ANALYST BRIEF

Sponsored by: Plex

The ability to simplify and optimize decision making through digitization has become invaluable to manufacturers focusing on operational predictability and resiliency. Leading manufacturers are more likely to possess the foundation for data-driven operations and are experiencing the benefits.

Laying the Foundation for Data-Driven Operations and Digital Maturity

September 2023

Written by: Reid Paquin, Research Director for IDC Manufacturing Insights

Introduction

The manufacturing industry has had to respond to consistent supply chain disruptions, geopolitical restrictions, and an ever-changing workforce, shattering manufacturers' best-laid plans in recent years. This has resulted in higher costs, longer delays, lower quality, and poor visibility — the opposite of Lean Six Sigma objectives. At the same time, concerns about demand volatility, inflation, workforce instability, and economic uncertainty have increased throughout the year, putting a renewed focus on shrinking revenue and profit margins. Companies have been forced to rethink long-term strategies and investment priorities, with little confidence that they have the data or experience to make informed decisions.

Competing in this dynamic environment has led numerous manufacturers to rethink fundamental aspects of their operations, and many have realized that a digital-first strategy is critical to success. However, traditional manufacturers understand this transition as a journey filled with complex challenges that affect innovation, production, efficiency, and delivery against growth targets. To counter this instability, manufacturers have been accelerating digital investments to lay the foundation for data-driven operations to quickly adapt to unforeseen disruptions and position themselves for growth when the business environment improves.

Operations digitization remains a safe bet for manufacturers looking to deliver sustainable value to the business. The reason behind this focus on operations becomes clear when examining the potential impact on the business from downtime. IDC's June 2022 *IT/OT Convergence Survey* showed that the average cost per hour of unscheduled downtime is more than $115,000 in manufacturing. While many factors can influence the cost of downtime (e.g., company size and manufacturing segment), even small improvements to asset downtime can save millions over a year.

AT A GLANCE

KEY STAT

» Manufacturing digital leaders experienced more than two times the revenue improvements and almost three times the profit improvements when compared with manufacturing digital laggards.

KEY TAKEAWAY

By investing in digital technologies, manufacturers have seen improvements in operational efficiency, product quality, and customer satisfaction. However, the most mature digital manufacturers are now tapping into new revenue streams, optimizing their supply chains, and enhancing their risk management capabilities.

Data-driven operations have been a notion for years, and manufacturing is progressing down the maturity path, but most of the industry is still in the earlier stages: digitizing assets and utilizing real-time visibility to monitor performance. There are five stages in IDC's data-driven operations maturity framework:

1. **Ad hoc:** This includes anecdotal and paper-based data processes. Decision making is hierarchical, slow, and prone to miscommunication. Data that exists is local, siloed, and lacking context.
2. **Opportunistic**: Decision-making processes are still largely hierarchical and dependent on local data analysis and interpretation. Data is only available on a role and site basis.
3. **Repeatable:** Decision making becomes more distributed, collaborative, and data driven. Data is available across roles, and best practices are identified and shared across operations.
4. **Managed:** There is near-perfect visibility of operations anywhere and anytime, as well as a high degree of predictability. Data access and management are centralized, and data carries context throughout its life cycle.
5. **Optimized:** Resiliency is built into the process automation through a dynamic system of digital twin capabilities. Data is high quality and ubiquitous both internally and across the value chain.

The potential return on investment increases sharply as a manufacturer progresses further in maturity. This is evident when viewing the maturity framework of leaders (those manufacturers outperforming their peers) and laggards. When focusing on the beginning of the framework, 47% of digital laggards are still stuck in the ad hoc and opportunistic stages (versus less than 20% of leaders). At the other end of the spectrum, 44% of digital leaders are in the managed and optimized stages of data-driven operations (versus only 19% of followers). Diagnosing issues before they arise is what all manufacturers need to strive for. This is how a manufacturer can shift from being reactive to proactive when it comes to operations — something that digital leaders are better suited to accomplish than digital laggards.

Leaders are far more likely to use a collaborative decision-making process that includes business partners and external resources.

