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SPECIAL REPORT

The Nuts and Bolts of Digital Transformation

How to plan for transformation, the power of interpersonal collaboration in driving change, and the importance of giving employees space for transformative learning.

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THE NUTS AND BOLTS OF
DIGITAL
TRANSFORMATION

STRATEGIZING ABOUT DIGITAL CHANGE in your organization won't get you anywhere unless you're making plans and setting goals that people will actually execute. But most senior executives struggle to establish realistic expectations, largely because they don't have a clear sense of how or why employees on the front lines adopt new tools.

Those are problems you can fix, says Paul Leonardi, a professor of technology management at the University of California, Santa Barbara, in the opening article of this special report. By understanding the six phases of digital adoption, Leonardi explains, leaders can strategize in reverse. That entails knowing what the tools can achieve in local performance gains — and then working your way back to define meaningful company objectives and secure what's needed to get things rolling in the first place: employee buy-in.

To spark transformation, it's also critical to boost employee engagement and collaboration, according to Rob Cross and Wendy Murphy at Babson College, and Amy Edmondson at Harvard Business School. Their analysis suggests that certain leadership behaviors, such as creating an environment of trust and imbuing work with purpose, determine how effectively people collaborate, how engaged they are, and how readily they embrace new ways of working.

Leading digital change involves giving employees space for transformative learning, as well. They need a low-risk "playground" to imagine who they might become, not just what they can do differently, says Gianpiero Petriglieri, an organizational behavior professor at INSEAD. Petriglieri points out some of the biggest obstacles to such learning and explains how organizations can make it easier for individuals to explore uncharted territory in the quest for development and growth.

—The Editors

YOU'RE GOING DIGITAL — NOW WHAT?

ENOUGH WITH THE TOP-DOWN STRATEGIZING. UNDERSTAND HOW CHANGE REALLY HAPPENS ON THE GROUND — AND PLAN FOR IT ACCORDINGLY.

BY PAUL LEONARDI

A t the 30,000-foot level of the corporate suite, plotting digital change is heady, exciting stuff. Business leaders can almost smell the gains in efficiency and speed and the data-driven increase in customer satisfaction when they think about all the new tools at their disposal and how they might restructure their organizations. As one senior executive at a large telecommunications company recently told me, "Mapping out a new approach to compete in the digital era has been so cool!"

But here's the decidedly less cool, more mundane truth that I've learned after 16 years of working on such transformations with more than two dozen companies across eight industries: Success depends less on strategic inspiration than on the way people on the front lines implement new digital tools, and most leaders aren't laying a foundation for those employees to succeed. In large part, that's because senior managers don't have any idea what really happens at the ground level. So they're caught by surprise when tools don't get used the way they're supposed to be (or even at all), data-driven insights prove unremarkable, and anticipated gains fail to materialize. Their digital transformations become digital flops.

To avoid that fate, leaders must understand how digital tools come to be used widely and effectively so that they can create an environment that provides optimal conditions. They can't hand that work off to IT and hope for the best.

In this article, using an automotive company's effort as an archetypal example, I'll describe how digital transformations tend to be experienced and processed by those on the ground and then show how reverse planning — working backward from that reality, phase by phase, to set broad corporate goals — leads to change that sticks. Plenty of articles offer theories about and strategies for digital transformation. This one will help you anticipate and manage the gnarly, often-ignored details that destroy many a well-intentioned plan.

THE PHASES OF DIGITAL ADOPTION

Most digital transformation efforts are launched with extensive rollout plans that outline activities such as financing the transformation, reorganizing the company to make it agile enough to get the most out of digital tools, developing data-driven insights that allow the company to deliver more customized products, and reducing time to market.

All of that is critical. But so is another process, one that doesn't get mapped out with similar rigor. I like to refer to it as the Work Digitization Process, or WDP for short. (See "How to Plan Your Company's Transformation.") This is a set of six interlinked phases of ground-level change that must happen for a digital transformation to take off. More often than not, these phases build upon one another, so early wins presage later successes, while early failures make each ensuing phase more difficult. To see how the process unfolds, and to clearly understand the impact of management action (or inaction), let's look at how things played out at one major international automotive design company that we'll call Autoworks.
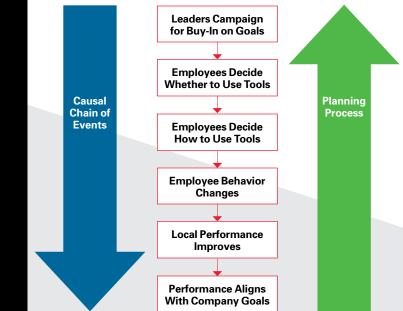
PHASE 1: **Leaders sell the digital transformation.** Without widespread buy-in from employees, any major change initiative will wither and die. Digital transformations are no different. That's why the first step in a successful effort is to explain the benefits of digital change to the workforce, which may or may not be receptive to altering standard operating procedures.

