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 operations 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, the key to success moving forward will be to become more innovative, market driven, and customer focused. The rapid pace of change has led the industry to start defining its future success by how well it can react to market disruptions, which IDC calls operational resiliency. This is achieved by providing employees with near-real-time information, detailed insights on performance, and analytics to improve the decision-making process across the manufacturing value chain.

Manufacturers have encountered many challenges in their efforts to become more resilient, but one of the most commonly cited issues is outdated/legacy infrastructure. Most manufacturers tend to rely upon a mix of plants, assets, and technology systems that are decades old and limited in functionality. This situation results in information being difficult to access and analyze, hindering the ability to make the most effective decisions in the necessary time frame. In response to disruption, the industry is now embracing cloud platforms as the foundation for a resilient business. However, some manufacturers had already made investments in modernizing their operations, improving their ability to respond more effectively. As a result, a "digital divide" exists between early adopters and those just now modernizing, with cloud-enabled manufacturers feeling less of an impact and further along in their recovery efforts. These manufacturers are now focused on innovating and trying to capture market share, while non-cloud-enabled manufacturers are still focused on cost cutting and selling off high-risk projects.
Benefits

Digitization 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 accrues over time for organizations that embrace digitization. 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 period, nondigital manufacturers experienced decreases of 9% in RPI and 2% in PPI.

The cost and productivity benefits of cloud adoption have been highlighted in numerous IDC studies. With disruption now top of mind for manufacturing, the importance of business resiliency has risen to the top in terms of cloud adoption (see Figure 1). As manufacturers aim to become more market driven and better prepared to pivot, cloud’s ability to optimize operations will become essential to long-term success. In addition to the resiliency that cloud can bring, the opportunity for innovation can be even more impactful, especially for the line of business.

For too long, plant managers have had to rely on legacy systems that limit their ability to innovate. Cloud technology can provide the scalable platform they need to transform the business. Legacy systems tried to curb innovation in favor of structured reporting and compliance. Cloud has given operational managers the ability to innovate around those structures without ignoring them. IT’s challenge is to work with a partner that can scale and secure what is being innovated without inhibiting it.

FIGURE 1: Manufacturing Business Resiliency, Continuity, and Innovation Achieved Through Cloud Adoption

Q. What is your organization achieving through cloud adoption?

![Graph showing various achievements through cloud adoption](image)

As cloud offerings have continued to mature, being able to provide the line of business with the innovative offerings it desires while improving business agility has been a driver of success.

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n = 140

Source: IDC’s COVID-19 Impact on IT Spending Survey, May 2020
Trends

Cloud adoption rarely involves a single cloud provider because multiple platforms/applications have to be integrated together to maximize value. According to IDC, 39% of manufacturers currently have a hybrid cloud environment, with an additional 47% planning to have one within the next 12 months. A hybrid cloud is a combination of multiple public cloud and/or private cloud hosting solutions as well as software-as-a-service (SaaS) solutions. It can also encompass a hybrid of models, such as infrastructure as a service (IaaS), platform as a service (PaaS), application platform as a service (APaaS), SaaS, and/or business process as a service (BPaaS). However, there are challenges with this approach. Many manufacturers (43%) said their top concern with public cloud is the difficulty in centrally managing IT, the Internet of Things (IoT), and the integration of cloud services. Although this issue is lower for private cloud (32% of manufacturers), it is clear that moving into multicloud environments by leveraging a mix of hyperscale public cloud, on-premises solutions, and private cloud is not a simple task.

As multicloud environments continue to grow, they are quickly becoming complex. IT departments are trying to manage a variety of vendors, but they often lack sufficient in-house talent to do so. Still, someone needs to prioritize the task of updating existing policies and procedures for new architectures and technologies. The right IT solutions partner or consultant can take on these tasks from the internal IT team, allowing those employees to focus on more strategic projects. While cloud-based modernization presents the potential for significant business value, many initiatives fail to realize that potential because they follow a transactional, technology-centric approach. There are many tools and technologies to ensure efficient cloud environments, but there is still room for improvement within the industry. Across all of these areas, roughly a third of manufacturers or less rated their usage and effectiveness as adequate (see Figure 2).

FIGURE 2: **Most Highly Implemented and Effective Technologies/Tools for Cloud Environments**

Q. Which of the following technologies/tools are adequately optimized to manage your cloud environments?

<table>
<thead>
<tr>
<th>Technology/Tool</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective use of automation, self-service, and orchestration tools</td>
<td>34.0</td>
</tr>
<tr>
<td>Standardized ROI and business case tools to evaluate the costs and benefits of cloud resources</td>
<td>33.0</td>
</tr>
<tr>
<td>Consistent service-level monitoring and reporting across private, hybrid, and public cloud applications and services</td>
<td>32.3</td>
</tr>
<tr>
<td>Support of IoT and other real-time analytically based initiatives through an event-driven architecture</td>
<td>31.1</td>
</tr>
<tr>
<td>Development of applications using a microservices architecture</td>
<td>28.8</td>
</tr>
<tr>
<td>Ability to accurately define costs and implement usage-based chargeback/billing mechanisms</td>
<td>28.5</td>
</tr>
<tr>
<td>Use of DevOps and/or continuous integration process</td>
<td>27.1</td>
</tr>
</tbody>
</table>

n = 424

Source: IDC’s Worldwide Industry CloudPath Survey, May 2020
It is important for manufacturers to identify all the business benefits of cloud migration by considering not only cost reductions but also factors such as increased innovation, improved capacity, and/or improved customer engagement. Additionally, cloud services can be integrated into end-to-end orchestration, automation, management, and optimization of services. There is also the opportunity to leverage cloud-native services in areas such as analytics, IoT, and augmented reality to enhance the business capabilities of core applications as a low-cost approach to accelerating improved performance.

