

Business Impact of Cloud Adoption for Industrial Manufacturers

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EXECUTIVE SUMMARY

In recent years, industrial manufacturers are facing an unprecedented convergence of challenges, including global supply chain disruptions and rising raw material costs. To navigate these challenges, many organizations have adopted cloud technology. The cloud helps organizations make quick, data-driven decisions while managing their operations, and relationships with customers and suppliers in a more efficient manner. The Hackett Group analyzed the business value trends for organizations that have moved to the cloud.

The results showed quantifiable benefits in four main areas:

- **Optimizing manufacturing operations**
 - 16% improvement in manufacturing overall equipment effectiveness (OEE)
 - 39% reduction in unexpected IT downtime
- **Improving supplier management**
 - 33% increase in sourcing savings
 - 20% reduction in full-time equivalent (FTE) staff per million dollars of spending
- **Delivering sales efficiency and customer satisfaction (CSAT)**
 - 42% improvement in revenue per sales professional
 - 34% improvement in customer satisfaction
- **Increasing business agility and innovation**
 - 22% improvement in speed to market for new products
 - 16% improvement in orders completed on time in full (OTIF)
 - 21% reduction in lead times

ABOUT THE STUDY

In late 2022, The Hackett Group conducted a global Industry Cloud Study of 600 organizations across multiple industries. Study participants have had cloud-hosted infrastructure for a minimum of one year.

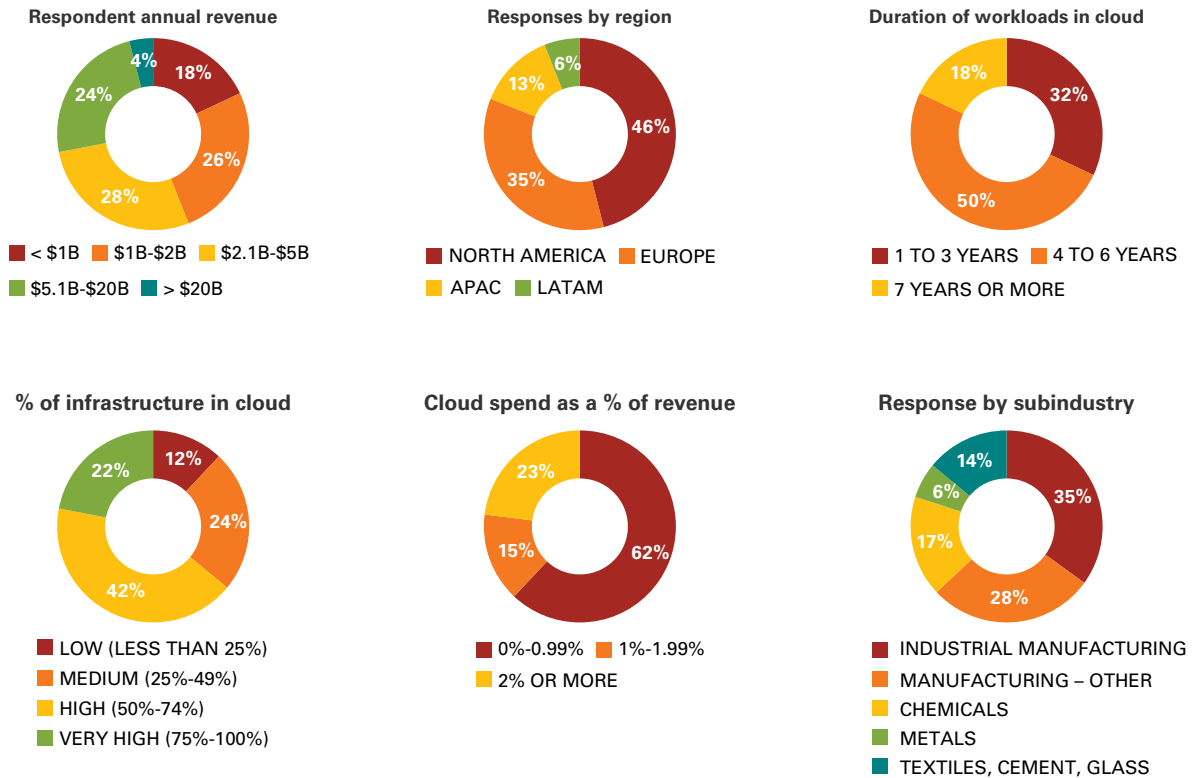
The goal of the research was to assess how a move to the cloud improved operations and business results. The study uncovered the effects of different cloud strategies on key metrics.

