



# The Digital Manufacturer in Europe

Resolving the Service Dilemma

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## Resolving the Service Dilemma

European manufacturing conjures images of modern production facilities churning out some of the finest products in the world—whether from Airbus or Audi, Rolls-Royce or Renault (to name a few). With more than two-thirds of all EU exports coming from manufacturing, the sector continues to be an important engine for growth.<sup>1</sup>

However, as we shall explore in this paper, Europe is lagging in some critical aspects of digital innovation, particularly in comparison with its Asian competitors. This at a time when European manufacturers face an array of challenges:

- Germany, Europe’s manufacturing powerhouse, contends with labor shortages and high wages, along with the rising cost of raw materials and falling global demand.<sup>2</sup> Moreover, the nation is reeling from a scandal at Volkswagen in which falsified emissions data have exposed corruption and eroded credibility.<sup>3</sup>
- Italy, struggling to emerge from a recession, has also been impacted by the scandal at Volkswagen, with its network of parts suppliers depending on the car maker. The slowdown in China has further suppressed exports.<sup>4</sup>
- France’s factories report a production decline that places the nation ahead of only Greece in the eurozone; job losses mount as orders from abroad fall.<sup>5</sup>
- U.K. manufacturers have been affected by difficulties in the Chinese economy, which have depressed the prices of many manufactured goods.<sup>6</sup> This, combined with a strong pound, has contributed to an ongoing lag in manufacturing exports as the nation emerges from recession.<sup>7</sup>

In such a climate, competition becomes ever more fierce and manufacturers must seize every opportunity and competitive advantage they can find. Increasingly, such advantages—along with new threats of disruption—come from digital technologies.

In a [recent Cisco survey](#) of executives from both industrial machine builders and end-user manufacturers<sup>8</sup> (see “About This Study”), 79 percent of global

### About This Study

To help close the services value gap, Cisco initiated a comprehensive research study of industrial machine builders and end-user manufacturers. The survey includes opinions from more than 600 senior decision-makers across 13 countries, with 128 coming from France, Germany, Italy and the United Kingdom. We also conducted qualitative interviews with key industry thought leaders, along with in-depth secondary research and economic analysis.

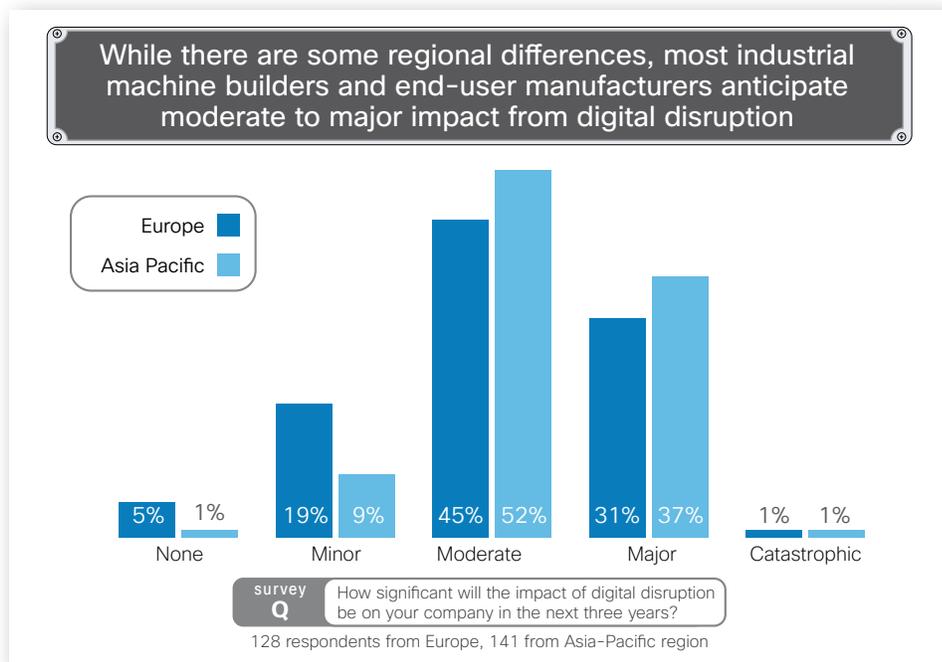
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Figure 1

respondents believe that digital disruption will drive a moderate to major impact at their companies in the next three years. While that figure rises to 90 percent among Asia-Pacific nations (for this survey, China, South Korea, Japan, and India), it falls to 77 percent for European manufacturers (for this survey, Germany, France, Italy, and the United Kingdom) (see [Figure 1](#)).