The leaders of Autoworks understood this. Like many companies in the automotive industry, Autoworks had embarked upon a digital transformation in the mid-2000s. One goal was to accelerate product development while cutting costs in

resource-intensive areas. To launch a single new model, for example, Autoworks would crash-test at least 30 preproduction vehicles. Each test cost roughly $750,000. New digital design tools, however, could cut that figure drastically by allowing engineers to build and test virtual cars on their computers. Even better, those simulations would allow the engineers to collect more data, further optimizing their ability to design better, safer, cheaper cars. Eager to get started, Autoworks' senior leaders beefed up the company's supercomputing center and licensed a slew of digital design applications. The CEO declared, "We're going to be a digital company."

Senior leaders were vocal and clear about the change they wanted. Moving performance testing onto digital applications meant that product development could get done faster and cheaper. Directors heard "faster and cheaper" in their staff meetings, managers heard "faster and cheaper" in their division meetings, and engineers heard "faster and cheaper" over and over from managers, directors, and executives in training sessions, at conferences, during all-hands meetings, and in everyday work. "Faster

HOW TO PLAN YOUR COMPANY'S TRANSFORMATION

By understanding how change naturally rolls out, you can start your planning with where you want to end up — identifying the gains in performance you can achieve with new digital tools — and work back from there to set company goals that employees will embrace.

Causal Chain of Events

Leaders Campaign for Buy-In on Goals
↓
Employees Decide Whether to Use Tools
↓
Employees Decide How to Use Tools
↓
Employee Behavior Changes
↓
Local Performance Improves
↓
Performance Aligns With Company Goals

Planning Process

and cheaper" became the mantra of the digital transformation.

Studies show that employees listen when senior leaders broadcast goals and announce bold initiatives for achieving them.[1] Early on, such pronouncements create frames of reference that people use to understand the technology they're being asked to implement. If you asked employees at Autoworks how they would know whether new tools could transform the organization, they would (and often did) answer, "I'll know if they help me build simulation models faster and cheaper."

PHASE 2: **Employees decide whether to use the new technology.** Once leaders have brought digital tools to the company, touted the anticipated benefits, and adequately funded training, they fully expect that employees will shift their work to the new applications. There's no guarantee that will happen, though. My research has shown that roughly 40% of potential users decided *not* to use the technology, even when it was mandated by their direct supervisors.

That's a big number — big enough, in fact, to derail a digital transformation. So it's important for leaders to understand why so many employees might make that choice. I've found that it's typically not because the technology is inadequate (it's usually pretty good) and not because training is poor (ditto). Rather, employees consider whether the technology enables *them*, as individuals, to carry out the goals announced by the company's leaders. At Autoworks, that meant that the engineers asked themselves, "Will this software help *me* develop new car designs faster and cheaper?"

As it turned out, not everyone thought it would, so "faster and cheaper" was more complicated rhetoric than Autoworks' leaders had imagined. The phrase inadvertently encouraged people to compare the new tools with the old ones they knew inside out and could already use quite efficiently. Some of the company's top engineers, who served as early adopters, did just that — and decided that it was in their company's best interest for them to stick with the tools they were already using, because the new software actually slowed their work down. Although they could see that it had other distinct advantages for the organization, they rejected it for failing, in their experience, to create the gains that company leaders had deemed most important.

Making matters worse, other engineers decided that if a colleague they respected had rejected the new software, they didn't even have to give it a try. The early experimenters thus became negative influencers in the network of company engineers, although their comfort with the old tools may have tainted their perception of the new ones.
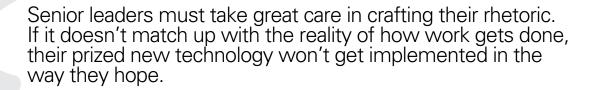
Of course, senior leaders had intended that "faster and cheaper" would be seen as the broad goal of the transformation effort. They hadn't considered how those words might scan at various levels and influence granular decision-making. That's why senior leaders must take great care in crafting their rhetoric. If it doesn't match up with the reality of how work gets done, their prized new technology won't get implemented in the way they hope.

