

Competition has never been higher in manufacturing, and outside factors can cause major disruptions overnight. A manufacturer's data strategy has become essential to success.

Manufacturing Transformation Requires Data-Driven Decision Making

January 2021

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Introduction

Customer and market expectations for more personalized products, deliveries, and services — as well as unanticipated events and sudden demand shocks such as COVID-19 — are driving change and creating opportunities for a company to transform how its operation stays aligned with its markets. Lean and other types of continuous improvement philosophies used by operations teams in factories and plants will always be important. These methods have benefited companies as they pushed for operational excellence. However, to achieve the balance between efficiency and resiliency while remaining competitive, leading organizations are now becoming more connected. Manufacturers are creating, gathering, and analyzing critical data throughout their operations and product engineering processes to increase awareness of market changes and automate decision making.

The act of connecting and synchronizing pertinent data across upstream and downstream roles is referred to as building a digital thread. Connecting business processes to eliminate siloed data and apply analytics to newly expanded and contextualized data removes bottlenecks and empowers workers to make rapid and confident decisions. Applying analytical models, digital threads, and real-time Internet of Things (IoT) data in a digital twin framework supports resilient decision making from the large data sets created in operations.

Connecting business processes, eliminating siloed systems, and applying analytics to these newly expanded and contextualized data streams empower organizations to make rapid and confident decisions. Expanding to look at data across operations, products, and the supply chain allows a company to become more aware of market dynamics, which is a critical part of operational resiliency. It is clear that data and resiliency go hand in hand; manufacturers more so than companies in any other industry must make these initiatives an integral part of their overall strategy (see Figure 1).

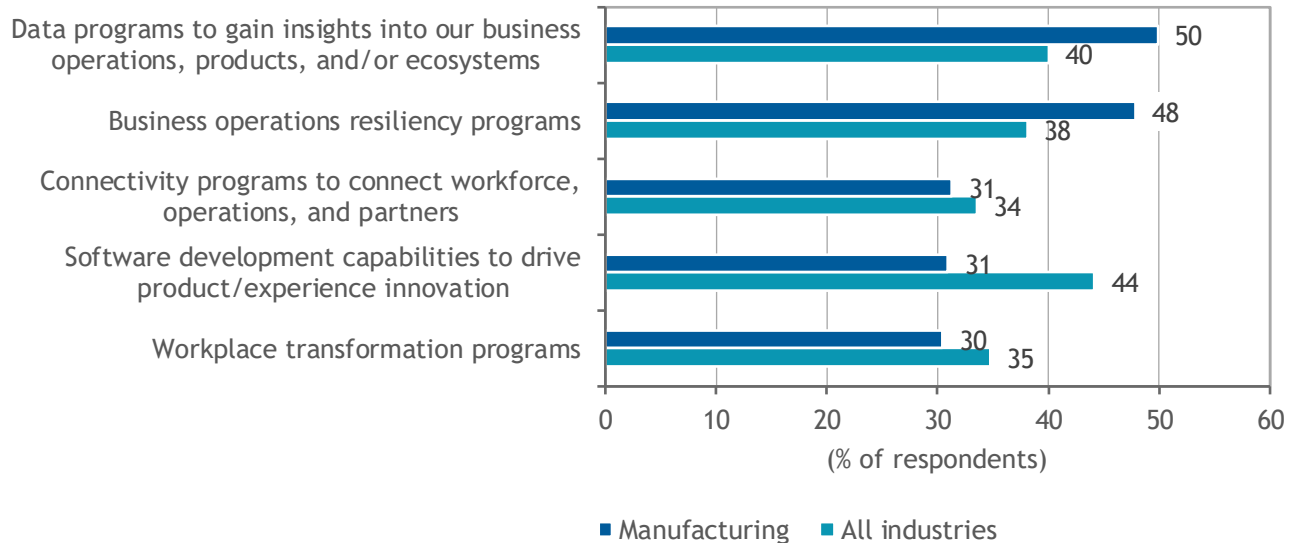
AT A GLANCE

KEY STAT

» Operational data generation will increase 2x–3x over the next five years.

WHAT'S IMPORTANT

The ability to connect business processes, eliminate silos, and apply analytics to newly expanded and contextualized data streams empowers organizations to make rapid and confident decisions.