Despite this lag in awareness among European manufacturers, some are responding to the challenge of digital disruption in proactive ways. The Industrie 4.0 incentive is an example that is being driven by the German government together with manufacturers such as Bosch and Siemens.<sup>9</sup>



Source: Cisco, 2015

A critical element of manufacturing innovation will be in the form of new business models, particularly regarding services and value-added offerings.<sup>10</sup>

Machine builders in Europe and around the world have long felt the lure of the service-oriented revenue model as a driver of growth and new revenue—one that significantly benefits their end-user manufacturer customers.

In effect, simply making a good product may no longer be enough. Increasingly, what happens after the product is sold looms ever larger. Machine builders that successfully leverage services are using them to drive disruptive new business models that, in effect, enable them to charge for business outcomes—such as plant uptime—just as they now charge for physical products sold as a capital investment.<sup>11</sup> Companies that don't harness services—by converging their service and digital journeys—will risk falling behind in a rapidly changing marketplace in which innovation and agility rule.<sup>12</sup>

European manufacturers are celebrated for the high quality of their products, but a purely product-centric mindset may be a hindrance moving forward. As we will see, they risk falling behind their global competitors in the transition to service-oriented revenue models.

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Rolls-Royce Holdings is a pioneer in transitioning to the service-oriented revenue model. The company, the second-largest manufacturer of aircraft engines, has leveraged its expertise in maintaining and repairing jet engines, while leaving the airlines to their own specialty: flying. In an outcome-based model, Rolls-Royce is paid for continuous uptime, rather than waiting to fix engines once they falter.<sup>13</sup> A key component of this business model is that Rolls-Royce draws more added revenue when the airlines themselves succeed—not when their planes are grounded. As one analyst remarked about Rolls-Royce’s TotalCare service, “They aren’t selling engines, they are selling hot air out the back of an engine.”<sup>14</sup>

### The ‘Service Dilemma’

Despite a clear impetus to act, however, only a select few manufacturers have successfully transitioned to service models. We refer to this as the “service dilemma.”<sup>15</sup> The gap between the desire for services and their limited success has existed for decades.<sup>16</sup> Machine builders and end users agree strongly on their intention to move into services. However, they acknowledge that in the near term, services will not grow faster than products—a major inhibitor that is slowing the transition to services.

Technology advances often bolster business models that drive innovation, efficiency, sustainability, and cost savings. Such advances in automation are causing many firms to rethink their overall strategy. In particular, the importance of connected products and connected machines in manufacturers’ service-oriented strategies—along with the mounting complexity that they bring—is creating new opportunities and challenges.

In effect, the services journey has now converged with the digital business journey. Many European manufacturers are in the early stages of connectivity.<sup>17</sup> By accelerating their digital business transformation, they will be able to better navigate complexities of moving to the service-oriented revenue model with greater ease and speed, less cost, and more effectiveness.

