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DIGITAL BUSINESS

# Preparing Your Company for Digital Transformation

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WINTER 2018

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# Five Myths About Digital Transformation

If you want to lead your organization's technology transition, the first step is grasping the realities of digital transformations — rather than getting seduced by the hype.

BY STEPHEN J. ANDRIOLE

**M**any boards of directors and senior management teams aspire to the efficiencies, innovation, and competitiveness that digital transformation might deliver. But in my experience, the path to transformation — like most major corporate initiatives — is a risky one.

I have spent much of my career overseeing and participating in digital transformations in both government and private sector settings. Specifically, I have served as the director of the Cybernetics Technology Office of the U.S. Defense Advanced Research Projects Agency (DARPA); as CTO and senior VP of Safeguard Sciences Inc.; and as CTO and senior vice president for technology strategy at Cigna Corp. And I

have observed that in the vast majority of cases, organizations will make significant mistakes — unless the transformation is well-planned, exquisitely executed, and enthusiastically sponsored by upper management.

Villanova University — where I now teach and direct research about digital transformation and emerging technologies — collects data about technology adoption and digital transformation trends. I'm constantly hearing about the "amazing," "fabulous," "terrific," and "incredible" projects under way with the

potential to "revolutionize" companies and "disrupt" whole industries. But when I probe survey respondents for key details about their initiatives, I often find that there is still confusion about the process. To replace this confusion with some clarity, I have distilled my observations and experiences into five myths about digital transformation — each of which has a corresponding reality. If you understand these myths, you'll be less likely to fall prey to the hype about digital transformation and be more aware of how arduous the process really is.



## MYTH #1: Every company should digitally transform.

**REALITY:** Not every company, process, or business model requires digital transformation.

Digital transformation is not a software upgrade or a supply chain improvement project. It's a planned digital shock to what may be a reasonably functioning system. For example, to launch a digital transformation of business processes, it's necessary to purposefully model those processes with tools that enable creative, empirical simulations. Think, for example, of the software programs that enable business process modeling and business simulations.

So, as a first step to digitally transforming your processes, you need to honestly assess if your company can create digital models that simulate the nuances inherent in its procedures. Simply put, the question is this: Can my company model its existing processes? Many companies cannot. That's no crime. But that means, in all likelihood, that you cannot easily digitally transform all of those processes.

Remember, too, that the impact of any initiative is ultimately defined by market share, revenue, and profit. That means that some companies — even if they *can* model

their nuanced processes — may still not be able to make a convincing business case for digitally transforming them. (In other words, just because it's *possible* doesn't mean it's going to be *profitable*.) What's more, you should keep in mind that your existing business rules, processes, models, and systems may be working just fine, so efforts to digitally transform them may not make sense, given the costs and time required of the effort.

Of course, over time, the efficiency of your rules, processes, models, and systems may diminish; when that happens, your company's need for digital transformation could grow. But you don't have to effect digital transformation just for transformation's sake; you should be able to make the business case, and you should be able to say, with certainty, that the transformation will successfully streamline some key processes.

**MYTH #2: Digital transformation leverages emerging or disruptive technologies.**

**REALITY:** Most short-term transformational impact comes from "conventional" operational and strategic technology — not from emerging or so-called "disruptive" technology.

Most transformational leverage comes from tried-and-true operational technology (for example, networking and databases) and strategic technology (such as enterprise resource planning or customer relationship management software). It rarely, in my experience, comes from emerging technology (such as augmented reality) or disruptive technology (such as machine learning).

Why is that? Many business processes and models are outdated. For example, consider the manner in which Uber Technologies Inc. and Airbnb Inc. have, by degrees, supplanted taxis and hotels respectively. While emerging

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technologies have abetted Uber and Airbnb's rises to prominence, their most significant gains have come from leveraging the mainstream networking technologies already in consumers' hands: mobile phones, apps, and websites optimized for quick transactions and location tracking. It's often easier to achieve impact with technologies already in widespread use than it is with emerging technologies.

