospect, but not in advance.

- **Chaotic.** There is no identifiable relationship between cause and effect.

These definitions provide a useful framework for articulating how the world has radically changed for most businesses over the last 10 years and why the change is truly fundamental. Over this period, the majority of businesses have moved from primarily operating in a

complicated world to now having to compete and excel in a complex one.

At the heart of this move from complicated to complex is the increasing importance of human factors in all facets of business, and in particular the liberation of the customer, who is now increasingly able to operate as an independent actor, with all the challenges and unpredictability this can lead to. As a broad generalization, we are also moving from a world of predominantly closed system interactions, which can be controlled, measured, and codified, to a world of open system interactions, where we need to constantly sense, adapt, and respond to emerging needs and challenges.

> **Technology best practices have been designed for complicated, closed systems and are wholly unsuited to delivering successful outcomes when challenged with complex, open systems.**

The interplay of complicated and complex can perhaps best be illustrated through a sporting analogy. In motor racing, a Formula 1 pit crew can change from dry tires to wet tires in less than 10 seconds — a complicated and highly orchestrated process that is analyzed rigorously and practiced obsessively to ensure reliable execution in race conditions. However, all teams have broadly similar capabilities, and whilst a failure in the ability to change tires faultlessly can certainly cost a driver his position on the winning podium, mastering the complicated tire-changing process does not allow the driver or his team to significantly outcompete their rivals. But what happens when there is a possibility that it may start to rain during the race?

In this scenario, the F1 team needs to rely on a sophisticated sense-and-respond mechanism, which does have an ability to directly impact race outcomes. If you predict the weather conditions better than your competitors, respond appropriately, and carry out your pit stops perfectly, you will create a significant opportunity to outperform your rivals. Unfortunately, though, the opportunity will be short-lived. Your competitors will very quickly change their tires over to wet-weather tires and put themselves back on a level footing. However, the same finely honed capability will present another opportunity to outperform the competition if it stops raining, the track dries out, and you decide to revert from wet tires to dry ones.

In this example, we are primarily operating in a complex, open system domain, where external factors (precisely when will it start to rain, how heavy will it rain, what race strategy the competitors will adopt) can have a major bearing on success or failure no matter how good the driver and team are at the aspects that they control (driving the car, changing the tires). Choosing the right strategy is critical — but then the chosen strategy needs to be executed perfectly. Mastering the complex allows a team to create a race-winning opportunity; mastering the complicated allows the team to seize the opportunity.

When we start to look at our businesses through a similar lens, we see that the truly game-changing opportunities or challenges we face are also a blend of the complicated and the complex. Being able to understand the difference between the two domains and manage accordingly is thus the key to success. An inability to differentiate between complicated and complex leads to one of the most fundamental causes of business and technology failure — the illusion of control.

Too often we believe we can precisely predict the outcome of our projects and actions because we have created detailed execution plans; we have a strong grip on delivery; we have locked down performance of external suppliers through precise contracts; we have applied a comprehensive governance framework; and we are obsessively measuring our progress. Then we "go live" and things don't quite work out as planned. As we are all painfully aware, the track record of major business technology projects delivering anticipated outcomes and benefits is spectacularly bad,[3] and yet we continue to slavishly apply so-called best practices and are still surprised when another major technology investment fails to live up to expectations.

The fundamental challenge is that technology best practices have been designed for complicated, closed systems and are wholly unsuited to delivering successful outcomes when challenged with complex, open systems. Under these circumstances, we need to understand best practices but fully embrace and apply next practices.

BEST PRACTICE VERSUS NEXT PRACTICE

The need to move from best practice to next practice manifests itself across multiple dimensions within an organization and at multiple scales, from individual activities to overall industry ecosystems. Consequently, successful guiding principles, which are required to

help with the transition from best to next, need to be able to inform and assist decision making within this "fractal" context.

At a summary level, next practice guiding principles can be categorized into four main dimensions:

1. Business leadership

2. Organizational and behavioral

3. Operational

4. Technology

The principles shown in Tables 1-4 (below and through page 44) are drawn from a library of over 50 examples and are intended to illustrate how principles can assist an organization in challenging conventional wisdom and avoid reversion to "tried and tested," which all too often now is "tried and failed."

CONCLUSION

Feedback from early adopters of next practice has found that this way of thinking helps make explicit the underlying trends and disruptions we all experience in our daily lives but struggle to articulate within the corporate environment — beyond labeling them with the overused "digital" tag. However, we also find that merely creating another tribe — this time a next practice one — only adds to the issues.