## Digitization Lays the Foundation for Service-Oriented Revenue Models

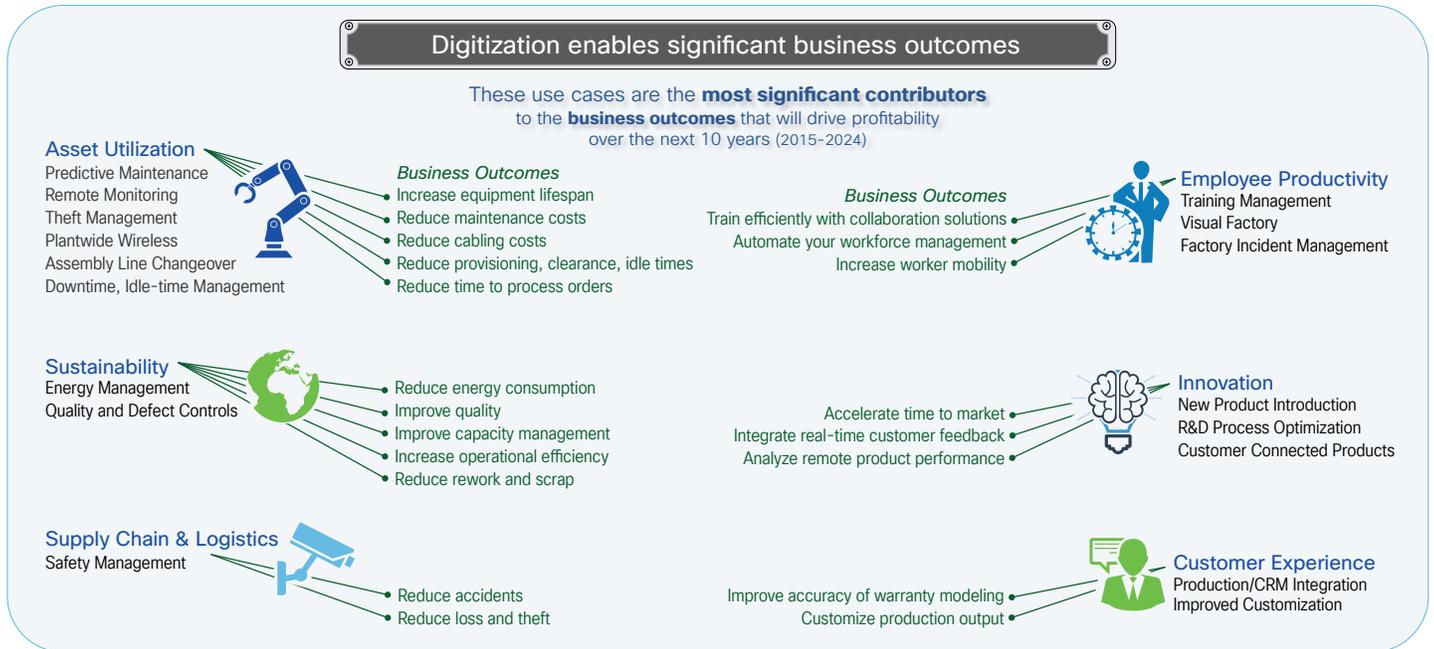
Cisco defines digital business transformation as organizational change through new business models and the use of digital technologies to improve performance. It enables greater, more contextualized insights and increased speed and agility, among other advantages.

### Service Dilemma defined

1. Manufacturers are challenged to improve profitability
2. They invest in new services
3. New services increase complexity
4. Increased complexity creates profitability challenges

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While many machine builders and end-user manufacturers have a digital agenda, a considerable roadblock is cost, especially amidst decreasing growth and flat-to-down budgets. However, the pace of business is accelerating exponentially. Manufacturers will need to take advantage of self-funding opportunities. With the pace of business accelerating every day, manufacturers must create a sustained competitive advantage by managing their own disruption and transformation. This requires that they fundamentally change how they operate, with a greater degree of speed. The good news is that manufacturers will capture significant value as they further digitize.

In a report by the Global Center for Digital Business Transformation, an IMD and Cisco initiative ([“Digital Vortex: How Digital Disruption Is Redefining Industries”](#)), nearly four of the top 10 manufacturing incumbents were considered vulnerable to digital disruption in the next three years. However, 41 percent of manufacturing respondents did not feel that digital disruption was a C-suite concern.<sup>18</sup> Given the threat of disruption, such a lack of concern is clearly a mistake.

Cisco’s latest Digital Value at Stake analysis confirms the opportunities. (Cisco defines Value at Stake as the potential bottom-line value that can be created, or that will migrate among companies and industries, based on the ability to harness digital capabilities over the next decade.) We project \$383 billion in total industry Digital Value at Stake will be driven by connected products,

**Asset Utilization**  
(example use case)



**Benteler**

Based in Germany, Benteler supplies safety, environmental, and efficiency solutions to vehicle manufacturers worldwide. In Benteler’s automated, self-running manufacturing plants, every tool and part is connected to the network, and every step in the production process can be analyzed and controlled from the cloud. Factories can easily move production lines and products from one line to another. The modular solution will result in more agile and efficient factory floors while controlling costs.

[\[learn more\]](#)

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connected machines, and new service models over the next 10 years.<sup>19</sup> The payoff for an average \$20 billion manufacturing firm that digitizes is a 12.8 percent profit upside over the next three years, and 19 percent over 10 years.