The Hackett Group also studied how these metrics changed based on different factors, including:

- Number of cloud-hosted applications
- Percentage of an organization's infrastructure in the cloud (cloud saturation)
- Cloud spending as a percentage of revenue
- Duration (years) in the cloud

The Hackett Group focused primarily on the manufacturing industry within the larger industrial sector (Fig. 1).

FIG. 1 Industrial manufacturing respondents' demographics



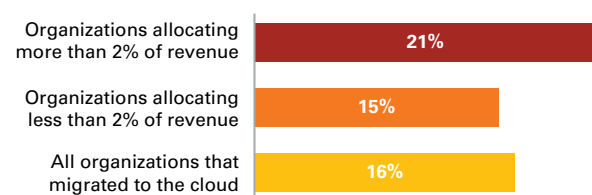
Source: The Hackett Group 2022 Industry Cloud Study

OPTIMIZING MANUFACTURING OPERATIONS

Organizations in this study have seen positive changes after moving to the cloud. One driving factor is the increased use of Internet of Things (IoT). The cloud helps to store and analyze the data from IoT for purposes, such as predictive maintenance. This leads to better availability, productivity, and quality – all of which contribute to higher OEE.

Manufacturing assets are a major part of industrial manufacturers’ balance sheet and influence their success. Therefore, improving OEE is a top priority for these organizations. OEE measures the portion of manufacturing time that’s fully productive, with a score of 100%, indicating maximum output, zero downtime, and no quality problems. After moving to the cloud organizations reported a 16% increase in OEE. The data also showed a correlation between cloud investment and OEE improvement. Organizations that spend more than 2% of their revenue on cloud have a 40% improvement in OEE versus those spending less than 2% (Fig. 2).

FIG. 2 Percentage of revenue allocated to cloud spend and change in OEE after cloud migration

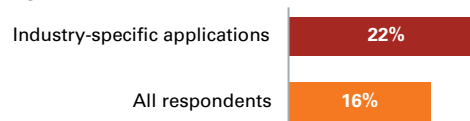


Source: The Hackett Group 2022 Industry Cloud Study

As boosting OEE is a key goal for industrial manufacturers, The Hackett Group analyzed the tactics used to achieve this. Results showed that organizations that migrated their manufacturing workloads, such as enterprise resource planning (ERP), experienced an extra six percentage-point improvement in OEE (Fig. 3). Additionally, unexpected IT downtime was reduced by 39% and unexpected manufacturing downtime was reduced by 36% after

migration. The decrease in unexpected IT downtime is attributed to the resilience of cloud infrastructure which proved to be a more reliable platform compared to on-premise data centers.

FIG. 3 Application types migrated and percentage change in OEE



Source: The Hackett Group 2022 Industry Cloud Study

Analysis of the results also revealed that organizations experienced a 42% increase in automation after moving to the cloud. Replacing human involvement with code and automating workloads is also a key factor in improving OEE. Study data shows that organizations with very high automation saw a 4.5X improvement in OEE (Fig. 4).

Study data findings highlight that moving to the cloud results in increased automation and resilience. These are key drivers to improve OEE. In addition, the link between organizations’ cloud expenditure and the higher OEE provides compelling evidence for the vital role of cloud in optimizing manufacturing operations.

FIG. 4 Automated operational workflows and percentage change in OEE

Automated operational workflows	% change in OEE
Low (less than 25%)	10%
Medium (25% to 49%)	13%
High (50% to 74%)	25%
Very high (75% to 100%)	45%
All respondents	16%

4.5X improvement in OEE for very high automation (45% change) compared to low automation (10% change).

Source: The Hackett Group 2022 Industry Cloud Study

IMPROVING SUPPLIER MANAGEMENT

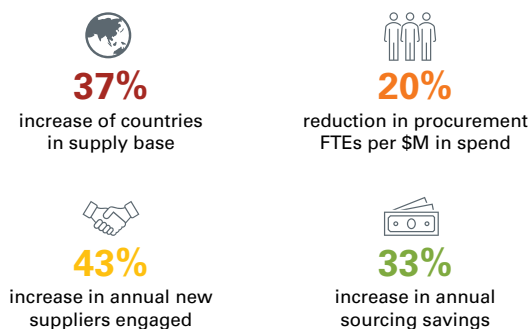
Having smooth supply chain management is crucial to the success of industrial organizations. It includes working with Tier 1 to 3 suppliers. To enhance collaboration and performance, cloud technology is a key enabler in various supply chain processes, such as forecasting, inventory management, supplier management, and order tracking.

