

strategy&

***Industrial
Manufacturing
Trends 2018–19***

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**New strategies
for IoT investment**



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Introduction

For many industrial manufacturers, what was once a clear path to success is now fraught with uncertainty. Making equipment for a wide array of industrial activities — such as big construction projects, large industrial facilities, oil and gas fields, and refineries — has for years been difficult to navigate, but major companies often used their size to sidestep obstacles. The strength of having multiple product lines covering the full gamut of industrial operations frequently allowed industrial manufacturers to eke out profits from some segment of their customer base even as slowdowns imperiled other sectors.

But juggling business in this way is no longer a viable strategy, particularly if a company relies on traditional machinery for its revenue streams, as many industrial manufacturers do. Customers increasingly seek improved efficiency and production transparency from connected technologies and digitization. Their loyalty to companies that fail to offer innovative products is waning. Equally important, the inherent advantages of large, diversified organizations — such as lower cost of capital and sophisticated talent development and recruitment programs — are diminishing as capital market efficiency improves lending outcomes for all participants and increasing information transparency provides windows into attractive new jobs across the corporate landscape for the best prospective workers.

These trends have been slowly emerging over the past few years, but the pace has quickened for digitized devices particularly. By our reckoning, a significant portion of new sales growth for industrial equipment manufacturers in the immediate future will come from connected equipment with sensors, actuators, and analytical insights that can exchange critical data with other machines and computer networks in real time via the cloud. Indeed, 72 percent of manufacturing companies [surveyed by PwC](#) said they are dramatically increasing their level of digitization and expect to be able to be ranked as digitally advanced by 2020, compared with just 33 percent today. These companies are committing US\$907 billion per year — about 5 percent of revenues — toward greater connectivity and smarter factories.

Also additive manufacturing, incorporating 3D printing, is rapidly catching on and transforming business models in the industrial world. This less wasteful and more efficient new production approach potentially rewrites the book on minimum product runs, the need for warehousing, plant location and design, and maintaining spare parts. Yet, despite aggressive and optimistic projections for advances like the Internet of Things (IoT) and additive printing and their impact on customers, industrial equipment manufacturers have barely dipped their toes in the waters of these aspects of Industry 4.0.

Even those industrial equipment makers that have embraced IoT technology and are taking proactive steps to prepare for this new industrial digital ecosystem face barriers. Lack of standardization in this relatively new arena makes research and development efforts arduous and expensive, especially since this equipment will be implemented in complex operating environments requiring coordination among multiple facilities, users, and networks. Moreover, customers, fearing technological obsolescence of freshly purchased equipment, are reluctant to take a chance on products that require long testing periods and learning curves. That goes against the grain of industrial manufacturers, whose traditional business models called for developing products with elongated life cycles.