As obvious as that point may seem, many leaders ignore it. They think they have to be positioned to pounce on the next wave of emerging technology, when that next wave is often difficult to predict and is, by definition, not yet conventional enough to produce a major impact.

**MYTH #3: Profitable companies are the most likely to launch successful digital transformation projects.**

**REALITY:** If things are going well—defined crassly as employee and shareholder wealth creation — then the chances of transforming anything meaningful are quite low.

Failing companies are much more motivated to transform themselves, simply because they need to change something—if not everything—quickly. Successful companies, especially if they're public companies, are understandably cautious about change. Think about it: How many successful companies—with market duress—have truly transformed their business models? Change is expensive, time-consuming, inexact, and painful. It also makes the leaders who suggest it easy targets for in-house politics, especially when the change initiatives move slowly or stumble.

And despite what the best-selling business authors, pundits, and huge-fee-collecting lunchtime speakers will tell you, the truth is, most human beings are

resistant to digital change when it happens in the organization where they've grown comfortable. That means that transformation efforts are often constrained. Yes, resistance to change can disappear quickly when a company begins to fail. But until that day arrives, it's difficult to tell everyone to fix what's perceived as unbroken.

Where is there the least resistance to digital transformation efforts? At companies hemorrhaging customers and cash, and at startups with investor cash to burn. That's because digital transformations work well when you have money to spend and a high capacity—and rationale—for taking risks. By contrast, established companies are “established” for a reason: They've reached consistent levels of profitable revenue generation, driven by well-understood processes that make up an ongoing business model. They are therefore typically unwilling to upend those processes as long as they continue winning in the marketplace.

**MYTH #4: We need to disrupt our industry before someone else does.**

**REALITY:** Disruptive transformation seldom begins with market leaders whose business models have defined their industry categories for years.

While market leaders pay lip service to their role as innovators and disruptors, they are usually unlikely champions of change—until their profits begin to fall and their shareholders scream for transformation.

Historically, industry disruptors have often been startups making bold bets on old industries. Examples include Airbnb (hospitality), Uber and Lyft (transportation), Amazon (books, retail), and Netflix (entertainment).

Does this mean there's no possibility for industry leaders to disrupt themselves? No. But let history serve as a helpful reminder: Disruption seldom comes from

established companies with consistent, profitable revenue streams.

**MYTH #5: Executives are hungry for digital transformation.**

**REALITY:** The number of executives who really want to transform their companies is relatively small, especially in public companies.

Digital transformation requires strong support from upper management. And while the *concept* of digital transformation can be sold up the management chain, simply selling the concept isn't enough. Transformations require overt, continuous support from the senior management team to succeed.

And it's this sort of support—public, persistent, enduring, and unwavering—that's more difficult to secure than one might assume. Many executives are suspicious of risky change efforts that might affect their status in the company. Many executives are also challenged by the sheer complexity of digital transformation projects, especially when they learn how long they take. Moreover, as we've already discussed, executives are reluctant to tweak existing business models that are consistently generating wealth for themselves and their shareholders.

In short, there's a wide gap between what executives say about digital transformation and what they do. It would be nice to think that executives are primarily motivated by what's best for the long-term health of the company, but their motives are often more complex.

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**Reprint 58317.**

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## [INNOVATION]

# Mastering the Digital Innovation Challenge

Bringing digital innovation to an established company such as Volvo Cars requires carefully balancing new capabilities and core competencies.

BY FREDRIK SVAHN, LARS MATHIASSEN, RIKARD LINDGREN, AND GERALD C. KANE

In 2010, a small group of managers at the automaker Volvo Car Corp. assembled to craft a vision for the future involving wirelessly connected cars. They recognized that the company needed to renew its innovation capability to compete more effectively in an increasingly digital environment. Doing so, of course, was easier said than done. One problem was that many managers didn't see a need to innovate digitally. Volvo Cars was a car manufacturer, after all, and not a digital business. Others saw the need to engage in digital innovation, but they couldn't get their head around how to do so. How could they convince their colleagues, when they didn't necessarily have a clear vision of what the innovation outcome would be and the process itself appeared to be ambiguous? At the same time, Volvo Cars' automotive business was strong, raising additional concerns about how to innovate digitally while maintaining core competencies.