The cloud makes it easier for organizations to work with suppliers by improving communications and expanding the supplier base. With the help of cloud infrastructure, businesses can share data and collaborate globally without having to set up their own infrastructure. This means that organizations can work with more suppliers, including those from different countries, which increases supply resilience and enables them to find cost-effective suppliers. This leads to a wider range of suppliers and more collaboration options, providing organizations with a strategic advantage and better business performance. The study results indicate that using the cloud led to a 43% annual increase in the number of suppliers and a 37% increase in the countries where these suppliers are based.

Study results revealed that using the cloud in supply chain management brought increased efficiency by expanding the supplier base. The cloud made it possible to share data and collaborate with suppliers globally.

Real-time communications and access to important information, such as forecast and shipment data, helped organizations save costs. This was demonstrated by a 20% reduction in FTE per million dollars spent and a 33% increase in sourcing savings (Fig. 5).

FIG. 5 Sourcing metrics



Source: The Hackett Group 2022 Industry Cloud Study

Supplier management is one of the benefits that peaks earlier in the cloud journey. Recent cloud adopters saw a 44% improvement of sourcing savings in the first three years of migration. Organizations quickly adjust resources after migrating while still relying on traditional processes. To support that, organizations that reduced or retained the same number of employees saw more than a 3X improvement in sourcing savings (Fig. 6).

FIG. 6 Post-cloud migration employee impact on sourcing savings and procurement FTEs per \$M spend

Change in employees	% change in sourcing savings	% change in procurement FTEs per \$M in spend
Decrease or no change in number of employees	238%	-19%
Increase in number of employees	78%	-20%
All respondents	140%	-20%

3X

Source: The Hackett Group 2022 Industry Cloud Study

DELIVERING SALES EFFICIENCY AND CUSTOMER SATISFACTION

Organizations strive to help their sales teams with efficiency and better customer engagement. Analysis of study results showed that post-cloud migration, significant improvements were achieved in sales enablement and customer engagement metrics.

As cloud services and applications improve the level of digital collaboration (e.g., two-way automated data sharing on orders) with customers by 33%, organizations gain more relevant customer insights to better meet their customers' needs. As a result, post-cloud migration, CSAT scores also improved by 34%.

Increased insights on customers and higher CSAT scores contribute to sales efficiencies. The study indicates an overall increase in revenue per sales and service FTE of 42% (Fig. 7). The study also indicates that organizations are able to steadily improve on this KPI as they host their workloads in the cloud over longer periods. The study data points to this KPI increasing by 7% for every year in the cloud.

FIG. 7 Cloud duration and percentage change in revenue per sales and service FTE

Cloud duration (years since beginning of cloud migration)	% change in revenue per sales and service FTE
1 to 3	25%
4 to 6	45%
7+	68%
All respondents	42%

Source: The Hackett Group 2022 Industry Cloud Study

Study participants reported improvements in efficiency and CSAT metrics in every year of their cloud journey, but the linear correlation between KPI improvements and time in the cloud indicates that sales efficiency and CSAT evolve further over time. Cloud enables organizations to build more trust with their customers over the years.

INCREASING BUSINESS AGILITY AND INNOVATION

Organizations in the manufacturing industry face increasing challenges in today's volatile business environment. To stay ahead, it is crucial to have business agility. This is where cloud technology comes in, offering cutting-edge solutions for smart manufacturing, including innovative product development, and engineering and design solutions. By moving to the cloud, organizations gain competitive advantages through increased agility and innovation.

Creating a digital twin is an example of how organizations use cloud. Having a virtual representation of a product or process allows organizations to be more predictive and agile in equipment maintenance, and research and development (R&D). Furthermore, cloud offers high-performance computing (HPC) at scale with better price performance. As a result, digital twins powered by HPC further improve business agility and the speed of innovation.

According to the study, organizations experienced a 22% faster time to market after cloud migration (Fig. 8). Organizations that migrated most (10 or more) of their applications to the cloud saw the greatest improvement, with a 36% improvement in time to market versus all respondents.

FIG. 8 Number of applications migrated to the cloud and percentage change in product time to market

Number of applications migrated to the cloud	% change in product time to market (weeks)
1 to 3	-13%
4 to 9	-21%
10+	-30%
All respondents	-22%

Source: The Hackett Group 2022 Industry Cloud Study

Introducing products faster to market leads to new revenue opportunities. Organizations saw a 41% increase in revenue from products and services introduced in the last two years. When analyzing factors impacting this improvement, the data shows that target cloud saturation levels do make a difference. Organizations are able to double their improvement with higher cloud saturation target levels (Fig. 9).