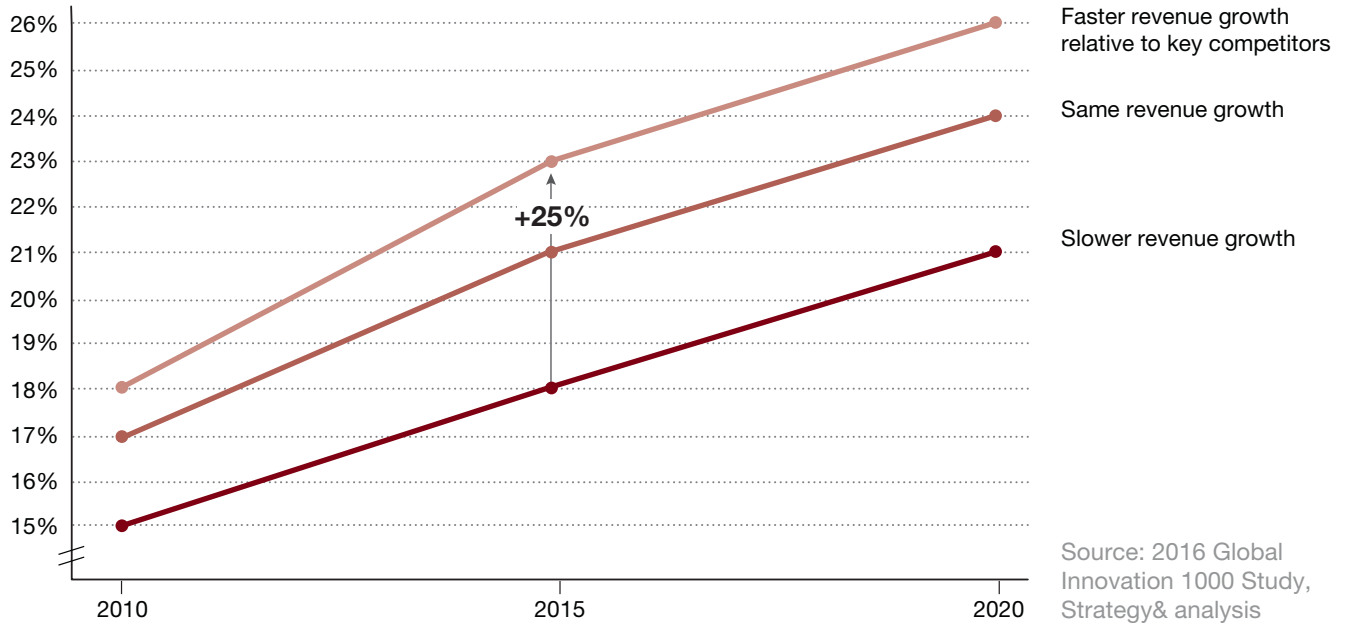
There is no single cookie-cutter solution to these challenges. However, if you are an industrial manufacturing executive, this would be a perfect time to take a deep breath and reexamine your company's portfolio through the lens of the new set of conditions you face. The payoff for a digitally oriented organization, adapting quickly to new technologies, is not a pie-in-the-sky forecast anymore; it's real. Data shows that across all industries, companies that earmark money for R&D spending on software earlier than their competitors enjoy greater revenue gains (*see exhibit, next page*).

The primary aim at this point should be to get out in front of the digitization trend via strategies that let you free up capital to invest in emerging technologies that will enable a potentially significant revenue stream in the future. Sprawling, incoherent portfolios work against this goal because they suffer from operational and administrative complexity, often bedeviled by "bolt on" acquisitions made for incremental financial benefit. Despite initial intentions, these acquired product lines fail to decisively improve company performance, while their dissimilarity impedes efforts to develop common technology platforms for equipment to communicate.

For many industrial manufacturers, organizational reengineering by aggressively reshaping and resizing their portfolios represents a profound change. But in today's charged business atmosphere,

Software-focused growth strategy for industrial manufacturers

Total R&D allocated to software offerings



you need to move quickly to stay relevant, anticipating and meeting customers' demands for more connected products and services before they look elsewhere for solutions.

We have mapped out two paths to consider for starting the process of rightsizing your portfolio and navigating toward a more digitally oriented future. These paths are largely complementary and may even overlap.

Route A: Spin-offs

Ask yourself, “Are we truly running efficiently, or are our legacy businesses dragging us down?” Aggressive acquisition sprees of the past have created broad and, some might say, bloated portfolios that are hobbling opportunities in the digital economy, constraining financial and strategic resources that should be targeted at new growth platforms and innovations in product areas closer to the company’s core and customer needs.

By divesting unneeded parts of overly diversified product portfolios, industrial manufacturers can achieve a number of critical outcomes:

- Free up cash for research and development of more valuable, strategic, and so-called disruptive products
- Begin a broader streamlining of the overall corporate bureaucracy, which may be prohibiting agility
- Help identify and shed business units in areas that don’t easily lend themselves to IoT technology, which is particularly important for companies that see their future tied to connecting highly engineered products to associated services
- Stay off the radar screen of activist investors that are increasingly compelling large conglomerates to unlock value

Recently, some industry players have begun to take the divestiture path precisely to address one or more of these imperatives. For instance, General Electric (GE) announced plans to divest its water and industrial solutions, transportation, current, and lighting divisions, representing total revenues of \$20 billion over two years. GE is also exploring the possibility of spinning off its healthcare information technology businesses, and in the past few years it has pruned its portfolio by shedding NBCUniversal, its plastics division, and most of GE Capital.