Many incumbent businesses share similar questions to those Volvo Cars faced in 2010. A recent report by *MIT Sloan Management Review* and Deloitte found that nearly 90% of managers surveyed report that their industry is likely to be disrupted by digital technologies, yet less than half report that their company is doing enough to prepare for this disruption. Our four-year research project at Volvo Cars offers insights into a challenge that

established companies must master — and competing concerns that they must balance — as they pursue digital innovations.

(Detailed findings from our research were published in the March 2017 issue of the journal *MIS Quarterly*. See “Related Research.”)

Working on a strategy for connected cars, the executive team of Volvo Cars outlined a vision that would allow certain digital aspects of the car to be updated after the car was manufactured and sold. New digital technology would enhance users’ experience and enable new revenue streams. By rethinking traditional automotive product development cycles, car connectivity could increase the pace of change. It would also allow the company to engage with external innovation ecosystems and sync with developments in consumer electronics.

The executive team realized this vision would not be easy to implement, nor was it mainly about creating new technological infrastructures. This bold vision stood in stark contrast to Volvo Cars’ existing innovation practices and business models. Indeed, pursuing the digital innovation necessary for connected cars required fundamentally rethinking the organization, while also keeping the core business functioning efficiently. To chart a new way forward while maintaining the integrity and viability of its core business, Volvo Cars had to balance four sets of interrelated competing concerns regarding: (1) innovation capabilities, (2) focus, (3) collaboration, and (4) governance of partnerships.

## 1. Balancing New and Established Innovation Capabilities

Volvo Cars’ first concern was how to balance the need to develop new capabilities for digital innovation yet still preserve the established innovation practices surrounding its core business. The company had traditionally invested substantially in innovation within product silos and multiyear time frames by relying on hierarchical structures and modular product architectures. Digital technologies, however, required a new way of thinking that cut across these specializations and moved forward more quickly than the company had ever done.

To achieve digital innovation, company executives realized they had to cross-fertilize the company's existing innovation environments and break away from its conventional product development practices. Although this transformation was necessary to leverage the new opportunities afforded by digital technology, it would require shifts in the company's capabilities, routines, and structures in fundamental ways that would affect Volvo Cars' identity and culture.

To manage those competing concerns, the executive team mandated a new initiative known as the Connectivity Hub, a cross-functional team tasked with developing new innovation capabilities for connected cars. The Connectivity Hub director, Mikael Gustavsson, noted, "The main job was to establish a new network that didn't reflect the existing organization. The Connectivity Hub was an opportunity to bring different parts of the

## RELATED RESEARCH

- F. Svahn, L. Mathiassen, and R. Lindgren, "Embracing Digital Innovation in Incumbent Firms: How Volvo Cars Managed Competing Concerns," *MIS Quarterly* 41, no. 1 (March 2017): 239–253.

firm to the same table. We didn't have an integrated forum where we could discuss those things." The Connectivity Hub orchestrated a broad internal debate about digital innovation and spearheaded efforts to prepare the organization for it.

The Connectivity Hub was set up as a temporary initiative so that it would not be perceived as a threat to existing organizational procedures. Nonetheless, the initiative at first generated substantial pushback. Resistance to the initiative occurred most intensely among middle managers, who felt torn between long-term visions requiring new capabilities and short-term commitments involving existing practices. This resistance was not unfounded: New product development at Volvo Cars customarily required product details to be frozen years in advance so that they could be implemented in production. However, making decisions about car connectivity features three years ahead would be impossible. These features could not be designed that far in advance; instead, they had to be generated through ongoing developments involving automakers, external developers, end users, and regulatory authorities. The Connectivity Hub had to figure out how Volvo Cars could foster such continuously ongoing innovation processes without compromising its ability to produce cars.