PHASE 3: **Employees decide how they will use the new technology.** Even if the new technology encounters a band of naysayers, the many employees who do make the switch will come to a second critical decision: *how* to use it. This, too, is a complicated choice with significant long-term ramifications.

Almost any digital technology, whether for businesses or for individual consumers, can be adopted in many different ways. (Think of Microsoft Excel, for instance, with its hundreds of features and possible uses.) But in a digital transformation, the features people choose to apply are deeply consequential, because they determine what kind of data will be recorded, produced, or analyzed, and how that data will be used.

Autoworks' leaders believed that data was a key benefit of moving design processes into a digital environment. The use of simulation tools would make it possible for engineers to run hundreds or thousands of iterations of crash tests or noise and vibration tests. By comparing all those results, engineers would be able to optimize a vehicle's design with far more sophistication than when the company ran a few dozen wrecks with crash test dummies. At least, that was the theory.

For one year, I tracked two departments that used the same digital tool for automating simulation designs. In one department, engineers engaged with the tool in widely varying ways, according to individual preference. In the other, every engineer used the same features in the same order. By the end of that year, the vehicles designed by the latter group were outperforming those created by the former by

"Senior leaders must take great care in crafting their rhetoric. If it doesn't match up with the reality of how work gets done, their prized new technology won't get implemented in the way they hope.

a 2-1 margin. Why? Because the data produced by the engineers who had followed the same path with the same features had a uniform foundation and could be analyzed for patterns of effectiveness. The engineers who had followed their own paths produced just as much data, but the information arose from varying assumptions and choices. These kinds of differences around the company made it difficult to create a set of best practices for the new digital tools. If a central value of digital technologies is the creation of data that can be mined for efficiencies and other valuable learning, shaping consistent usage patterns is essential.

PHASE 4: New kinds of data change the way employees behave. In its pre-digital days, Autoworks had developed a handoff approach for moving data across the company. In the case of vehicle design testing, the standard operating procedure went like this: Engineers conducted crashes and various other tests, collected the data, and passed it along to the data analysis group, where analysts tried to glean universal principles for good vehicle design. There were engineers; there were data analysts. The difference between the two groups was clear.

Remember those engineers who used the new digital simulation tools in consistent ways to produce comparable data? They're the ones who started to change the status quo. They could see the results of their own tests, of course, and could examine results in the aggregate. But they went a step further and started talking to one another about their results and thinking about them together. As one engineer commented, "Now that we've gone digital, our roles as design engineers are changing." Instead of being siloed away from one another while they ceded analysis to an equally siloed data analysis department, the design engineers had become a collaborative team of data analysts.

Some "by the book" managers tried to curtail this empowerment by insisting on keeping analysts' and engineers' responsibilities separate. But this

process — of more and better data changing tasks, resulting in changed roles and relationships — is an inevitable byproduct of digital transformations. At their core, relationships between people in different roles are based on data. When employees start performing new roles because they have new data and information, they necessarily start interacting with different people. The result is the formation of new and initially invisible social networks. According to some research, these powerful new networks may be the most important ingredient in driving digital transformations.[2]

PHASE 5: Performance improves locally. There's often a dichotomy between the targets business leaders impose for their digital transformations and the benefits employees experience at a local level.

Once they were effectively using the new digital tools and comparing results with others in their emerging social network, Autoworks' engineers started to see concrete gains that they could appreciate. For instance, they found that it was becoming easier for them to optimize designs to improve such key variables as crashworthiness and fuel economy.

The process of moving from testing to final design solutions improved significantly as well. In fact, according to my analysis, engineers who changed their roles to incorporate data analytics and shifted their social networks to interact with other engineers solidified the design of their vehicles 23% faster and with 31% fewer laboratory tests than engineers whose roles didn't change. In other words, engineers were working faster and cheaper, after all.

That sounds like the kind of success Autoworks' leaders had been hoping for. It is, but with two important caveats. The first, of course, is that 40% of engineers had initially rejected the software because they hadn't found it obviously faster and cheaper. The second is that those engineers who did achieve faster and cheaper gains arrived at them via metrics that mattered to them in their roles, like design quality improvements. If senior executives had customized

their rhetoric early on to resonate with engineers' own experience of their work, they might have motivated more engineers to adopt the new digital tools sooner and secured even more significant gains.

PHASE 6: **Local performance aligns with company goals.** A digital transformation gets traction when it meets key corporate goals by employing technologies that improve local processes and results.

One reason Autoworks chose to focus intently on vehicle design is that 20 years of robust statistical analysis had identified that process — along with supply chain, regulatory compliance, and manufacturing efficiency — as critical to reducing the time it took to get cars from concept to dealer. Better time to market would accelerate top-line growth.