Cloud technology and services for manufacturing can range from preconfigured applications on a public cloud to proprietary platforms. A cloud platform also allows for the incorporation of innovation accelerators such as IoT, artificial intelligence (AI), or machine learning (ML). As the manufacturing industry continues to evolve at lightning speed, companies that break down silos and embrace modern technology will be the ones that thrive in this environment. Applying these innovative technologies through the cloud is critical. The amount of data that can be analyzed in the cloud is where true value is generated, as manufacturers can now analyze larger data sets and drive improvements across multiple plants/locations. Analytics will be critical not only in the design and manufacture of products but also in analyzing IoT-connected products in the field, enabling new value-added services and a better understanding of the customer experience. The ability of cloud to impact both profits and revenues highlights the long-term importance of this technology.

**Considering NTT DATA**

NTT DATA is a global information technology, consulting, and outsourcing company with headquarters in Tokyo, Japan. Founded in 1988, the company employs 120,000 people, with over 75 delivery centers globally. NTT DATA has more than 1,000 manufacturing clients, distributed across all manufacturing segments, with automotive representing the top segment. It has manufacturing customers across the globe, with Asia/Pacific representing the largest geography at 50% and North America at 20%; 90% of the company’s manufacturing clients have revenues greater than $1 billion.

NTT DATA’s cloud offerings are powered by the Nucleus Intelligent Enterprise Platform, which combines its IP with third-party tools and open source solutions that can be easily configured and expanded upon to create smart digital solutions for clients. It offers and enables a number of manufacturing-specific digital solutions, including:

- **Manufacturing Enterprise Cloud.** NTT DATA provides a hybrid cloud application and integration framework optimized for manufacturing operations as well as end-to-end solutions that strategize, design, migrate, manage, and integrate hybrid cloud environments into a seamless operation and service delivery model.

- **Manufacturing Data Analytics.** NTT DATA provides a foundation for ingestion of vast quantities of data from disparate sources. Data is analyzed in real time, which drives real-time business insights and identifies prescriptive business actions, leading to insights-driven business decision making that is more proactive, more deterministic, and much faster than traditional data and analytics efforts.

- **Intelligent Automation.** NTT DATA designs and implements predictive and automated workflows that integrate enterprise data with information collected at the edge, supporting improved decision making and collaboration, as well as tools that integrate and automate information and decision making.

- **OT Cyber Security.** NTT DATA and NTT Inc. combine to provide services for operational technology (OT) threat detection, gap analyses, and subsequent implementation of remediation measures.
These digital assets and accelerators are designed to deliver digital manufacturing solutions tailored to seven distinct manufacturing value chains: product and service development, customer and sales operations, workforce management, production management, maintenance management, after-sales service, and supply chain.

**Challenges**

As industry complexity continues to increase, manufacturing organizations will be under tremendous pressure to become more innovative, market driven, and agile. NTT DATA will need to help its customers manage this complexity while delivering value and support to numerous functional groups/stakeholders across manufacturing. Serving the needs of IT and the line of business is essential to long-term success within manufacturing. In addition, NTT DATA has a large presence in the Asia/Pacific region, but market awareness for manufacturers in other regions could be improved. The company should also be more vocal about its development of resources in North America and Europe as global deployments and pushing into new markets/geographies remain top priorities for manufacturers.

**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. Manufacturers are beginning to view cloud as the platform to drive tangible business outcomes and overall transformation. The reality is that multicloud environments will be commonplace, so tying these cloud instances together into a digital platform to drive manufacturing excellence will be imperative.

**About the Analyst**

**Reid Paquin, Research Director, IDC Manufacturing Insights**

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

Shift from IT to the Business, and from Back-Office to Revenue and Customer Focus, to Maximize Impact of Cloud Services

With cloud services becoming a ubiquitous part of manufacturing operations, the creation of value is no longer a technical challenge, but rather one of mindset, organization, and governance. Manufacturers can maximize the impact of cloud services on their business by:

» Identifying and prioritizing specific impacts on business value chains, and incorporating the tangible business improvements into the design, execution, and management of cloud strategies.

» Focusing on how cloud services can accelerate growth in terms of customer intimacy, product innovation, and speed to market, in addition to the traditional focus on core manufacturing operations and support functions.

» Integrating cloud services into end-to-end orchestration, automation, management, and optimization of services, with a focus on ongoing optimization and continuous cost and performance improvement of cloud environments.

» Leveraging cloud-native, best-of-breed services in areas such as analytics, IoT, and augmented reality to enhance business capabilities of core applications as a low-cost approach to accelerating improved business performance.

Find out more at www.nttdataservices.com/go-digital.