A key issue for the least mature companies is that many still approach data-driven operations from an ad hoc perspective. These organizations will see almost no operational improvements and thus face competitive stagnation. Any new technology initiative will face resistance and will be siloed in adoption or application-specific limits. This inertia is a major challenge that manufacturers must address to start their journey toward data-driven operations. While most are in the second and third stages of the maturity framework, it is the last two stages in which leading organizations have the greatest advantage. In these stages, companies begin to experience step-change improvements in operational performance driven by broad data/insight access and high-fidelity models. Operational data is now contextualized, and organizations are better positioned to extract greater meaning. There is near-perfect visibility of operations anywhere and anytime as well as a high degree of predictability, all delivered to the relevant stakeholders. In addition, this access to operational data drives widespread collaboration within and across groups. This collaboration includes the extended value chain that can access and exchange salient data to improve upstream and downstream partner outcomes. Traditional business models — including responsibilities within the extended value chain — get disrupted, and new business models emerge for these leading manufacturers.

Technology solutions have continued to mature, and manufacturers do not need to rely upon siloed legacy systems. System modernization brings a company's existing infrastructure and application portfolio to a point where the pace of digital operations is maintainable. The overall goal for manufacturers should be to create a well-defined road map for data-driven operations, one that progresses the company down the maturity path to deliver increasing value to the business as the company matures.

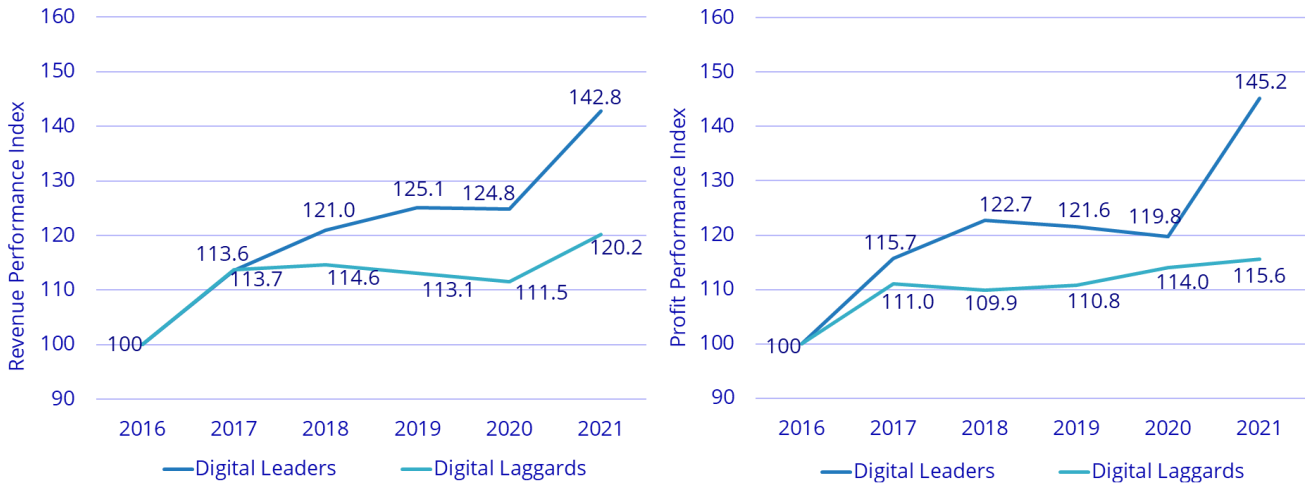
Benefits

The speed and complexity of manufacturing operations are increasing faster than ever. Organizations hoping to compete in the digital economy can no longer accept manual/paper-based processes. Effective decisions are always based on data analysis and information, not speculation or conjecture, and this is no different for operational-related decisions. Automated data collection is the basis for creating the real-time enterprise and is usually a telltale sign of a successful organization versus a poorly performing one.

Digitization has long been the backbone of operational effectiveness for manufacturers. IDC's May 2023 *Digital Manufacturing Survey* of 3,129 manufacturers highlights the clear advantage that accrues over time for organizations that embrace digitization. The study included the analysis of financial information (revenue and profit details) for the top 5,000 manufacturing organizations (more than $250 million in global revenue), which was extracted for the past five years. The scale/scope of digital initiatives and annual spend contributions on digital technology were used to determine the maturity of each manufacturer.

Over the study's five-year period, digital manufacturers benefited from a 25% increase in their revenue performance index and a 22% increase in their profit performance index. These improvements speak to the importance of digital transformation and are a major reason that almost every manufacturer has made efforts to digitize recently. However, the scope, scale, and maturity of digitization efforts matter and are highlighted when looking at the performance of digital leaders and laggards (see Figure 1).

