

Unlocking the full power of automation in industrials

The automation of nonphysical core processes is an often-overlooked source of value in industrials.

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Automation will drastically alter the way companies work, and this potential makes it a top priority for many business leaders. Indeed, McKinsey research shows that up to 50 percent of work performed today can already be automated with currently available technology.¹ However, companies in the heavy industry sector (such as in energy, mining, utilities, and manufacturing) tend to struggle to set bold aspirations, develop robust business cases, and devise effective deployment approaches to take advantage of automation. Building these capabilities could help these companies capture benefits at scale, improve customer and employee experience, and build a long-term competitive advantage.

Although an array of automation initiatives in the sector are targeted at physical processes that increase the efficiency of site operations, research indicates that nonphysical core processes have higher automation potential. Nonphysical core processes, which involve the collection, processing, and analysis of data, are more easily and effectively automated compared with their physical counterparts. And once automated, these nonphysical processes can help bolster broader automation and digitization programs.² For example, wrench-time (direct maintenance activity that adds value to a process, system, or asset) records of chemical technicians at a nuclear plant reveal that about 25 percent of their work adds value. Our analysis suggests that automating repetitive work, such as data entry or verifying system trends, can double the share of a technician's value-added work. Doing so can help heavy industry secure significant economic benefits, increase efficiency, and improve employee experience—all at much lower levels of risk to production, safety, and health than what is involved in automating physical processes.

Streamlining core processes is becoming easier with maturing technologies, lower implementation costs, and greater awareness of and skills in lean processes, agile, and design-thinking methodologies. In such an environment, companies

that don't prioritize automation in their core enterprise strategy risk falling behind more forward-looking competitors.

Delayed impact at heavy industry companies

The heavy industry sector isn't lacking in exploring or attempting automation, but those attempts rarely benefit the bottom line. A recent McKinsey survey found that 88 percent of respondents from the heavy industry sector have either embarked on an automation transformation or are planning to start one in the next year (Exhibit 1).³ Less encouraging, only 4 percent report capturing significant bottom-line improvements. Worse still, more than half of respondents believe it will take anywhere from a year to more than three years to realize bottom-line benefits—or simply don't know. Yet more than 40 percent believe their organizations have been “successful” or “very successful” at meeting their automation targets.

This mismatch between measurable results and respondents' perception of the success of their automation initiatives suggests that respondents use a different metric. Instead of fundamentally changing the way their organizations work, they have been measuring their ability to raise awareness about automation and deploying automation technology. But this mind-set impairs organizations' abilities to make meaningful changes and generate value. In fact, many automation programs in heavy industry exceed their budgets while making no quantifiable operational impact. Done right, we have seen the most successful automation transformations allow companies to capture 20 to 40 percent efficiency gains and generate a positive return on investment in 12 to 18 months.

The main culprit for a bungled automation transformation is a failure to scale. Companies often find themselves stuck in pilot mode, testing a smattering of technologies such as robotic process automation (RPA) or business-process-management tools to address isolated obstacles

¹ For more, see “Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages,” McKinsey Global Institute, November 2017.