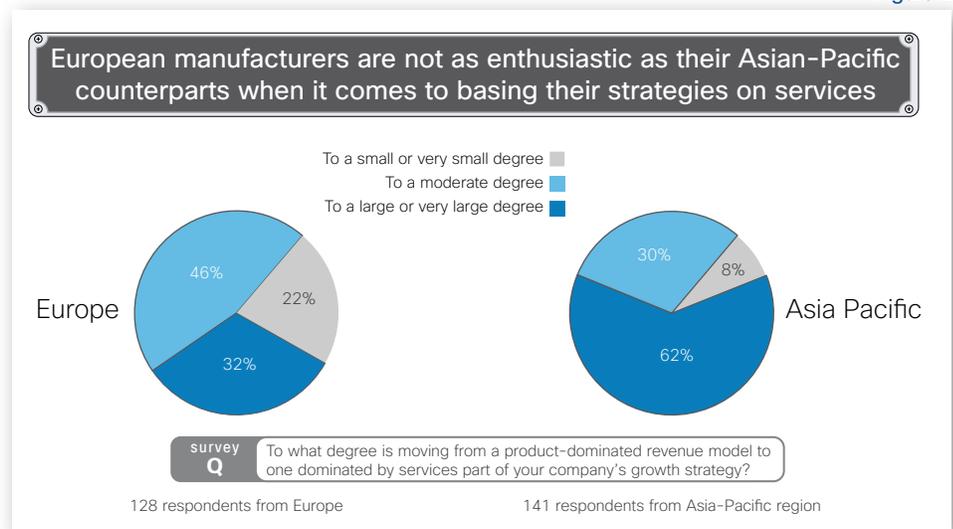
While manufacturers have made significant inroads toward digital transformation, it is increasingly clear that the digital opportunity is accelerating dramatically faster than their current capacity to change.

## The Digital Age Demands Transformation in Technology and Business Models

The promise of services exhibits a powerful pull on manufacturers that want to remain competitive in the digital age. Rather than simply selling an industrial machine for a one-time fee, for example, machine builders can offer a product that—once connected within the plant or, ultimately, across an ecosystem—can be offered as a service in a recurring revenue model. In addition, by virtue of being connected, the machine’s performance and utilization data can enable new value-added offerings, including predictive maintenance, quality control, plant-floor efficiency, and customer engagement.

Our survey suggests that the transition to a service-oriented revenue model is top-of-mind for Asian manufacturers, while their European competitors are lagging. More than half of manufacturers interviewed in the Asia-Pacific region agree to a large or very large degree that their companies plan to grow by transitioning to services (62 percent), compared to 48 percent in the Americas and only 32 percent in Europe (see [Figure 2](#)).

Figure 2



Source: Cisco, 2015

## Europe Trails Asia in Capturing Value from Services

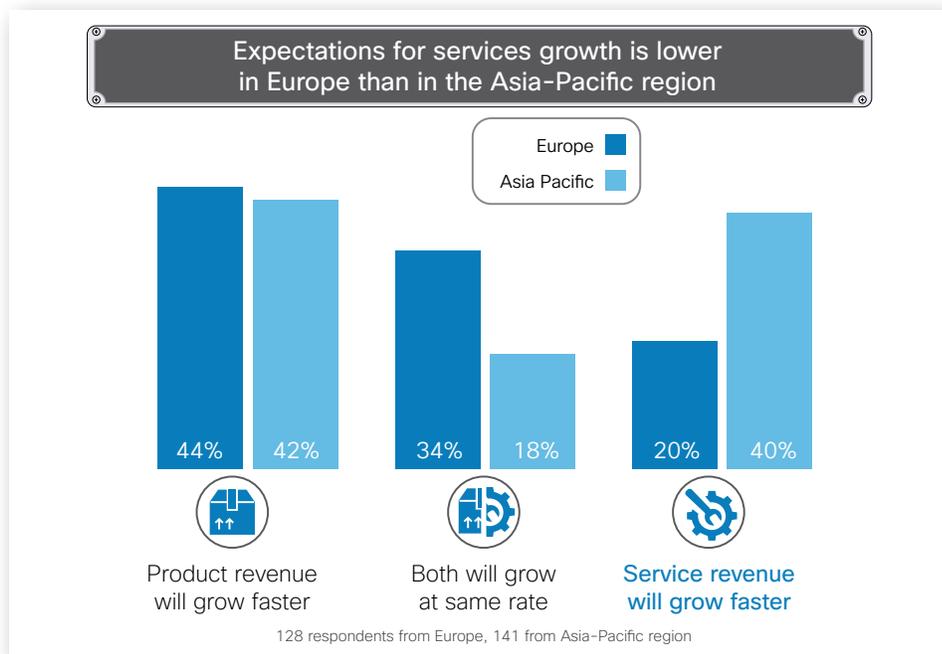
Many manufacturers struggle with the transition to services due to the immediate prospects of service revenue being smaller than those of traditional product offerings. They want the flexibility to leverage both CapEx and OpEx; but in order to achieve this, they need to diversify.