Similarly, in October 2017, Honeywell announced its intention to simplify its broad portfolio by spinning off two stand-alone, publicly traded companies: one from its transportation systems business and the other from its Homes product portfolio and ADI global distribution business. The decision was part of a rigorous portfolio review that will allow Honeywell to focus on high-growth businesses related to aerospace, commercial building products, performance materials, and safety products. The move also frees up as much as \$15 billion for acquisitions in more innovative technologies and product areas.

Although acquisitions in digital and IoT arenas are tempting, it's important for industrial manufacturers not to waste the opportunity to build more connected technology capabilities internally after a broad divestiture. Which brings us to the second route that companies could travel.

Route B: Digital divisions

There are stages of digital maturity that some industrial manufacturers are already beginning to go through. At the minimum, digital novices are linking up with innovative companies in limited, nonexclusive relationships to access certain necessary technologies but have no comprehensive digital strategy. Other companies are vertically integrating some bespoke digital technologies into their product and service offerings. However, on the more mature side of the scale, digitally advanced industrial manufacturers either are collaborating with other companies to develop new digital technologies that they can own and embed into their products in a unique way or are creating technologically focused R&D units that operate almost as separate companies.

A good example of the collaboration approach is a recent deal that links the Schindler Group, which makes elevators, escalators, and other mobility equipment, with General Electric to develop software and advanced analytics to monitor the performance of Schindler's products. The goal is to use the data from this Schindler proprietary tool, which will cover the comings and goings of more than 1 billion people a day, to identify potential service issues before they occur and launch new products based on customer behavior.

As for semi-independent R&D units, which can run the gamut from relatively freewheeling incubators to better-funded and focused business teams, they should be able to be leveraged across all operating units in the "traditional" organization. In other words, their developed technologies should ultimately serve the strategic direction of the company as manifested by the products and services the company is poised to deliver now and in the future. In addition, new digital divisions should help to inject more entrepreneurship into the organization while allowing the parent corporation to command higher multiples, closer to the levels that technology companies have grown used to.

An example of these units is United Technologies (UTC) Digital Accelerator, a \$300 million investment in a state-of-the-art technology hub based in the newly hip neighborhood of Dumbo in Brooklyn, N.Y., far away from UTC's corporate mother ship in Connecticut. The new division is charged with developing software overlays for UTC's product and service portfolio, which includes such varied items as jet engines and elevators. And in a similar vein, the tool and construction equipment company Stanley Black & Decker has opened a manufacturing "center of excellence" in Hartford, Conn., that is charged with developing and perfecting next-generation industrial technologies encompassing IoT, cloud computing, artificial intelligence, 3D printing, robotics, and advanced materials.

Rather than going all-in on digital divisions initially, some industrial companies may prefer to start small, with a team of perhaps a half-dozen to a dozen people possessing digital and design expertise, as well as commercial capabilities, and representing various organizational functions such as data analytics, architecture, or software development. Although the incubator would be highly collaborative with other business units, it should have relative autonomy to facilitate a more entrepreneurial culture and avoid any legacy biases or distractions during the proving-out phase of the digital products and business lines.

The overall advantages of a digital unit include more agile and timely product design, a departure from traditional operating models. For example, prototyping, a method first used by software companies, allows the startup teams to quickly develop and test new products and capabilities without the delays inherent in large organizations, which are often bogged down by layers of management and protocols. In addition, these teams could test the market with so-called minimum viable products, which have sufficient features to attract early adopters who can provide feedback for subsequent full-fledged versions of equipment or devices. Such pilot products can also assess customer sentiment for specific innovations and measure their value in the marketplace as well as to the industrial manufacturer itself.

To be sure, making the incubator concept work requires a lot of foresight. All too frequently, departmental budgets are slashed when company quarterly expectations aren't met, and these programs are often the first to go. But sticking with them can reap long-term benefits, as digital units are scalable and able to grow in both size and resources as IoT adoption and penetration speed up.