Best Practice *Managing the Complicated*	Next Practice *Embracing the Complex*
• **Assumption is that the system is closed.** Strategic plans assume certainties, with management focus and resources prioritized on "delivering the plan," which will often be multiyear in duration. Failure to deliver the predetermined plan is not an option. • **Internal focus dominates.** The majority of management attention is on internal factors (e.g., overseeing internal resources). • **Metaphors and inspiration are drawn from engineering and the physical sciences.** Terms like "engine of growth," "software factory," and "the machinery of the business" dominate, reinforcing a mechanistic, reductionist mindset and diminishing the attention and focus on human factors in the business. • **Strategy defines challenges (*a priori*).** Strategy — that is, where we play and how we win — is deterministic. The business is focused on analyzing and then answering the questions it sets itself.	• **Assumption is that the system is open.** Strategic plans assume uncertainties and emergence, with management focus on delivering the next part of the plan, deliberately assessing feedback, and constantly tuning resource allocation to deliver the part. "Pivots" are allowed as new evidence is discovered that challenges the initial hypothesis. • **External focus dominates.** The majority of management attention is on external factors (e.g., customer and market feedback). • **Metaphors and inspiration are drawn from biology and the natural sciences.** The notions of emergence, memes (ideas and concepts that can self-replicate across the organization), and discovery are favored over invention. • **Challenges define strategy (*a posteriori*).** Strategy is emergent based on real-world feedback, even if it doesn't fit with the prevailing mental model the business has of its world. The primary strategic questions to be answered emerge from a wide-ranging survey of data and insight and are unknown or only partially known before the analysis.

Table 1 — The business leadership dimension.

Best Practice *Managing the Complicated*	Next Practice *Embracing the Complex*
• **Command and control.** Management always knows best and tells staff what to do, often in highly prescriptive ways with close scrutiny. • **Hierarchies and chain of command.** Decisions are made by the most senior person. Activities are directed and delivered through individuals that are perceived to be wholly under the control of the organization. • **People thought to be totally rational, calculating machines.** Ways of working and KPIs assume people are totally rational (based on management's view of what "rational" looks like). • **Staff seek permission.** Permission is required to undertake an activity that is not preordained or tightly defined; responsibility is held by the few.	• **Influence, enable, and empower.** Management creates overall direction and principles and then empowers people to use their talents to deliver the best outcome in an emergent and often unpredictable set of specific circumstances. • **Networks and shared incentives.** Decisions are made by the most qualified person. Activities are delivered by a network of individuals with widely differing levels of direct control from the organization but with aligned incentives to ensure coordinated, win-win outcomes. • **People thought to be predictably unpredictable.** Ways of working and KPIs assume the business is more like an economy than a factory, and that human factors (such as those defined by behavioral economics) dominate. Individual actions may not be precisely predictable, but the sum of activities is stochastically reliable. • **Staff ask for forgiveness.** Staff are encouraged to use initiative to achieve goals but also to take responsibility for actions; responsibility is held by the many.

Table 2 — The organizational and behavioral dimension.

We propose next practice as an "and," not a wholesale replacement for good and established practices. Most fundamentally, it should be a way to help creativity, continuous learning, and common sense prevail. We hope this article has triggered a reaction — one way or the other! — and we welcome the ensuing debate and challenge as part of the evolution of the next practice mindset.

ENDNOTES

[1] The term "next practice" has probably arisen independently multiple times, but we were first introduced to the concept by C.K. Prahalad.

[2] "Cynefin" (Wikipedia).

[3] Chapman, Jake. "System Failure." Demos, April 2002 (www.demos.co.uk/files/systemfailure.pdf).

Greg Smith is a Partner in Arthur D. Little's London office and co-leads ADL's Digital Strategy & Transformation practice. Mr. Smith specializes in leveraging emerging digital technologies and existing technology assets to address intractable business problems. He can be reached at Smith.Greg@adlittle.com.

Carl Bate is a Partner in Arthur D. Little's London office and co-leads ADL's Digital Strategy & Transformation Practice. He specializes in working with companies to define and deliver game-changing initiatives. Mr. Bate is the author of numerous next practice approaches, including "Pattern Breaking Pattern Matching" (PBPM), as an aid to inventive problem solving. He is also coauthor of VPEC-T, a behavior analysis framework for complex systems and an aid to business transformation. He can be reached at Bate.Carl@adlittle.com.