## 2. Balancing Process and Product Focus

At Volvo Cars, process innovation was traditionally associated with production efficiency and incremental product improvements. But now the company faced a very different challenge in

that its digital features were not necessarily defined up front. Yet Volvo Cars' executive team did not believe its connected car vision would come to fruition unless digital features could be integrated with the physical car environment. New innovation processes had to be developed while still benefiting from the company's current strengths in building cars.

To manage these competing concerns, Volvo Cars explored how to develop generic digital resources, rather than simply focus on addressing specific end-user problems. Such generic resources offered prefabricated digital building blocks that could be utilized, combined, and built upon to resolve new innovation problems in the future. To legitimize such efforts in an environment inherently focused on specific functions, Volvo Cars built a portfolio of different platforms, each with a limited scope and distinct focus. These platforms were gradually developed to cover a broader range of applications. This approach allowed the automaker to shift its current focus on product platforms for cost-efficient implementation of predefined products to digital platforms that enabled new, often unforeseen, digital services.

As an example, Volvo On Call was originally a telematics service with specific features for remote car unlocking and safety monitoring. Volvo Cars realized this technology could be developed to issue generic digital keys that would enable retailers to deliver groceries to a specific vehicle. This service was later expanded, and the digital key is now a centerpiece in a commercial platform called In-Car Delivery, connecting car owners, logistics organizations, and a whole range of retailers in different niches.

## 3. Balancing External and Internal Collaboration

When Volvo Cars started to conceptualize its digital capabilities as generic functions, questions were soon raised about who would use the different platforms to develop new services. The company had long controlled the internal collaboration required to leverage the scale advantages that its investments in modular product designs afforded through specialization and effective division of labor.

Not surprisingly, it became clear that this approach would not be able to release the potential of digital technology to produce increased variation and novelty of digital services for connected cars. The availability of digital platforms made the automaker realize the importance of also engaging external stakeholders as cocreators of value for the connected car aftermarket. Volvo Cars therefore launched a new software environment, called Volvo Cloud, to host in-car services based on software in back-end servers. This successful initiative opened up possibilities for external collaboration with third-party app developers, such as Pandora internet radio and Spotify's digital music services, to secure a steady flow of new digital services to Volvo Cars' customers.

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Because software resided in the cloud rather than being inscribed into car parts, the automaker could manage innovation concerns by opening up opportunities for collaboration with external partners without disturbing existing internal innovation practices. Volvo Cloud allowed in-car functionality, such as web radio, to be enabled, updated, or replaced without touching the car configuration.

#### **4. Balancing Flexibility and Control**

Collaborating with new partners on product development in turn invited new ways of thinking about innovation governance. Early collaborations with application development companies revealed that these new partners would not engage on the same terms as traditional suppliers of car parts. The automaker therefore launched an app development group, staffed with people from the consumer electronics industry and embedded within Volvo Cars' internal research and development department. This group served as a bridge between internal and external environments and crafted a range of boundary-spanning resources that could help Volvo Cars interact with external application developers. Initially, this spurred a series of cocreation initiatives involving external partners such as the location-sharing app Glympse.

These options, however, lost momentum during transition from demonstration to commercialization as soon as Volvo Cars' purchasing department got involved. The purchasing department staff instinctively applied traditional supplier contracts, based on monetary transactions, to regulate supplier implementation of Volvo Cars' requirements. However, in its collaborations with Pandora and Spotify, the automaker did not write elaborate requirement specifications or pay these partners — essentially making traditional contracts useless.

To effectively manage the relationships with these new types of external partners, Volvo Cars learned to balance the need to control the relationships with enough flexibility to stimulate value cocreation. In doing so, the automaker crafted a new contract that emphasized mutual liability and cost neutrality. This contract recognized partners' need for Volvo Cars' long-term commitment to support delivery of high-quality digital services and formalized, sustainable relationships that did not involve explicit monetary transactions.