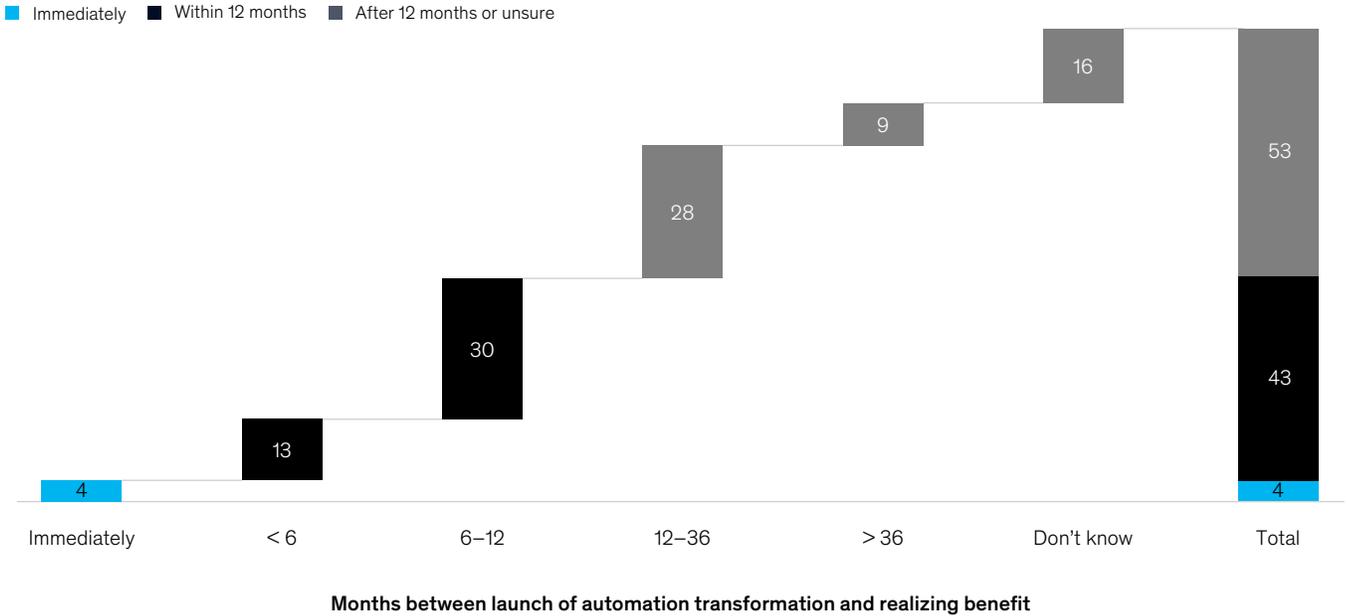
² For more, see “Jobs lost, jobs gained.”

³ Analysis of “The automation imperative,” September 2018, McKinsey.com.

Exhibit 1

Only 4 percent of heavy industry’s automation transformations have created bottom-line results.

% respondents realizing bottom-line benefit



Source: "The automation imperative," September 2018, McKinsey.com

without improving end-to-end processes. Such efforts are typically not anchored in robust, comprehensive business cases that focus on transforming core processes with clearly defined change management and workforce reskilling.

The full power of automation in heavy industry

Heavy industry’s distinctive characteristics necessitate a tailored approach to accomplish ambitious automation goals and ensure sustainable process changes.

First, operations and technology functions are already somewhat integrated in sectors such as banking and high tech; this is ideal for scaling automation transformations. By comparison, heavy industry typically has highly fragmented field workforces that operate separately from technology functions. Second, heavy industry often has more risk-averse cultures than companies in other sectors, sometimes contributing to a distrust of

digital technology. Line workers often prefer a high level of human involvement over digital tools, largely because of misgivings about changing effective manual processes and automating high-risk processes that affect production or safety.

Finally, the labor-force dynamics in heavy industry can make the short-term business case for automation difficult to justify. For instance, utility companies in the United States represent the second-highest unionized workforce in the country,⁴ which makes reskilling roles around technology and reassigning a significant share of the workforce to higher-value activities challenging.

Despite these hurdles, industrial companies are identifying exciting use cases for automation, and some have managed to transform at scale. Examples include mining companies using analytics and machine learning for work-order planning and scheduling, utility companies using RPA to replace time-consuming regulatory reporting, and energy

⁴ Union affiliation of employed wage and salary workers by occupation and industry database, US Bureau of Labor Statistics, January 18, 2019, bls.gov.

companies automating their budgeting process and using analytics to highlight potential performance gaps to make operational improvements. To help industrials undergo successful automation transformations, we identify five critical steps to scale up from these pilots in a way that addresses the sector's discrete challenges.

Set an aspirational target and support it with strong executive sponsorship

Setting the tone for a successful automation transformation requires the leadership team to weave an ambitious vision into the overall enterprise strategy. This vision should be defined in terms of measurable efficiency and effectiveness improvements that would add value to the organization. It should also extend beyond financial measures to include key performance indicators such as risk management, employee satisfaction, and customer experience. Because technology-enabled transformations often demand cultural changes and retraining of the workforce, executives must model these practices and values and clearly articulate the necessity and value of refocusing work (see case study, "Vision setting for a utilities company").