FIGURE 1: **Top Manufacturing Priorities Through 2021**

Manufacturing n = 134

Source: IDC's COVID-19 Impact on IT Spending Survey, September 2020

The Importance of Technology

IDC defines the future of intelligence as an organization's capacity to learn, combined with its ability to synthesize the information it needs in order to learn and to apply the resulting insights at scale. The ability to continuously learn at scale — and apply that learning across the entire organization instead of in silos at a faster rate than the competition — is the crucial differentiator that will separate those with greater enterprise intelligence enterprises from their peers. While manufacturers are much more automated today than they were five years ago, significant opportunities to better leverage technology remain. Resilient decision making through automation not only speeds decisions through decision support but also potentially limits dependency on human involvement in more repetitive decision-making tasks.

An advanced level of automation in decision making provides more rapid and effective actions in times of crisis and addresses an overall need to draw insights from the rapidly growing amounts of data being generated and ingested by the organization. Resilient decision making is not solely about predicting or responding to larger and potentially longer-term disruptions; it is also about deftly navigating the multitude of small "divergences" that occur almost continuously within global operations.

The following key business strategies enable resilient decision making:

- » Enabling continuity through predictive analytics
- » Having autonomous artificial intelligence (AI)-driven decision making and control
- » Creating digital scale through a new digital engineering organization

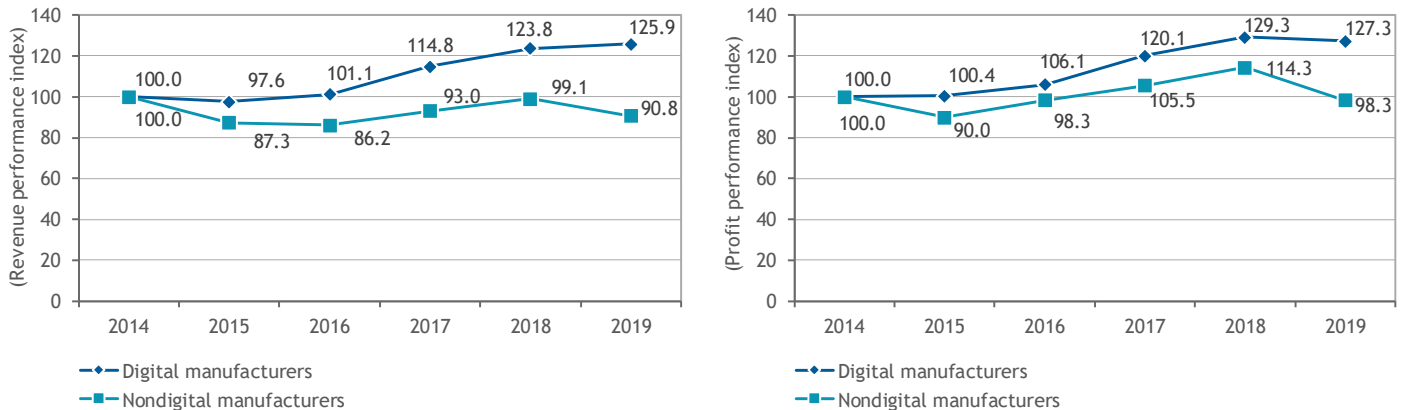
- » Becoming market driven through hyperconnected products
- » Achieving resilience through ecosystems

However, it is not sufficient to just have data and insights. Manufacturers also need agile decision making and flexible business processes to translate these insights into proactive and automated actions. Becoming more proactive can drive improvements across the entire manufacturing value chain. Assets can be monitored in real time and shut down if thresholds are exceeded, without the need for human intervention. Field service can be scheduled automatically based on service needs through remote monitoring. These are just a few use cases where automating actions to become proactive rather than reactive can drive value to a manufacturer; however, all areas of the business should be considered.

Benefits

Digitalization has long been the backbone of operational effectiveness for manufacturers. IDC's recent Digital Manufacturing Study of 680 publicly traded manufacturers highlights the clear advantage that occurs over time for organizations that embrace modernization efforts (see Figure 2). Over the study's six-year period, digital manufacturers benefited from a 26% increase in their revenue performance index (RPI) and a 27% increase in their profit performance index (PPI). During this same time, nondigital manufacturers experienced a decrease of 9% in RPI and a decrease of 2% in PPI.

FIGURE 2: *Digital Initiatives Impact the Top Line and the Bottom Line*



n = 680

Source: IDC's Digital Manufacturing Study, 2020

However, the biggest takeaway from the study is how the gap between the two groups increases over time. Many companies have already acted, using digital technology to make better decisions, and they are reaping the benefits. This gap has only increased as a result of COVID-19 as manufacturers with digital investments already in place were able to adapt much faster than those without. The question nondigital manufacturers need to ask themselves is, How much longer can we wait? The more time that passes without taking any action, the more of an advantage their peers experience. In today's highly competitive manufacturing environment, where disruption can occur at any moment, companies cannot risk inaction.