#### **Embracing Digital Innovation**

Volvo Cars' journey toward digital innovation offers several lessons about how incumbent companies can compete more vibrantly in digitalized environments. First, it demonstrates that digital innovation is an organizational capability, not merely a new technological platform or an innovation incubator. Developing digital innovation capability requires fundamentally

rethinking how the business is organized, how it makes decisions, with whom it partners, and how those partnerships are managed. These concerns are systematically interrelated and mutually dependent, so companies may find that a failure to address any of these competing concerns may have a wide-ranging impact on the overall success of digital innovation initiatives.

Second, it is possible for established companies to develop digital innovation capabilities while maintaining their core businesses. In fact, it is essential to do so. Successful established companies possess knowledge and expertise that have served them well for years, and the way they have done business is largely institutionalized. Digitalization provides opportunities to infuse new types of features and services into existing products. Doing so certainly means that some established ways of doing business must change. For example, this was true for Volvo Cars' traditional innovation cycle time, collaboration patterns, and partnership governance practices. This recognition, however, doesn't mean the old way of doing things is necessarily wrong. In fact, Volvo Cars managed to retain critical aspects of its approach to car design and production that still proved useful. Incumbent companies must find ways to leverage their strengths to capitalize on new ways of doing business. Ultimately, managers need to carefully identify which practices need to change and which need to be preserved.

Lastly, developing digital innovation capabilities will not happen by accident. Volvo Cars' executive team developed a clear vision for the broad parameters of their efforts, even though they did not yet know much of the specifics. They communicated this vision to the organization and provided the necessary support and resources to begin and endure the journey. Not everyone was initially on board. Many executives saw it as a high-risk, low-reward undertaking. Yet the clear communication of the vision, and the implementation of changes when needed, allowed Volvo Cars to innovate in its organization and its products to continue competing in an increasingly digital business environment.

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**Reprint 58315.**

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# Using Artificial Intelligence to Set Information Free

REID HOFFMAN

We are on the cusp of a major breakthrough in how organizations collect, analyze, and act on knowledge.

*Editor's Note: This article is one of a special series of 14 commissioned essays MIT Sloan Management Review is publishing to celebrate the launch of our new *Frontiers* initiative. Each essay gives the author's response to this question:*

*"Within the next five years, how will technology change the practice of management in a way we have not yet witnessed?"*

Artificial intelligence is about to transform management from an art into a combination of art and science. Not because we'll be taking commands from science fiction's robot overlords, but because specialized AI will allow us to apply data science to our human interactions at work in a way that earlier management theorists like **Peter Drucker** could only imagine.

We've already seen the **power of specialized AI** in the form of IBM's Watson, which trounced the best human players at "Jeopardy," and Google DeepMind's AlphaGo, which recently defeated one of the world's top Go players, Lee Sedol, four games to one. These specialized forms of AI can process and manipulate enormous quantities of data at a rate our biological brains can't match. Therein lies the applicability to management: Within the next five years, I expect that forward-thinking organizations will

be using specialized forms of AI to build a complex and comprehensive corporate "knowledge graph."

Just as a **social graph** represents the interconnection of relationships in an online social network, the knowledge graph will represent the interconnection of all the data and communications within your company. Specialized AI will be ubiquitous throughout the organization, indexing every document, folder, and file. But AI won't stop there. AI will also be sitting in the middle of the communication stream, collecting all of the work products, from emails to files shared to chat messages. AI will be able to draw the connection between when you save a proposal, share it with a colleague, and discuss it through corporate messaging. This may sound a bit Big Brother-ish, but the result will be to give knowledge workers new and powerful tools for collecting, understanding, and acting on information.

Specialized AI will even help us improve that scourge of productivity, the meeting. Meetings will be recorded, transcribed, and archived in a knowledge repository. Whenever someone in a meeting volunteers to tackle an action item, AI software will record and track those commitments, and automatically connect the ultimate completion of that item back to the original meeting from whence it sprang. Sound far-fetched? The AI techniques for classification, pattern matching, and suggesting

potentially related information are already part of our everyday lives. You encounter them every time you start typing a query into Google's search box, and the autocomplete function offers a set of choices, or every time you look at a product on Amazon, and the site recommends other products you might like.