FIG. 9 Cloud saturation target level and percentage change of revenue from new products and services

Cloud saturation target	% change of revenue from new products and services*
Low (less than 50%)	21%
High (50% to 100%)	43%
All respondents	41%

*Products and services introduced in the last three years
 Source: The Hackett Group 2022 Industry Cloud Study

The benefits are not limited to new products and services. Organizations also experienced a 21% reduction in order lead time for all products and services. Increased cloud saturation also played a key role in improving this KPI. Organizations with a 50% or more cloud footprint realized an extra eight percentage-point reduction in order lead times (Fig. 10).

FIG. 10 Cloud saturation and percentage change of supplier order lead time

Cloud saturation	% change of supplier order lead time
Low (less than 50%)	-16%
High (50% to 100%)	-24%
All respondents	-21%

Source: The Hackett Group 2022 Industry Cloud Study

The organizations in this study decreased order lead time and delivered more orders on time in full, with a 16% increase in OTIF deliveries. The OTIF increase indicates improvements across the value chain, spanning the manufacturing and order management processes.

The study revealed that business agility and innovation metrics showed further improvement with a larger

footprint in the cloud. This supports the idea that embracing modern technologies, such as smart manufacturing, requires a robust set of digital capabilities enabled by the cloud (e.g., machine learning, data lakes). The wider and deeper the adoption of the cloud, the better the results.

CREATING A BLUEPRINT FOR SUCCESS

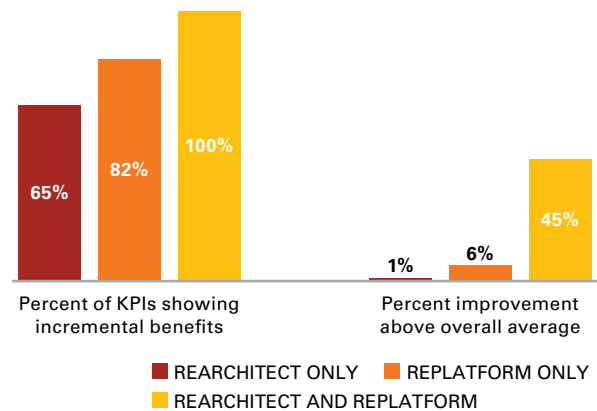
Cloud adoption is crucial to the success of digital transformation for organizations. The top-performing organizations, known as Digital World Class™ have a clear plan for cloud migration and actively manage it to take advantage of the benefits uncovered with the study.

Study analysis found a variety of cloud adoption approaches among industrial manufacturers, such as:

- **Migration:** Rehost, replatform, rearchitect, retire, repurchase
- **Modernization:** Serverless computing, containers, managed data and analytics, DevOps

All migration approaches improved KPIs for organizations, but those that used a replatform strategy, in other words, those that modified their legacy systems to work better in the cloud, experienced incremental benefits in 82% of KPIs. The rearchitect approach improved 65% of KPIs, while the combination of the two showed optimal incremental benefits across 100% of all KPIs (Fig. 11). This research highlights the beneficial synergies among these two approaches.

FIG. 11 Migration approaches and improvements in KPIs



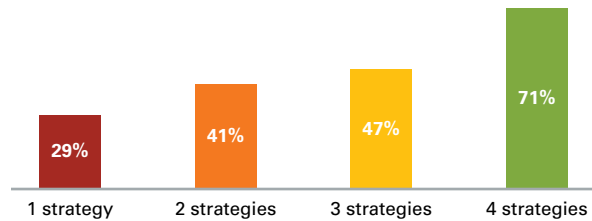
Rearchitect: Redesigning on-premises applications by using cloud-native features to improve performance, and then deploy to the cloud.

Replatform: Migrating on-premises applications to the cloud, and then applying optimizations to take advantage of cloud capabilities.

Source: The Hackett Group 2022 Industry Cloud Study

The study also helped uncover a strong link between using multiple cloud modernization strategies and improved KPIs. Organizations that only used one strategy experienced improvements in 29% of KPIs, while those that utilized all the available strategies saw improvements in 71% of KPIs (Fig. 12).