Best Practice *Managing the Complicated*	Next Practice *Embracing the Complex*
• **Stability and predictability.** Management culture, KPIs, and incentive systems are all based on predicting the future and then precisely delivering to that prediction. Change is seen as disruptive.	• **Agility, emergence, and adaptability.** Management culture is based on delivering value early and often and accepting emergent phenomena. Self-disruption is seen as not only to be expected, but as a positive.
• **Procedures, rules, and routines.** All activities are broken down into discrete elements, with staff then expected to precisely follow specific procedures (although they don't always seem to). Staff often view procedures as centrally imposed and feel they "get in the way of getting the job done."	• **Algorithms, checklists, proxies, and heuristics.** Rules of thumb and tried-and-tested shortcuts are used to guide decisions, along with checklists for specific activities. Proxies are used to allow early insight into the performance of a system. Staff view tools as helpful and take personal ownership of their ways of working.
• **What has worked in the past.** Actions are based primarily on prior experience and learned behavior.	• **What could work better in the future.** Actions are based primarily on expertise and continuous learning, even if this challenges habits and prior successful ways of working.
• **Measure and manage.** Management is based on what is known as well as retrospective analysis and reviews (e.g., month-end reviews).	• **Sense and respond.** Management is based on continuously seeking out what should or could be known and reacting in near real time to emerging situations.

Table 3 — The operational dimension.

Best Practice *Managing the Complicated*	Next Practice *Embracing the Complex*
• **Established enterprise solutions.** Technology strategy is primarily based on well-known enterprise solutions and technologies. Governance is applied via rules and regulations that direct which technologies can be used and how they are implemented.	• **What would the Web do?** Technology strategy is primarily based on emerging technologies and consumer-style solutions. Governance is via principles and patterns.
• **Change management.** People are told what the new ways of working are, and the assumption is that staff will adopt them rationally once they have gone through required training and familiarization.	• **Adoption engineering.** Focus is on influencing changes in habit and being in the shoes of the recipient, not mandating change centrally; techniques like MINDSPACE[1] and SCARF[2] can be used to allow users to self-adopt. Adoption of change is driven by "path of least resistance" and mimics users' experience with consumer technologies.
• **Up-front grand design and big-bang delivery.** Large-scale programs follow significant periods of design, without usage; team size can be 100+.	• **Emergent requirements and incremental delivery.** Smaller programs deliver early and often; team size tends to be 15 or less.
• **Legacy as millstone to be replaced.** The assumption is that legacy *is* the problem and needs to be replaced wholesale to allow major changes.	• **Legacy as lodestone to be leveraged.** The focus is "What problem are we solving for whom?" and the assumption is that legacy may be part of the answer. Teams ask the question "What is the minimum we can change and still deliver the benefit?"

[1]"MINDSPACE Behavioural Economics." Institute for Government, updated 15 April 2015 (www.instituteforgovernment.org.uk/our-work/better-policy-making/mindspace-behavioural-economics).

[2]Rock, David. "SCARF: A Brain-Based Model for Collaborating with and Influencing Others." *NeuroLeadership Journal*, Vol. 1, 2008 (http://scarf360.com/files/SCARF-NeuroleadershipArticle.pdf).

Table 4 — The technology dimension.

Digital Transformation: Technology Is in the Driver's Seat

by Munish Gupta

Enterprises in every domain are undergoing digital transformation. New age digital companies are overturning the existing business models, and technology is fundamentally driving these changes. In this article, I will explore how existing enterprises can transform and digitize their business, operations, and technology processes to compete better in the market, create new revenue opportunities, and better serve the customer.

DIGITAL TRANSFORMATION AND THE VALUE CHAIN

New forces are impacting the entire value chain of the enterprise. The availability of large amounts of digital data, the automation of production processes, the interconnectivity of value chains, and the digitization of the customer experience are reorganizing entire industries, thereby leading to transformation of business models (see Figure 1).

Let's look at the some of the critical pieces of the value chain and see the impact of the new technologies:

- **Manufacturing.** For any enterprise that is manufacturing or sourcing raw materials/parts/products, global sourcing has become the norm. Interconnectivity of the entire supply chain via telecom networks has synchronized supply chains and shortened production cycles. The advent of the Internet of Things (IoT) has enabled this interconnectivity across the value chain.