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Figure 3

Globally, just 29 percent of respondents indicated services would grow faster than products. This is despite services growing, in the vast majority of instances, from a much lower base. Once again, Asia is ahead, with 40 percent of respondents believing that services will grow faster than products (see Figure 3). This was notably higher than the percentages expressed by their counterparts in the Americas (28 percent) and Europe (20 percent). Again, European manufacturers should be well aware of the greater openness to innovation and business-model change expressed by their Asian counterparts.



Source: Cisco, 2015

Moreover, the top goals of European manufacturers in pursuing a service-oriented revenue model are focused on enhancing current businesses by reducing production costs and improving productivity, and on deepening relationships with existing customers. These are, of course, laudable and important goals. However, they do not reflect the opportunity to pursue new growth opportunities.

The opportunity to generate significant new growth rests upon the agility and insights that come with digitization.

### Digital Capabilities Are Core to Success

Overall, the move from products to services is driving what could be called a “two-front war” in manufacturing—in effect, trying to maintain existing quality standards while at the same time moving into unexplored realms.

At the core of these challenges is the fact that manufacturers are not themselves “technology companies”; yet, services increasingly demand they must be. As General Electric CEO Jeffrey Immelt has stated, “All companies need to become Internet and software companies. The industrial world is changing dramatically, and those companies that make the best use of data will be the most successful.”<sup>20</sup>

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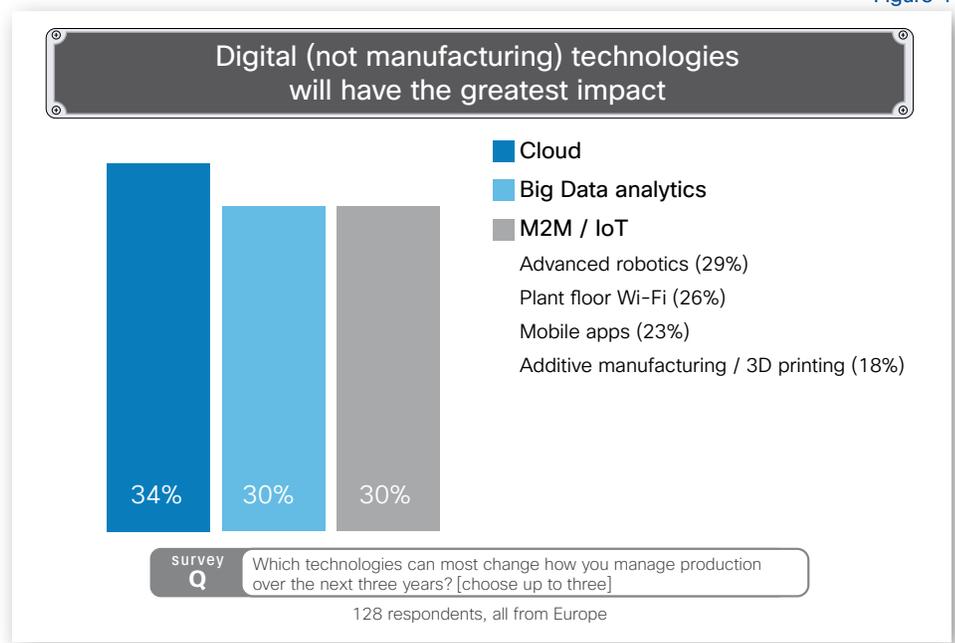
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Many European manufacturers are in the early stages of digitization and the transition to services. While some have begun to connect industrial machines on the plant floor, sharing data among makers, end users, third parties, and so forth is complex. One reason is a large percentage of proprietary protocols, which hinder interoperability. This is a situation that Industrie 4.0 is looking to remedy with its open protocols.<sup>21</sup>