The rise of the knowledge graph will affect the practice of management in three key ways:

## 1. Better Organizational Dashboards

Right now, organizational dashboards — the sets of information executives monitor and use to guide decision making — are limited to structured data that is easy to extract or export from existing systems, such as revenues, app downloads, and payroll information. These backward-looking metrics do have value: They help managers understand what has happened in their operations and identify hot spots for troubleshooting. But AI-generated knowledge graphs will dramatically expand the scope of these dashboards. For example, managers will be able to access sentiment analysis of internal communications in order to identify what issues are being most discussed, what risks are being considered, and where people are planning to deploy key resources (whether capital or attention). AI-powered dashboards will provide forward-looking, predictive intelligence that will deliver a whole new level of insight to managerial decision making. Computers won't be making decisions for us, but they can sift through vast amounts of data to highlight the most interesting things, at which point managers can drill down, using human intelligence, to reach conclusions and take actions. This is an example of what Joi Ito, director of the MIT Media Lab, refers to as

"extended intelligence" — in other words, treating intelligence as a network phenomenon and using AI to enhance, rather than replace, human intelligence.

## 2. Data-Driven Performance Management

Current performance management processes are terribly flawed. A Deloitte study found that just 8% of organizations believe that their annual review process excels at delivering business value. One of the big reasons for this dissatisfaction is the lack of data to drive objective performance management. In order to manage performance, you have to be able to measure it, and in most organizations, this simply isn't possible for the majority of employees. Senior leaders might be evaluated based on the company's overall performance, and certain functions like sales have objective, quantitative performance metrics, but almost everyone else is evaluated by subjective criteria and analysis. In the absence of data, internal politics and unconscious bias can play a major role, resulting in **performance management that is biased and inaccurate**. The knowledge graph will allow managers to identify the real contributors who are driving business results. You'll be able to tell who made the key decision to enter a new market and which people actually took care of the key action items to make it happen. Yet even as the knowledge graph reduces the role of guesswork and intuition, the human manager will still be in the loop, exercising informed judgment based on much better data. The result will be much more efficient allocation of human capital, as people are better matched with projects that suit their strengths, and the best people are deployed against the highest-leverage projects.

### 3. Increased Talent Mobility

As we get better at allocating human capital, organizations will need to do a better job of supporting increased talent mobility, both inside and outside the organization. In the networked age, talent will tend to flow to its highest-leverage use. Each such “tour of duty” will benefit both the company and the worker. But people are not plug-and-play devices; they need time to become productive in a new role (in part because it takes time to build the needed connections into a new network). The knowledge graph will make onboarding and orientation far more rapid and effective. On the very first day on the job, a worker will be able to tap the knowledge graph and understand not just his or her job description, but also the key network nodes he or she will need to work with. Rather than a new employee simply being handed a stack of files, onboarding AI software will be able to answer questions like, “Whom do I need to work with on the new office move? What were the meetings where it was discussed? When is our next status meeting?” The new employee will also be able to ask how things were done in the past (for example, “Show me a tag cloud of the topics my predecessor was spending his time on. How has that allocation evolved over the past 12 months?”). AI might even ask outgoing employees to review and annotate the

key documents that should be passed on to their successors. The tacit knowledge that typically takes weeks or months to amass in today’s workplace will have been captured in advance so that within the first hours of accepting a new job, an employee will be able to start applying that knowledge.

For all AI’s potential benefits, some very smart people are worried about its potential dangers, whether they lie in creating economic displacement or in actual conflict (such as if AI were to be applied to weapons systems). This is precisely why I am, along with friends like Sam Altman, Elon Musk, Peter Thiel, and Jessica Livingston, backing the [OpenAI project](#), to maximize the chances of developing “friendly” AI that will help, rather than harm, humanity. AI is already here to stay. Leveraging specialized AI to extend human intelligence in areas like management is one way we can continue to progress toward a world in which artificial intelligence enhances the future of humanity.

*This article was originally published on June 14, 2016, with the title, “Using Artificial Intelligence to Humanize Management and Set Information Free.” It has been updated to reflect edits made for its inclusion in our Fall 2016 print edition.*

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