- **Distribution and logistics.** The distribution model is moving online, market boundaries are blurring, and businesses and people are ordering products from all over the world, leading to changing dynamics in the distribution and logistics part of the supply chain. The arrival of 3D printing will bring changes in the way logistics are managed. Parts can be printed on location, saving on costly logistics and requiring a different warehousing strategy from
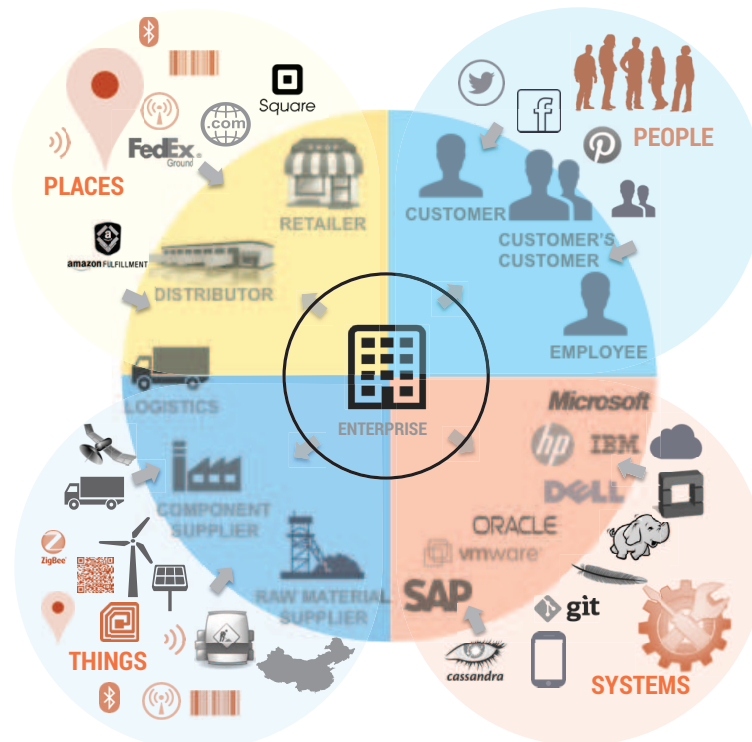

Figure 1 — Digital business opportunities across the value chain.

today. Third-party warehouse and fulfillment centers (e.g., Amazon fulfillment) change the whole cost model. Any small enterprise can make use of the third-party fulfillment centers and compete with large, established enterprises. The emergence of geolocation has allowed real-time tracking of items, enabling more transparency and thus faster decision making.

- **Customers, employees.** With smart devices everywhere, consumers are starting to ask for information that is contextual, real time, and pushed to them. When the same individuals go to work in their companies, they expect the same quality of customer experience. The entire social revolution (Facebook, Twitter, etc.) focused only on the social aspects of the customer journey (sharing content, collaborating), but what digital natives need is digital transformation of the end-to-end customer journey. Enterprises can combine the large amounts of customer interactions gleaned from social networks (a 360-degree view of the customer) with their knowledge of the customer from internal systems (another 360-degree perspective) to create a personalized, contextualized customer experience (a 720-degree view of the customer).

- **Enterprise systems.** Digital transformation is being enabled by technology, and enterprises need to upgrade/enhance their legacy systems and technologies to support the new digital processes/models. The availability of SaaS solutions, open source software, big data, and cloud computing is changing the enterprise landscape. Companies will need to build and/or acquire the skill sets required to manage and make sense of this plethora of newer technologies in order to drive transformation.
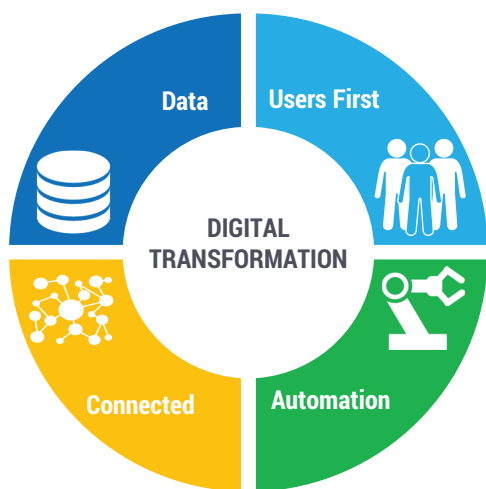

Figure 2 — Role of technology in digital transformation.

The impact of the transformation can be seen in pioneering industries such as:

- **Music.** Digital products are delivered via digital channels.

- **Media.** Traditional print news media is already on a downward spiral; media giant Facebook does not create any content.

- **Retail.** Brick-and-mortar stores are getting replaced with online e-commerce stores; e-tail colossus Alibaba does not own any inventory.

- **Taxi services.** Online ride aggregators are changing the dynamics of traditional taxi services; Uber does not own any taxis.