The challenges are clear to our European survey respondents. In their eyes, the No. 1 downside of services is greater dependency on third parties (32 percent), followed by complexity in product / service lifecycle management (30 percent) and difficulty in delivering services profitably (26 percent). In fighting a “two-front war” on both the product and service fronts, manufacturers will need to operate and share data across an expanded ecosystem of partners, third-party vendors, and so forth. Especially in Europe, many manufacturers are small and medium-sized enterprises that lack some of the broader digital capabilities that will be critical moving forward.<sup>22</sup> Partners and collaborators will assume an increasing role in solving the complexity issues that arise from new technologies and business models.

Digital operating models provide more options when moving to an as-a-service model. These models require fundamental capabilities (analytics, compute at the edge, infrastructure/software/cloud) that allow organizations to continue evolving.

When we asked European end users and machine builders which technologies will have the greatest impact on production over the next three years, they cited digital capabilities such as cloud, analytics, and machine-to-machine (M2M) communications (see [Figure 4](#)). As with our global totals, this is notable because of what respondents did not emphasize: “manufacturing” technologies such as robotics, 3D printing, and so forth. This underscores the pivotal role of digitization in manufacturing’s evolution, especially as connecting across an entire ecosystem—not just the plant floor—becomes essential.



Source: Cisco, 2015

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### Connected Machines: Data-Driven, Networked, and Ever Smarter

To further explore the impacts of digitization on capturing service value, we focused on one key manufacturing use case: connected machines on the plant floor. Connected machines can come in several different forms—devices monitored in-house, devices monitored by a third party, or a new concept: “machine-as-a-service” (MaaS), in which the end-user manufacturer (that is, the customer) pays for a business outcome (for example, better uptime, improved production efficiency) as an operating expense, rather than buying a physical machine as a capital investment.

In our survey, we found that the “connected plant-floor machines” use case is a highly mature opportunity among European machine builders, with 43 percent already receiving telemetry from customers’ plant environments, and another 46 percent planning to do so. Just 7 percent of machine builders have no such plans. Of those machine builders already receiving telemetry from their customers’ plant-floor machines, 52 percent strongly agree with the following statement: “Our company gets a lot of value from the data we receive from the machines we sell to customers” (another 40 percent somewhat agree). These percentages were similar to the global totals.

Also consistent with the rest of the world, European end-user manufacturers view the MaaS model for connected plant-floor equipment in a positive light. However, at 76 percent “fairly” or “very” interested, Europe still lags behind Asia (89 percent) and the Americas (85 percent). The primary benefits of MaaS for European manufacturers are agility for manufacturing process change (37 percent) and quality improvement (34 percent).

Predictive maintenance is a critical application enabled by connected machines and data analytics. It allows workforces to maintain the machines that need their attention most, anticipating breakdowns before they cause downtime.<sup>23</sup> In an industry in which original equipment effectiveness (OEE) metrics typically hover around 60 percent, such improvements promise true competitive differentiation.<sup>24</sup>

End-user manufacturers with access to predictive maintenance via connected machines highlighted the importance of digital technologies in maintaining uptime. Nevertheless, Europe lags behind global competitors once again. In our survey, 79 percent of European end-user respondents highlighted the critical importance of predictive maintenance, calling it either a “somewhat” or “very” positive capability. This compared with 95 percent of Asia-Pacific respondents and 87 percent globally. As European manufacturers expand their digital foundations, they will be able to extend such offerings beyond standalone “point” solutions limited to the plant floor.

#### Asset Utilization (example use case)



##### Bosch

Bosch integrated its connected power tools into a system for tightening industrial fasteners (nuts, bolts, rivets, and screws) with the correct amount of torque and speed to meet high-precision manufacturing standards. It also captures process data for real-time analysis to drive accuracy, quality, and safety.

This has improved accuracy by recording torque data for hundreds of thousands of bolts; manufacturers can identify discrepancies and potential causes of faults. Engineers can improve processes and productivity in real time to detect problems for improved quality and safety. Based on open standards, Bosch’s connected tools can fit seamlessly together, regardless of tool brand or type.