Needless to say, the company was happy that the technologies led to faster and cheaper designs. Rather than sit on its laurels, however, Autoworks conducted a deep analysis of how the gains had been achieved. That's how it discovered the remarkable value of the social network that had been unleashed by the new design software: Engineers who spent three times more hours discussing vehicle design with one another than they spent instrumenting simulation models dramatically reduced the amount of rework that needed to be done in later stages of development. Sure, new software helped engineers speed the delivery of a final, optimized vehicle design, but the dialogue spurred by the software accelerated things even more. By digging into its success, Autoworks uncovered knowledge that could fuel further improvements in the years ahead.

PLANNING IN REVERSE

The six phases I've just described illustrate the way change develops internally during a digital transformation. Now let's turn to how understanding this process should shape planning for your own company's transformation. As I mentioned earlier, the best way to plan is in reverse: Start by assessing what company goals you can achieve locally with new digital tools, and build from there. In my experience, business leaders can kick-start this process effectively by answering three questions.

1. Which local activities have the most potential to transform your company? Many corporate leaders know where they'd like their company to go,

but few have a clear sense of how to get there. Identifying the local activities with the highest potential to transform will affect which digital tools you bring in, inform how you lay the groundwork for implementation, and buttress your efforts to rally the company behind the changes you seek.

First, you'll need to assemble and analyze your company's data about what kinds of local outcomes best drive big organizational goals. For instance, I once worked with a large children's hospital that received many emergency transfers from community hospitals and had identified an urgent need to improve survival rates for these vulnerable patients. Digging deep into its data, the children's hospital discovered an undeniable link between transfer patients' survival and the quality of the initial diagnosis before they arrived. Seeing this link allowed the hospital to target a specific solution: a digital platform

BUSTING MYTHS ABOUT DIGITAL CHANGE
Implementing transformation often belies the hype.

THE PERFORMANCE MYTH: **New technologies have immediate and direct effects on performance.**
REALITY CHECK: New technologies usually have, at best, an indirect effect on organizational performance. They change the way employees perform their tasks, which alters people's roles, which alters the networks of people who work together on tasks. Ultimately, these changes in roles and social networks are what drive improvement in key performance metrics.

THE NOT-MY-JOB MYTH: **Implementing new technologies is the IT department's job.**
REALITY CHECK: Implementation is a job for business leaders. Most IT departments are accustomed to managing support applications, like Microsoft Office and CRM software. But today's powerful digital tools allow users to manipulate and analyze data in ways that can reinvent an organization. Rolling them out requires keen business insight and management skills. Senior leaders are most equipped to sort out where to deploy them and to understand how the tools might reshape the culture. They're the ones who know which influencers can accelerate adoption and which bureaucratic obstacles must be cleared. They're in the best position to ensure that employees actually use the technology so that they can meet the company's objectives.

THE FAILURE MYTH: **Most digital transformation efforts fail because the technology didn't work.**
REALITY CHECK: Most digital transformation efforts fail because employees didn't use the new technology. There are two main reasons for this. First, when people are not sufficiently trained, they can't apply new tools effectively, so they stop using them and find alternatives. Second, when leaders promise certain outcomes that don't quickly materialize — like an increase in customer satisfaction or swifter time to market — employees will make a principled decision that it's in the best interest of the company for them to find other methods to secure those outcomes.

that allowed community hospital physicians with little expertise in pediatric emergency care to record details about a child's physical condition that could be easily read by the expert nurses and physicians at the children's hospital, making it easier to appropriately triage transfer patients.

After you identify local activities that can drive success, it's important to measure the impact of your digital efforts in order to improve them. Sometimes those metrics are clear: The hospital knew it was succeeding, for example, when survival rates for transfer patients increased significantly. When the metrics aren't so obvious, it helps to break down whatever process you're trying to improve into discrete steps.

For instance, one large financial services company I worked with was intent on increasing knowledge sharing. That's a pretty multifaceted process, so we broke it down into several steps, like helping employees accurately identify experts and communicate with those experts. Then we launched surveys to gauge how accurately employees assessed one another's expertise and what volume of communication between people best facilitated knowledge transfer. With those baseline scores in hand, the company implemented an enterprise social networking technology that allowed employees to see what other people were working on. By tracking changes in the two measures every six months, we were able to monitor the progress of the knowledge-sharing initiative. That kind of local data is essential for any digital transformation. It's the only way to know whether behaviors deep within the company are enabling or hindering your change effort.