- **Cars.** Electric cars are changing the dynamics of the entire auto industry; repairs and enhancements can now be accomplished through software updates rather than costly recalls.

Signs of similar digital transformation can be seen across most industry domains.

TECHNOLOGY'S ROLE IN DIGITAL TRANSFORMATION

For enterprises disrupting the marketplace, technology is the key enabler that is helping them create new business models and processes. Open source software has been vital in developing these new scalable and high-performing systems. The following four levers also play a major role in digital transformation (see Figure 2):

- **Connected.** With the arrival of the IoT, everything is getting connected. All this data is being transmitted over mobile and fixed-bandwidth networks and enterprises are making sense out of it, thus leading to real-time decision making. Furthermore, new service models are being created around data. For example, Rolls Royce aircraft engines capture data on engine performance, which can be provided on a subscription basis to airlines that have purchased their engines, to be used for predictive maintenance. By virtue of collating data across its client airlines, Rolls Royce can use this data to develop models for better engines.

- **Data.** All the data from "things," device location, social interactions, and so on needs to be captured, processed, and analyzed for patterns and behavior discovery to allow better predictions and decisions to be made.

- **Automation.** Given the scale of the systems and data being gathered for analysis, automation is the critical enabler. Traditional technologies need to be

combined with artificial intelligence and machine-learning models to create systems that can work autonomously. Many supervisor roles can be automated using AI models. For example, Uber has completely eliminated the middle management role found in a traditional taxi services company.

- **Users first.** All the data and automation need to be used to build and provide contextualized products and services for the users. Enterprises or intermediaries can get direct access to users/customers via mobile apps. Users can have fully transparent access to their data, and enterprises can offer services around that. For example, Tesla has built a model for direct selling of cars to the end customer, bypassing the franchise/dealer network. This allows the company to understand the customer's behavior and usage of the car. As a result, Tesla can sell additional services based on the user's context.

We are still in the early days of digital transformation. Many enterprises are implementing digital as merely digital marketing, which is a very narrow and siloed focus. Digital transformation is about rethinking the business, its operations, and its technology processes (customer onboarding, customer cross-sell and up-sell, customer service, core products/services, etc.). As I noted above, technology is the key enabler that will drive the entire business model in the digital economy. Companies in all domains are being transformed into technology companies, where technology is enabling all these digital interactions. Creating products alone is not sufficient; services around a product bring in additional insights and help enterprises know the end usage of the product. The Rolls Royce example is a case in point.

BUILDING DIGITAL CAPABILITIES

Most enterprises are struggling to innovate and are not investing enough in new technologies to counter disruptive measures. As a result, in a few years, their products or services could become irrelevant in the market. The examples of Blackberry, Nokia, Kodak, and Blockbuster have been cited numerous times. Technology has lowered the entry barrier to innovation, and new entrants (e.g., Uber, Airbnb) can easily disrupt entire business models in a matter of months. Geographical borders do not guarantee competitive advantage anymore. Courtesy of social media, any breakthrough or new idea can travel around the world in a matter of minutes.

For an enterprise embarking on digital transformation, the following things need to fall into place in order to build digital capability within the enterprise:

- **Business vision.** Digital transformation initiatives are cross-division or cross-functional endeavors. Consequently, having a common business vision to drive the transformation is very important.

- **Senior leadership.** Digital initiatives need to be top-driven and led by a senior executive. The cross-functional team will report to this leader.

> **Digital transformation is about rethinking the business, its operations, and its technology processes.**

- **People skills.** The cross-functional team needs to be staffed with people that bring varied experience and are adept at defining and refining the digital journey focused on customer experience. If the team is relatively new to digital, then the enterprise will have to hire for the appropriate skills. Existing team members can also undergo training in the required skills. People who bring multiple skills to the table are vital to the team.

- **Platform approach and automation.** When looking at technology choices in implementing the identified projects, organizations must start thinking in terms of platforms instead of systems. Digital transformation is not about one project or program; the continuous iterations and interconnection of functionality require platforms that provide the requisite services to build improved customer experience rapidly. The implementation team should not get bogged down with scalability and performance issues, typically things that mar the customer experience. The platform should handle the scalability and performance aspects of the application. Similarly, horizontal capabilities like data analytics, data aggregation, content services, and logging services should be viewed and built as platform services. Again, if platform-building skills are not available inhouse, the organization will need to hire people who have them to jump-start the process.