[\[learn more\]](#)

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### Transform Now To Capture New Value

Clearly, European manufacturers are interested in exploring use cases such as connected machines, but they also struggle with navigating operational complexities to capture value from services. Moreover, they risk being outpaced by global competitors that adapt and innovate faster. European manufacturers are famous for the high quality of their products, but they cannot afford to be complacent in adhering to a product-centric mind-set.

To alleviate complexities such as the “two-front war,” organizational silos, and a broader ecosystem of partners and third-party vendors, manufacturers must build a solid technology and business-process foundation. As long as the foundation is solid, they will have the flexibility to re-engineer their business based on digital capabilities and business models, as they extend their solutions beyond the plant floor across an extended ecosystem.

For many European manufacturing leaders, budgets are flat and additional technology investments can appear daunting. Digital transformation, however, requires a “save to invest” strategy. Increases in plant uptime, business agility, and customer engagement will offset initial costs. For example, [Cisco research](#) on enabling digital architectures found that such investments would drive 20 percent savings on IT costs, which could be deployed elsewhere in the business.<sup>25</sup> As we have seen in this study, an average digital manufacturer can drive a 12.8 percent profit gain projected over three years. The real cost is in not transforming.

Digital business transformation will enable manufacturers to:

**Build a Hyperaware Organization:** To implement competitive new business models, manufacturers will need agile IT architectures, hyperaware analytics, and overall business agility. That is, if they are to respond to customers and end users in real time, while ensuring quality and uptime with unprecedented standards of excellence. Security must be built-in at every step, across the entire network, not simply added piecemeal on an app-by-app basis.

**Make Informed Decisions:** Manufacturers need to treat analytics as a core capability. All of that data generated by new connections will need to be transformed into insight.<sup>26</sup> Manufacturers need to move from making machines to generating value by gaining insights from data. In the digital age, no one goes it alone. Data insights will need to be shared securely across an expanding ecosystem of partners, customers, and third-party vendors. Manufacturers will need a new model to orchestrate that

#### Asset Utilization (example use case)



#### Maserati

Maserati needed to improve flexibility and speed in new car model rollouts while reducing costs. The company implemented connected factory and connected machine solutions, seamlessly integrated with pervasive Wi-Fi and cloud networks. Results have included faster speed to market; improved quality, resiliency, and availability; and flexibility for fast plant reconfiguration.

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dynamic ecosystem and derive insights from data mined from far-flung sources. This will require foundational business and IT capabilities. In short, if manufacturers don't first transform, they will fall far short in their efforts to become innovative, agile ecosystem players.

**Execute Fast:** The process of changing business models is a highly complex endeavor that cannot be achieved by facing these challenges on a piecemeal basis. Industrial machine builder and end-user manufacturer leaders will need to shift perspective from building an organization known only for reliability to that of an organization—underpinned by data analytics—that is known for its speed and agility.<sup>27</sup> Each firm will need the business process and technology foundation to drive business agility; this will in turn enable innovation and business-model change while breaking down silos between IT/OT and engineering/services. Organization-wide digital business transformation—powered by the right technology foundation—will enable the speed and business agility that allow firms to meet these challenges and outpace their competition.

### A Digital Revolution in European Manufacturing

Without looking at the service transition through the lens of digital business transformation, the efforts of manufacturers in this area will continue to falter. Technology change is critical, but it must be undertaken in concert with organizational change. That demands consistent policy and company culture, driven by top-down leadership from the C-suite and the board of directors.<sup>28</sup>

As we have seen, European manufacturers face an increasingly volatile market climate. As our survey results reveal, they understand the threat of digital disruption, along with the need for innovation and business model evolution. However, their global competitors, especially in Asia, threaten to outpace them in terms of digital innovation. In such a climate, “staying the course” is not a viable option. Only digital transformation will keep Europe a manufacturing powerhouse in the digital age.

Organizations that transform will experience a new era of innovation, with concrete gains in uptime, safety, energy savings, and customer engagement. By driving organization-wide digital business transformation, the winners will leave the service dilemma—and their competitors—behind.

#### Asset Utilization (example use case)



#### Airbus

Airbus has begun investments in smart tools and connected machines for its Factory of the Future. The company is using a rapid prototype approach to develop new technology from initial proof of concept to real application. The integration of cyber-physical systems and data analytics enables smarter production and allows operators and machines to collaborate in the same physical environment

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