2. How can you foster information flow and behavioral change in your organization? Business leaders must create an environment that encourages and allows their people to achieve the local performance gains that will drive transformation. To make the most of powerful new data and analytics, employees need to be able to change tasks, roles, and social networks fluidly. Leaders can free them up to do so by understanding information flow and removing institutional obstacles to the positive social change that follows an injection of powerful new data.

How does a diagnosis of information flow help? Consider the example of a large public utility I worked with. The company saw great potential for a new digital technology that allowed for remote monitoring of utility consumption. By constantly measuring usage and sending repair crews out preemptively, the utility could avoid disastrous failures of transmission equipment. But how could the information flow within the company ensure that this preventive maintenance actually took place? The billing department, which already monitored usage on a monthly basis, would have to coordinate with the maintenance department, which was accustomed to increasing and decreasing the number of workers on the clock according to peaks or valleys in demand. This meant that some employees in billing would have to shift from being mere data aggregators and bill producers to being analysts (much like the engineers at Autoworks). Recognizing this, company leaders set up training sessions, established new targets for employees who made the transition, and hired new employees who already had these skills. In the wake of this effort, a new social network arose consisting of employees devoted to preventive maintenance, and the digital transformation proved a great success. This kind of diagnostic work is often called *organizational network analysis*; it's one of the most useful and unheralded tools for digital change.[3]

As the example makes clear, it's not enough for business leaders to know who will be employing the new technologies. They also have to know how groups of employees currently interact, so they can support the new social networks that are so critical to success. One of the reasons employees don't end up collaborating with the right people during a digital transformation is that their formal roles are misaligned with their emerging roles. If you don't enable a formal role transition for your employees and codify the changes by altering job descriptions and how you evaluate people's performance, they will be unmotivated to develop the skills to be good collaborators with their new social network partners.

3. Who are your key influencers, and how can they help your culture become digitally ready? Remember those key influencers at Autoworks? Most helped drive adoption of the new digital tools, but a sizable minority became naysayers who led colleagues to avoid the new digital tools altogether. By identifying influencers before the launch of a digital transformation, you can enlist them in your efforts to

broadcast the promise of the coming digital change.

I once worked with the leaders of a large medical device manufacturer that was about to embark on a digital transformation entailing the introduction of new technologies and a significant structural reorganization. They had a big problem: A faction of midlevel executives opposed the effort. The leaders worried that if these naysayers dragged their feet, they might sink the transformation in a bureaucratic mire.

Based on the Work Digitization Process, I knew that the best way to counter this opposition was to recruit the company's key influencers. Influencers aren't necessarily the most popular people or those highest on the food chain. More often than not, they're central players in the informal advice-seeking networks of the company. To identify them, I conducted an organizational network analysis by asking employees two simple questions: "Whom do you go to for advice about technical issues?" and "Whom do you go to for advice about strategic issues?" That helped identify the 10 key influencers in each business unit.

It was then important to turn as many of them as possible into proponents of the new changes. I started by interviewing each one and learning about their initial reactions to the change. Some liked both the new digital tools and the reorg; others thought both were terrible; and a third group was mixed — they liked the reorg but not the technology, or vice versa. I then developed an internal marketing plan for each group. Working with the company, I provided hard data that supported the first group's inclination, giving them something concrete to point to when evangelizing. Company leaders and I then met with the second group to show how the changes could amplify the positive aspects of their current work patterns and discuss ways that things they didn't like could be improved. We provided the third group with examples of how the reorg and the new technologies could build on each other to drive significant change. That solidified support and won over quite a few skeptics. We deepened the influencers' involvement by asking them to help us generate the messaging that would convey the benefits to the bulk of the workforce.

We didn't win everyone over. But taking the influencers seriously paid big dividends. In the business units where we worked with influencers, the company saw a more than 75% adoption rate for the new digital tools; in the few business units that we didn't work with, less than 25% of employees got on board.

BEHIND THE GLIMMERING PROMISE of becoming a digital company lies a stark reality: Implementing digital technologies to create meaningful change is hard work. To make a digital transformation take off, business leaders have to first understand the internal chain of events that is set off by the introduction of new technologies. Only then can they lay the groundwork for success, working from the end of that chain (those places where local improvements can drive big corporate goals) to the beginning (where business leaders exhort the workforce to support a massive digital disruption of the status quo). Success doesn't automatically arise from sparkling rhetoric and bold promises. Instead, it depends on decisions made by employees on the front lines. The reverse planning outlined in this article will help them make the right choices.

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