Another critical capability is automating the development-to-operations application lifecycle (DevOps). When you work at scale, manual processes and intervention are error prone and not at all

feasible. Investment in automation of the entire DevOps process is key.

- **Open source software.** In the digital products and services space, given that the product can become viral overnight, scalability and performance of the product/service are central criteria. Use of commercial proprietary products limits the ability of the enterprise to scale the product. Licensing cost is also a major factor for handling potentially vast user bases. Open source software allows enterprises to benefit from a larger community, cutting down on costly licenses, increasing the use of commodity hardware, and enhancing the ability to dig deeper into code (if required). The platform approach is executed using a combination of open source software.

Enterprises threatened with changing business models have started building digital capabilities. Companies like Walmart are no longer just brick-and-mortar players but giving tough competition in the online e-commerce space also. In the automotive space, self-driven cars are being pursued by almost all companies. Fintech companies are disrupting the financial services sector. Investment into the future is required for enterprises to reinvent themselves for the digital era.

> **One of the key characteristics of the digital age is the need to process and manage large amounts of data.**

DIGITAL-FIRST BUSINESS AND IT FOUNDATION CAPABILITIES

Enterprises embarking on the digital transformation journey have made huge investments in existing infrastructures over the years. The system of records (e.g., ERP, CRM) and system of integration (e.g., ESB, BPM) run the core and, through customization of processes, provide differentiation for the enterprise in the market. These systems are crucial for the smooth running of the enterprise. Traditionally such systems are functionally stable and less prone to change.

In contrast, new digital systems that will be built as part of digital transformation (systems of innovation) typically undergo continuous iterations for features and functionality. For customer-facing applications (like mobile apps), enterprises can listen to customer feedback and release new features/functions in an agile

mode. Enterprises do not try to release all the functionality in one go, but build a minimum viable product and use customer feedback to enhance and build a future roadmap. Enterprises can build the app functionality iteratively, incorporating the customer feedback that allows them to provide innovative experiences and features to the end customer.

Systems of records and integration focus on stability, and systems of innovation focus on agility (see Figure 3). Analyst firms have termed this approach "bimodal IT" or "two-speed IT." Keeping in mind that there will be systems in the enterprise with different rates of change, how does an enterprise build capability that makes use of stable systems to build agile systems? To allow rapid iteration of customer-facing systems (systems of innovation), the system of records needs to provide certain key features:

- **Channel-level services model.** For the new channel applications, there is a need to create a strong channel services layer that will provide services like content, notification, geolocation, social media, personalization, prediction, and so on. These services are not typically part of the core enterprise systems.

- **API-enabled.** Most enterprises have already implemented SOA over the years. Core functional processes that are being used by new digital innovations need to be accessible over APIs (preferably in an asynchronous model). This will allow the system of records to continue to be a master data store.

- **Application platform model.** The standardized model to host the channel services and provide a gateway to the SOA business services needs to be based around a platform model. For global enterprises, rolling out a standard platform with a defined set of APIs provides a common ground for innovating around the channel applications. The APIs might integrate with disparate systems spread across various locations. The platform provides a rapid way to iterate and explore/build new business models.

- **Data platform.** One of the key characteristics of the digital age is the need to process and manage large amounts of data. A data platform should provide the following:

  ○ An ability to process large volumes of data events in real time, correlate the events, and provide actuate services around them.

  ○ An ability to capture, store, and process data offline in batch mode. This allows data models
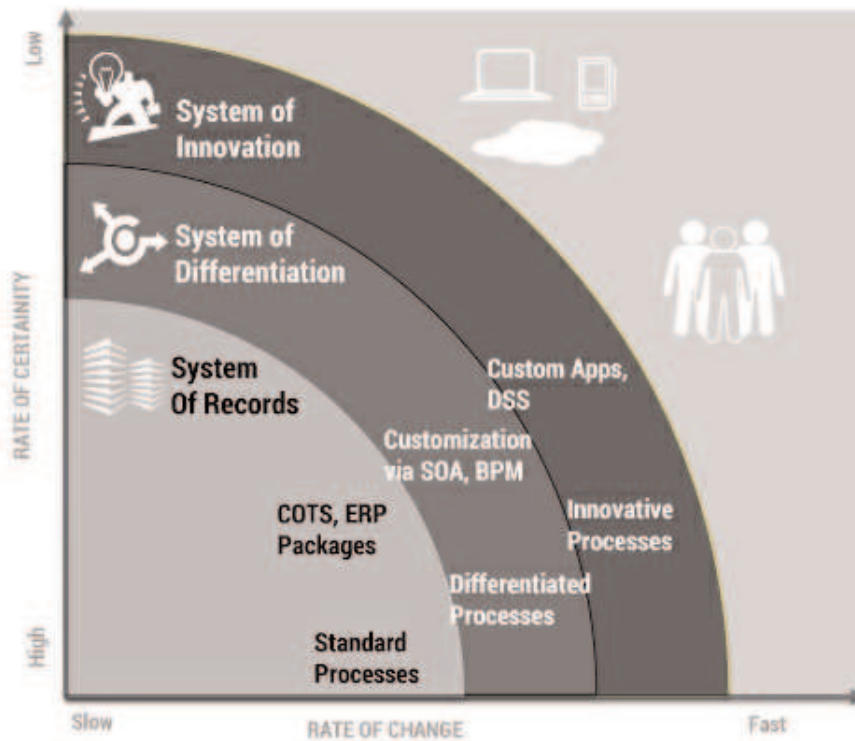
Figure 3 — The IT landscape.