Transform processes end to end instead of grafting technology enhancements

On average, a majority of work can be automated, though few individual roles can be fully automated, which means most roles will continue to require some level of human intervention. For example, 27 percent of activities in a record-to-report process in finance can be automated (Exhibit 2). The only way to capture that productivity gain is to redesign the end-to-end process, redefine roles, and reassign people to higher-value activities (see case study "An end-to-end transformation of a procure-to-pay process").

Indeed, the key to comprehensive automation is to fundamentally recalibrate employees' focus to encourage work that requires human problem-solving and decision making. When beginning such an undertaking, organizations must consider all associated activities (including ones across functional boundaries) and stakeholders (including external ones, such as customers and suppliers).

Case study

Vision setting for a utilities company

The CFO of an electric utility company wanted to set audacious goals for a comprehensive transformation of the finance function that was consistent with the company's digital aspirations. The vision encompassed both aggressive efficiency targets and operational improvements:

- Overall efficiency improvements of 30 percent
- No human intervention on collecting and processing data

- Month-end closing processes that lasted two days instead of two weeks¹
- Self-serve dashboards delivering 80 percent of reports
- Time savings from these improvements used to triple organization-wide time spent on using data to generate insights

This shared vision of a move away from rote and routine tasks toward higher-value and more engaging work centered

on insights joined the members of the organization around common goals. As a result, the team was able to launch the transformation in eight weeks and broke even on the investment in the program in 12 months.

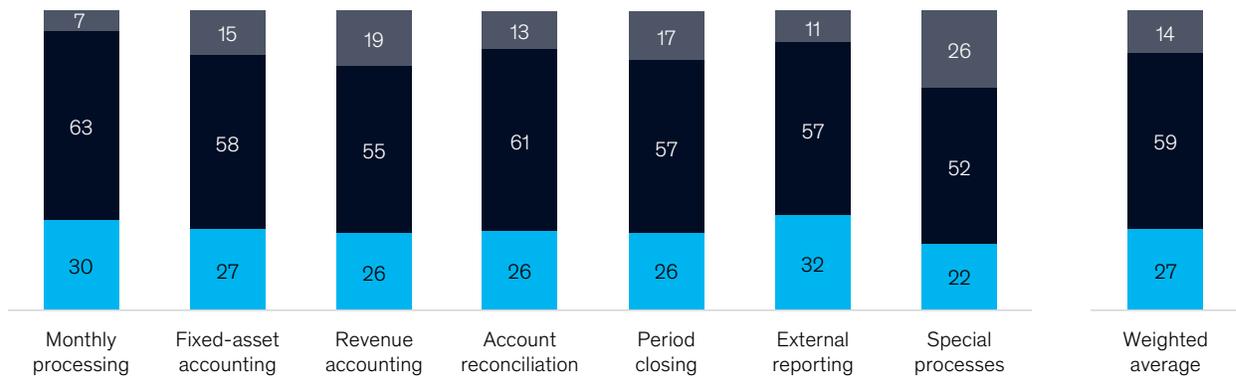
¹ Month-end closing is the accounting process by which entries for the current month are finalized.

Exhibit 2

27 percent of the record-to-report process can be cost-effectively automated with current technologies.

Degree of automatable record-to-report process, %

■ Automatable ■ Difficult to automate ■ Not automatable



Case study

An end-to-end transformation of a procure-to-pay process

A global mining company had numerous hitches in its procure-to-pay process. Low rates of compliance with the official procurement procedures, poor data quality, and poor adherence to contract terms led to significant losses.