Of course, the more ambitious digital units represent huge investments that can take years to pay off. Consequently, to facilitate the development of new technologies and conserve resources for developing innovative proprietary products internally, some industrial

manufacturers and large technology companies are joining forces in nonprofits to test broad applications and processes in the IoT arena, as well as to promote the IoT concept globally. For instance, Siemens, GE, and Fujitsu are among upward of 100 companies (including AT&T, Cisco, IBM, and Intel) in the Industrial Internet Consortium (IIC), which helps in the development and deployment of industrial Internet technologies. Gleanings and results from joint efforts like IIC are intended to be used by digital divisions for their bespoke design efforts.

Building a culture of resilience and speed

Technological transformation is meaningless without a culture that enables risk taking and change, and talented employees who can manage, implement, and sustain a specialized portfolio of products and services in a cutting-edge and connected manufacturing world. Whichever IoT investment strategy industrial manufacturers choose, succeeding over the long term requires organizational overhaul to attract the best teams, as well as investment in the existing workforce to help longtime employees build the skills necessary to keep up with the digital revolution.

It's common to react to market challenges by cutting costs and downsizing the employee population. But a program of rapid change, hiring, and firing in response to every market bump will likely fail. Instead, the goal should be to identify critical current and future talent needs that the organization must nurture even while managing the shareholder demands faced by public companies. It's essential to create within the organization a consistency of core values and a shared mission among diverse employees who feel empowered to work across functions to test out new ideas and challenge the status quo.

To create this nimble new workplace, industrial manufacturing leaders need to do the following:

- 1. Start attracting talent now**, and be more open about where they will find their best employees. In a recent PwC study of the German workforce, 89 percent of respondents said digitization will demand hiring of new employees with the necessary qualifications, while 81 percent said they are having difficulty finding qualified candidates. Creative solutions to fill the talent gap include hiring people who are not necessarily prepared for a career in industrial equipment — indeed, who may have preferred a job in Silicon Valley or someplace attractive like that — but are technologically savvy and potentially a great asset for a manufacturer in transition. Allow these new hires to work with experienced industry personnel to build a healthy mix of talent on each team. And importantly, establish new units such as UTC's Digital Accelerator for these fresh recruits to ply their technological skills and add value to the company.

- 2. Invest in education and training.** It's well-known that the U.S. educational system has poorly prepared the general workforce, which is often lacking the math, engineering, and programming skills necessary to operate the factories of the future. Other countries, including Germany, have gotten this right by adopting apprenticeship systems that educate workers on the job. Industrial equipment manufacturers should consider following that example, or partnering with community colleges, nonprofits, and government agencies to develop skills training and vocational programs that will prepare entry-level employees for a company's specific needs. In-house training as well as external partnerships will also help to prepare the existing employee base to program, operate, and maintain the robots and digitally enabled machinery they will be standing alongside in the production lines.

- 3. Remake the workplace culture.** Industrial manufacturers must compete fiercely with tech companies and startups to attract more millennial talent. These workers tend to prefer flexible work environments that are light on hierarchy and encourage creativity and risk taking. UTC's Digital Accelerator is adopting this approach in attempting to woo as many as 300 people with expertise in technology areas like product management, software development, data science, analytics, and cybersecurity by offering a work space in Brooklyn designed like a vibrant startup.

Industrial manufacturers must get out in front of this war for talent. Corporate culture that has been part of a company's DNA for decades cannot be overhauled overnight. These businesses need to start building workplaces and processes to attract and retain the most skilled and educated workers before the next big wave of hiring hits.

The biggest challenge for industrial manufacturing companies in the process of digital transformation isn't the technology — it's the people. It's critical not to underestimate the importance of this part of the equation as leaders implement a new era of digital industry. Success will depend largely on the digital IQ of leaders and their teams. The makeup of the workforce will need to change drastically, but transformation can be hard on individual employees. Leaders must deploy and enhance change management capabilities to help ease their people through this radical disruption, working closely with teams across all functions before, during, and after implementation.

The road ahead

Once they have embraced the decision to go full forward with IoT and connected technologies, industrial manufacturers need to navigate their way along these paths with precision and care. Whether they decide to invest, divest, build up capabilities organically, or add to their digital strengths through M&A or external alliances, their strategies require a level of self-awareness and a deep understanding of their core strengths, operational goals, and vision for the future.

But, again, the one option they do not have is to continue standing still.

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