to be created that can be used to provide customization services for the channel applications.

Digital transformation needs a robust platform that binds the systems of records and integration with the systems of innovation. This digital platform that sits at the cusp of integration and innovation provides the ability to bind the core processes with the new digital processes in order to allow building of new channel applications. Core digital capabilities — user context, DevOps, computing capability, data mining capability, and so on — need to be available to enable the rollout of newer features and applications to the user in a rapid manner.

CONCLUSION

Digital transformation is a continuous journey in which an enterprise unveils new business models and new learning at every milestone. It needs to be driven by leadership from the top with the aim of disrupting the status quo. With every iteration, the enterprise will build the core expertise that will help it move forward.

Munish Gupta is a Lead Architect with the Global EA practice of Wipro Technologies. He helps clients with crafting digital transformation strategies and roadmaps and building digital platforms. He can be reached at munish.gupta@wipro.com.

●●● ACCESS TO THE EXPERTS

Cutter Membership

The ultimate *Access to the Experts*

With unlimited access to Cutter research, inquiry privileges with Cutter Senior Consultants and Fellows, regular strategy meetings for your team with a Cutter expert, virtual roundtables and peer-to-peer networking led by Cutter thought leaders, free or discounted admission to events, and more, your Cutter Membership opens up multiple avenues to interact with Cutter's experts to brainstorm and gain guidance to transform your enterprise and boost success. Like everything business technology, one size does not fit all. That's why we encourage you to choose the Membership level that's right for your organization:

> "I am amazed that this venue exists; that I can listen and interact with these individuals. I am more amazed that I have not done this before."
>
> — Mark Rubin,
> Fidelity Investments,
> USA

> "Cutter seems to be unique in consistently providing information one can immediately put into action or clarify one's thinking on day-to-day problems. The service provides tremendous value for the money."
>
> — Lloyd Fletcher,
> Information Systems Manager,
> Institute of Physics Publishing,
> Bristol, UK

Full Membership

Best for organizations seeking personal, real-time guidance on the full gamut of business technology and digital transformation issues, and dedicated to investing in the career development of its entire staff.

Business & Enterprise Architecture

Best for organizations interested in using architectural approaches to manage the complexity and cost of the business and to transform the enterprise.

Software Engineering/Agile

Best for software and product development organizations seeking to optimize their processes and more accurately estimate, plan, track, and govern development to maximize profits and business impact.

Business Technology & Digital Transformation Strategies

Best for organizations developing a sound business technology strategy and harnessing the latest in leadership and implementation, from IaaS to IT restructuring and governance, sustainable innovation to successful change management, and digital transformation to enterprise risk management.

Data Analytics & Digital Technologies

Best for organizations challenged with data collection, analysis, and integration as well as internal- or external-facing information sharing via social, mobile, or legacy apps. Spans Agile analytics to Internet of Things; big data to wearable devices.
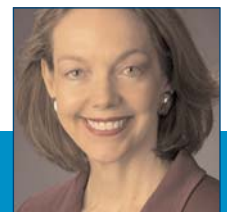
Membership Benefits

■ Continuous flow of advice, insight, and answers via enterprise access to written and multimedia research from Cutter's top experts

■ Real-time answers to your questions with priority Access to the Experts

■ Strategic advice from Cutter Practice Directors or Senior Consultants via regular strategy sessions

■ Discussion of emerging trends and solutions through client-only online Q&A sessions with Cutter experts

■ Peer-to-peer discussions led by Cutter's experts

■ Seat(s) at Cutter events, including Summit: Executive Education+

■ Add-on options for consulting, virtual training, onsite training, and exec ed offerings

And more ...