FIGURE 1: ***The Difference Between Digital Leaders and Digital Laggards Across the Industry***



Source: IDC's Digital Manufacturing Survey, May 2023

By the end of the survey, digital leaders experienced a 43% increase in revenue and a 45% increase in profits, which is more than double the revenue improvements and almost three times the profit improvements when compared with digital laggards. For three years (2018–2020), ineffective digital execution led to tapering dividends, which resulted in a plateauing of benefits. This trend was reversed with a reinvigorated post-pandemic digitalization push in both digital leaders and digital laggards, which triggered positive revenue and profit performance. However, this impact was significantly higher in leaders, underscoring the importance of digital maturity in responding to and thriving in times of disruption. By investing in digital technologies and processes, manufacturers enhance their operational efficiency, improve product quality, and boost customer satisfaction. In addition, digitalization enables leading manufacturers to tap into new revenue streams, optimize their supply chain, and enhance their risk management capabilities.

The biggest takeaway from the IDC survey is how the gap between the two groups continues to increase over time. Many companies have already acted by using digital technology to make better decisions, and they are reaping the benefits. The lagging manufacturers must ask themselves one question: How long can we wait? There are real costs to technology paralysis. The more time that passes without action, the greater the advantage experienced by an organization's peers. Companies cannot risk inaction in today's highly competitive manufacturing environment, where disruption can occur at any moment.

Considerations

Even with a strong commitment to digital transformation, significant external and internal challenges exist in fostering data-driven operations. Common pitfalls holding manufacturers back include:

- **Legacy/siloed systems**: Manufacturers tend to rely on assets/plants/facilities that can be decades old and siloed. The issue with silos has existed for years but is becoming worse in today's data-rich world. However, silos are about more than data and they affect organizational structure, staff, and processes. The growing use of cloud-based systems will help companies address these concerns as more migrate systems away from being on premises.
- **Building/executing a data strategy:** Data must be at the core of any operational effort. Organizations that do not focus on their data strategy will struggle with scaling their initiatives and will be unable to take advantage of the newest technologies such as AI/ML, which has the potential to dramatically improve the decision-making process. The ability to deliver actionable information in the context of its recipient's role will be the true differentiator between successful organizations and those that struggle to compete.
- **Lack of talent/expertise to support initiatives:** Manufacturers often lack industry expertise and digital literacy/skill sets. As digital technology has become more widely available and adopted by the industry, having a workforce with the skills to take advantage of these tools is essential to maximize investments. Companies should turn to partners that possess expertise in both areas.

Conclusion

Global economics and market demands are changing the manufacturing environment faster than ever. As the industry comes to terms with this shift, organizations that balance efficiency, resiliency, and innovation will experience the most success. Enabling this balancing act will require data-driven operations to make the best decisions possible in the fastest timeframe. However, using data to make fast and effective decisions requires a proper digital foundation, something that

many manufacturers currently lack. These manufacturers must modernize their operations to ensure that they do not fall too far behind their peers.

About the Analyst

Reid Paquin, *Research Director for IDC Manufacturing Insights*

Reid Paquin is a 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 in 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

Plex, by Rockwell Automation, is a leader in cloud-delivered smart manufacturing solutions, empowering the world's manufacturers to make awesome products. Our platform gives manufacturers the ability to connect, automate, track, and analyze every aspect of their business to drive transformation. The Plex Smart Manufacturing Platform is a system of record and engagement that serves as the central nervous system of manufacturing operations and is comprised of a broad suite of applications, including manufacturing execution suite (MES), enterprise resource planning (ERP), quality management system (QMS), supply chain planning (SCP), production monitoring, MES automation & orchestration, and asset performance management (APM). This modular approach provides manufacturers with a range of entry points to connect people, systems, machines, and supply chains, enabling them to lead with precision, efficiency, and agility.

Learn more at www.plex.com.

IDC Custom Solutions

The content in this paper was adapted from existing IDC research published on www.idc.com.

IDC Research, Inc.
140 Kendrick Street
Building B
Needham, MA 02494, USA
T 508.872.8200
F 508.935.4015
Twitter @IDC
idc-insights-community.com
www.idc.com