Even with a strong digital plan in place, organizations face significant external and internal challenges in becoming resilient. Perhaps one of the most important aspects of the entire transformation is setting priorities for digital initiatives. Among manufacturers, two priorities have risen to the top in recent years:

- » **Smart manufacturing/Industry 4.0.** Asset management is a core aspect of smart manufacturing, and transforming this process through remote monitoring, control, and predictive analytics can serve as the foundation for operational resiliency. For manufacturers that have proper data and AI frameworks such as digital twins in place, transforming asset management can also lead to control and autonomous operations that support resilient decision making.
- » **Supply chain planning and execution.** Supply chain resiliency will allow companies to react more quickly to internal and external events as well as speed "time to recovery" for larger disruptions. IDC expects that by the end of 2021, more than half of all manufacturing supply chains will have invested in supply chain resiliency and artificial intelligence, resulting in productivity improvements of up to 15%.

Considerations

Manufacturers face many challenges when building and executing on a data strategy, which often results in pilots that fail to scale and a lack of return on investment for these initiatives. Common pitfalls holding manufacturers back include:

- » **Legacy/siloed systems.** One of the most frequently cited roadblocks to becoming a data-driven enterprise is the use of legacy or siloed systems. The issue of silos has existed for years but is becoming worse in today's data-rich world. However, silos extend to more than data; they also affect organizational structure, staff, and processes. Silos result in lost productivity, exposure to unnecessary risk, opportunity cost, and sub-standard customer, employee, and external stakeholder experiences. Modernizing these systems is a crucial first step for any manufacturer because it serves as the foundation for actions and insights. A "digital divide" is forming, with digitally enabled manufacturers more focused on innovating and trying to capture market share, while nondigital manufacturers are still focused on cost cutting and selling off high-risk projects.
- » **Reliance on outdated information.** Manufacturers tend to focus most efforts on information capture and delivery of reports that highlight past performance rather than supporting all the steps in the decision-making process that involves a range of descriptive, diagnostic, predictive, and prescriptive analysis methods. Few enterprises can pervasively provide decisioning functionality to help evaluate scenarios, understand key drivers, recommend next best actions, and do all that and more in a collaborative environment among internal and external subject matter experts.
- » **Lack of a cohesive and comprehensive data, analytics, and AI technology architecture.** The variety of data has resulted in a plethora of data management technologies, advances in AI have resulted in a broad range of model libraries and services that vary depending on use case and data types, and new deployment models have distributed data more widely across on-premises and multiple cloud platforms requiring new data orchestration and data intelligence capabilities.

Manufacturers that already made investments in modernization were better prepared to respond to disruption.

Conclusion

The manufacturing environment is changing faster than ever before. As the industry comes to terms with this shift, organizations that embrace resiliency will become the most successful. The improvements that can be realized through data-driven decision making are too important to overlook. Given the complexities of managing the increasing amounts of data from products, operations, and ecosystems, manufacturers should consider working with a partner that can help them modernize their systems and turn their data pilots into full-scale deployments.

About the Analyst



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Reid Paquin is Research Director for IDC Manufacturing Insights responsible for the IT Priorities and Strategies (ITP&S) practice. Mr. Paquin's core research coverage includes IT investments made across the manufacturing industry and manufacturers' progress with digital transformation. Based on his background covering the manufacturing space, Mr. Paquin's research also includes an emphasis on the technology enablers that help manufacturing executives make better-informed operational decisions.

MESSAGE FROM THE SPONSOR

Move from After-the-fact Analytics to Real-Time Insights and Actions to Drive Business Excellence

Manufacturers can drive business excellence by ensuring their data provides timely and meaningful insights, and most importantly, drives timely and effective actions.

This requires a fundamental rethink of how data and analytics are applied to business operations:

- » Recognize the proliferation of real-time data from multiple sources beyond traditional enterprise systems, including human operators, digital twins, sensors, and edge devices.
- » Accept that traditional approaches based on a more static view of data – e.g. data warehouses and after-the-fact analytics – will not address the complexity and velocity of modern Manufacturing operations.
- » Ensure that the increasingly varied and complex data are integrated and analyzed in real-time, utilizing modern analytics solutions that integrate seamlessly to all sources of data.
- » Shift focus from reports and dashboards to intelligent workflows that drive automated actions in real-time based on the analytics and insights.

Find out more at www.nttdataservices.com/data-driven-enterprise.

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