To arrange for a free trial membership or to discuss how Cutter's consultants can help your organization, contact our team today: sales@cutter.com or +1 781 648 8700

What's Unique About Cutter?

■ Cutter's internationally recognized expert practitioners provide all of Cutter's research and analysis. You get to tap into this brain trust whose written words have been likened to a "consultancy in print."

■ Without exception, every single inquiry is fielded by a Cutter Senior Consultant, Fellow, or Practice Director.

■ Cutter approaches every consulting, onsite training, virtual training, and exec ed assignment as unique, requiring a tailor-made solution, and creates a team for you that includes only its best-in-class experts. We focus on knowledge transfer, so you can leverage our work and move forward on your own.

■ With Cutter, you get cutting-edge thinking from multiple viewpoints so you can determine what's best for your situation.

■ Emphasis is on strategies and processes, so you can be sure your success is not dependent on vendor/product detail.

■ Cutter is unique in having no ties to vendors. Rest assured that the advice you get is unbiased and in the best interest of your organization alone.

■ Focus includes the business management of technology — you're plugged into the research from top business thought leaders.

"I have personally been able to leverage Cutter's services since 1999. Among the attributes that differentiate Cutter from other firms, two remain at the top of my list — *Thought Leadership* and *Real Value* — executed in a practical way.

Thought Leadership is driven by Cutter's experts. The advantage is that Cutter doesn't pitch a single best practice for a given area. Instead, Cutter provides multiple good practices/options that come from both academic rigor as well as on-the-ground experience. This provides several benefits for Dairy Farmers of America:

■ Exposure and awareness of proven good-practices — particularly for IT, but also for overall business leadership and management

■ A finger on the pulse of emerging good practices and IT-impacting trends

■ Options for improving our performance

■ The opportunity to develop relationships with the experts

The last, "Access to the Experts," drives the *Real Value*, letting us go beyond just understanding the options. We can develop relationships with the experts and tailor the options so that they can be quickly and practically executed within our organization, enabling our business technology team to continually improve, engage, and contribute to business growth."

— Doug Mikaelian,
VP Business Technology,
Dairy Farmers of America
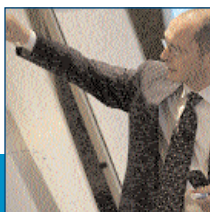
About Cutter Consortium

Cutter Consortium is a truly unique IT advisory firm, comprising a group of more than 100 internationally recognized experts who have come together to offer content, consulting, and training to our clients. These experts are committed to delivering top-level, critical, and objective advice. They have done, and are doing, groundbreaking work in organizations worldwide, helping companies deal with issues in the core areas of software development and Agile project management, enterprise architecture, business technology trends and strategies, enterprise risk management, metrics, and sourcing.

Cutter offers a different value proposition than other IT research firms: We give you Access to the Experts. You get practitioners' points of view, derived from hands-on experience with the same critical issues you are facing, not the perspective of a desk-bound analyst who can only make predictions and observations on what's happening in the marketplace. With Cutter Consortium, you get the best practices and lessons learned from the world's leading experts, experts who are implementing these techniques at companies like yours right now.

Cutter's clients are able to tap into its expertise in a variety of formats, including content via online advisory services and journals, mentoring, workshops, training, and consulting. And by customizing our information products and training/consulting services, you get the solutions you need, while staying within your budget.

Cutter Consortium's philosophy is that there is no single right solution for all enterprises, or all departments within one enterprise, or even all projects within a department. Cutter believes that the complexity of the business technology issues confronting corporations today demands multiple detailed perspectives from which a company can view its opportunities and risks in order to make the right strategic and tactical decisions. The simplistic pronouncements other analyst firms make do not take into account the unique situation of each organization. This is another reason to present the several sides to each issue: to enable clients to determine the course of action that best fits their unique situation.

For more information, contact Cutter Consortium at +1 781 648 8700 or sales@cutter.com.

The Cutter Business Technology Council

The Cutter Business Technology Council was established by Cutter Consortium to help spot emerging trends in IT, digital technology, and the marketplace. Its members are IT specialists whose ideas have become important building blocks of today's wide-band, digitally connected, global economy. This brain trust includes:

- Rob Austin
- Ron Blitstein
- Tom DeMarco
- Lynne Ellyn
- Vince Kellen
- Tim Lister
- Lou Mazzucchelli
- Ken Orr
- Robert D. Scott