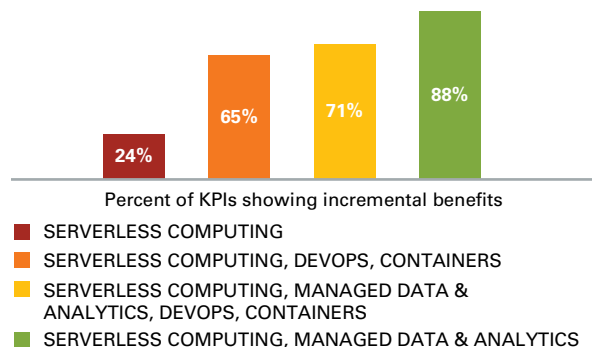
FIG. 12 Percentage of KPIs showing incremental benefits by number of modernization strategies adopted



Source: The Hackett Group 2022 Industry Cloud Study

The study team also analyzed the synergies among modernization strategies. The combination of serverless computing, and managed data and analytics was the most synergistic, resulting in improvements in 88% of KPIs. Although serverless computing was a key factor in all the top-ranking combination strategies, it only led to a 24% KPI improvement when adopted alone (Fig. 13).

FIG. 13 Impact of serverless computing on modernization strategies improvements in KPIs



Serverless computing is a cloud-based service where the cloud provider dynamically allocates resources needed to execute application code. The cloud provider manages all the infrastructure, which means that the application teams only need to write code.

DevOps increases an organization's ability to deliver applications and services at a faster pace than organizations using traditional software development and infrastructure management processes. This speed enables organizations to better serve their customers and compete more effectively in the market.

A container is a standard unit of software that packages up code and all its dependencies, so the application runs quickly and reliably from one computing environment to another.

Managed data and analytics refers to database services built and accessed through your cloud provider's platform. A cloud database enables organizations to host databases without buying dedicated hardware. Cloud databases support both relational and nonrelational databases.

Source: The Hackett Group 2022 Industry Cloud Study

RECOMMENDATIONS

Cloud provides benefits throughout the value chain and across all KPIs measured in this study. How an organization realizes those benefits depends on the specifics of the migration path. The study analysis reveals different paths for different objectives, and not all these paths are parallel.

To maximize benefits of cloud migration organizations should:

- Improve supplier management through cloud adoption for greater savings, especially in the early years after migration. Given the current state of the economy, saving money is crucial for many organizations.
- Increase sales efficiency and customer satisfaction. Time and patience are critical in achieving these goals, according to the study. Continuing to build trust with customers over the years after cloud migration helps maintain progress and maximize benefits.
- Invest in cloud solutions to increase resilience and automation, leading to improved OEE. The study results highlight the link between OEE and cloud investment levels; and while spending more on cloud may not be the preferred option – improved OEE results will outweigh the cost.
- Increase cloud saturation as a priority to win in the marketplace. Not all organizations are ready to fully migrate to the cloud, but many want to innovate at a faster pace. The study revealed business agility improvements for all organizations, however top-performing organizations have very high cloud saturation levels.
- Prioritize combining advanced migration approaches and modernization strategies for additional benefits. Nearly half of the participants in the study combined the migration approaches of rearchitecting and replatforming, leading to higher benefits across all KPIs.

About the Advisors



PREM PURUSHOTHAMRAJ

Director, Technology Benchmarking and Advisory

Mr. Purushothamraj works with leaders across industries to help them realize business value from their investments in digital transformation. He has over 16 years of management consulting and technology transformation experience, and has managed delivery of digital transformation programs across functional teams. He has hands-on experience in delivering current-state assessments and transformation efforts for technology organizations to improve their overall performance, and execution of their digital strategies.



TADA YAMAMOTO

Director, Strategy and Business Transformation

Mr. Yamamoto has served numerous global industrial manufacturing clients in operations, sourcing and procurement. He is a Six Sigma Black Belt and has applied his knowledge to leading projects across heavy machinery manufacturing and IT call center optimizations. Mr. Yamamoto has also developed should-cost models for multiple clients, including automotive OEMs, that contributed to double-digit percentage reductions in sourcing costs.



MATT DOUBERLY

Manager, Benchmarking and Advisory

Mr. Douberly has five years of management consulting experience with a primary focus on business performance reporting and analysis. He has enabled organizations to better understand their financial performance, and improve their overall effectiveness and efficiency through data analysis. Currently, Mr. Douberly partners with industry leaders to help them maximize the value of their IT organizations.



JOHN VAN DECKER

Associate Principal, Vice President, Chief Research Officer

Mr. Van Decker sets the vision for the research program at The Hackett Group. He has over 35 years of experience as an industry analyst, CIO, software strategy leader, business/IT consultant and finance/sales operations end-user. Mr. Van Decker has spent 17 years prior to joining Hackett as a leading ERP and financial management IT industry analyst, where he has worked with thousands of customers concerning their IT and business strategies.

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