Over the course of four months, the company took the following steps to transform its entire procurement process:

- Assembled a team of finance, procurement, and site-operations experts to support the process redesign
- Eliminated unnecessary process steps
- Applied design thinking to interactions with stakeholders, such as supplier contacts
- Used a full suite of technologies—including robotic process automation, optical character recognition, natural language processing, and visualization tools—to limit human operators' involvement to cases requiring judgment

The new process not only improved the company's relationships with suppliers—it saved costs up front, increased the rate of early-payment discounts, and increased the company's process adherence rate from 30 percent to 85 percent in the first six months following the transformation.

To fully realize efficiencies from automation, companies can combine traditional approaches (such as demand management, which involves streamlining processes and requirements) with automation tools (such as RPA and workflow tools) to promote automation and more seamless handoffs between workers. This transformation is not a technological project but a core reboot of the way work is done.

Incorporate a portfolio of automation technologies

A recent McKinsey survey found that heavy industry companies tend to rely most heavily on RPA for their automation initiatives; 44 percent of heavy industry uses this technology.⁵ But the most successful companies across industries have more varied portfolios of automation technologies. For example, 20 percent of companies outside the heavy industry sector are experimenting with natural language processing, compared with only 6 percent of heavy industry⁶ (see case study “Automating a reporting process with a collection of digital tools”).

⁵ Analysis of “The automation imperative.”
⁶ Analysis of “The automation imperative.”

Thanks to easy-to-deploy digital tools, it is now relatively low risk for industrials to incorporate more technologies and amplify the effects of automation. Indeed, maturing technologies have introduced a variety of automation tools for performing a range of tasks (see sidebar “Digital tools can help companies comprehensively transform processes”).

Develop organizational capabilities to sustain automation transformations

For automation transformations to be sustainable, they cannot be isolated to the project level. As such, companies that succeed at achieving at-scale transformations invest in building in-house capabilities that can weather rapid technological changes and enable agility in day-to-day operations.

While an exhaustive inventory of capabilities to sustain automation transformations isn’t required, companies do need to develop and maintain some key skills, such as agile methodologies, design thinking, and full-stack development. Those that

Sidebar

Digital tools can help companies comprehensively transform processes

Stabilized by maturing underlying technologies, digital tools can supplement and even replace human involvement across five primary categories: visualization, decision making, automation, recording, and identification.

Visualization tools provide real-time interactive data displays. They can replace current management reports and eliminate the disruption of ad-hoc reporting requests.

Decision-making tools incorporate advanced analytics, artificial intelligence, and cognitive agents. They help organizations make more effective predictions (for example, by generating precise forecasts) and support strategies.

Automation tools include robotic process automation, smart workflows, optical character recognition, and natural language processing. Removing manual work helps improve efficiency and effectiveness and allows employees to focus on insight generation.

Recording tools collect, process, structure, and store data. The centralized data storage they provide allows professionals across the company to access a single, consistent source of data.

Identification tools, such as process mining, can help identify processes suitable for digitization. They help companies identify process-improvement opportunities.

Automating a reporting process with a collection of digital tools

- A utility transmission company wanted to radically streamline its internal reporting process (exhibit). To accomplish this goal, it took the following steps:
 - Built a data platform for the whole organization
 - Automated the collection, cleansing, and aggregation of data
 - Implemented business-intelligence tools to create reports on demand
 - Used advanced analytics to conduct variance analysis and forecasting;
 - Used natural language tools to generate basic narratives based on the data

Exhibit

Advanced technologies can automate information-intensive processes.

		Reporting journey				
		Prepare data	Process data	Distribute reports	Deliver insights	Deliver ad-hoc reports
Current		Data manually gathered, sourced, and cleansed	Routine analysis manually performed by analyst	Inflexible report contents and manual distribution	Insights manually developed ad hoc (pull vs push)	Ad-hoc requests, creating distractions from value-added work
Future		Basic reports gathered, validated, and generated by business-intelligence platform	Standard reports generated through business-intelligence tools Long-term trends and predictive insights identified by machine learning	Self-serve access to standard reports	Automated narratives through natural language processing Insights validated and enhanced by analysts	Ad-hoc analysis via business-intelligence tool Advanced data management and analytical capabilities provided by available analysts
Next-generation levers		Automated reporting	Automated analytics	Self-service	Natural language processing Analytics	Dashboard Analytics

have been most successful at creating value through automation invest heavily in building and maintaining capabilities—both by hiring new employees with the necessary technical skills and by reskilling high-potential employees for

higher-value business areas. Companies can also maintain a steady pace of internal development by providing training curriculums for roles that are crucial to the automation transformation team. Such training would ideally combine theoretical learning

with practical applications. No matter the specific approach, continuous upskilling should be framed as an ongoing journey rather than a one-off exercise.

Companies can begin to develop internal capabilities in low-stakes ways. The best first step is simply to get started. A best practice is to assemble a small cross-functional team of eight to 12 members (see case study “Launching transformations with small cross-functional teams”). This team should include representatives from IT (such as developers and architects) and the business (such as process designers and subject-matter experts) and receive support and

coaching to develop new-to-the-company skills (such as agile methods and design thinking). Once the organization has confirmed that the team’s work and training are valuable and replicable, it can scale the team to implement the full road map of opportunities and create similar teams in other areas of the organization.

Manage implementations as business transformations

Many industrials mistakenly manage automation as a technological transformation when the goal should be to achieve business results. Certainly, automation transformations should take

Case study

Launching transformations with small cross-functional teams

A global power utility set up a nine-person “automation pod” to propel a digital transformation of its HR organization. This transformation would be the pilot for an eventual company-wide digital transformation. The company assembled a team with a mix of skills and responsibilities:

- A product owner who bears chief responsibility for the new process. This person also makes critical design decisions.
- A scrum master to direct the day-to-day logistics of the transformation using agile methodologies such as brisk work cadences and frequent status updates.
- A process designer who uses design thinking to redesign processes from end to end.

- A technical lead who is deeply knowledgeable about the available technologies that can support the development team.
- Three developers who are skilled in full-stack development (work that includes databases, servers, and systems engineering). They are the execution team that builds the technology solutions required.
- An internal IT lead to support the production of new technology solutions and to ensure that they are securely integrated into the current IT infrastructure.
- A process owner who can advise the team about the process the team is transforming.

This team was able to transform its first process within six months. The team’s success demonstrated the way an automation transformation can proceed with the help of agile methodologies and served as a test case for the “automation pod” approach to process transformations.

As the program expanded, the original team scaled the company’s digital and agile capabilities through training and internal certifications. By the end of the enterprise-wide transformation, the company had a permanent digital center of excellence of more than 100 people.

Building an investable execution plan

A manufacturing company wanted to ensure a rapid and profitable digital transformation, so it validated the value of the transformation and incorporated the corresponding information in the business plan. The team spearheading the effort spent eight weeks accomplishing the following tasks:

- Implementing four proofs of concept across the procure-to-pay process to demonstrate the ease and speed of implementation
- Quantifying the potential value of automation across all core processes in the company
- Creating a detailed execution plan for the use cases that would support full core-process automation
- Building a bankable business case that outlined how the transformation could be managed and tracked with specific performance indicators

The business case allowed the leadership team to fully understand the benefits of transforming their core processes and plan for making it happen. In addition, the detailed preparation helped leaders track the transformation's performance and ensure that it achieved the projected efficiency savings of 20 to 30 percent.

place in close collaboration with IT—but organizations should take care to validate proofs of concept then quickly pivot to building solutions that yield bottom-line value.

Proofs of concept demonstrate the organization can implement the proposed technologies and create value. In parallel, organizations should create comprehensive business cases for each underlying technology to generate the investments required to launch and scale automation programs. A detailed execution plan (that includes strategies for scaling up the team) must complement the business case so the organization can manage the execution as a business process, complete with regularly reviewed

performance targets and indicators (see case study “Building an investable execution plan”).

The key and the challenge for industrials attempting automation transformations will be to act quickly without waiting for perfection. Companies can extract value from automation by setting high aspirations at the outset, empowering a pilot team to pioneer small-scale transformations and scaling the transformation through end-to-end processes in partnership with IT. Managed properly, automation transformations can produce significant business impact and provide a strategic advantage.

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