The State of the Market:

How the Right Mix of Technology and Strategy Puts CPG Manufacturers on Top

Recent Accenture research states the consumer packaged goods (CPG) industry "will see more change in the next 10 years than it has in the last 40." For this report, we surveyed leading CPG manufacturers to examine the technologies, processes, and operational strategies they are deploying to survive—and thrive—in this era of transformation.

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Key Survey Takeaways:

- 44% of CPG manufacturers are turning to mixed-mode manufacturing.

- 91% are currently using or are planning to use real-time data to manage their supply chains.

- 39% of on-premise users cite a struggle with "limited production insights" as a top challenge, compared to only 19% of cloud users.

- Cloud users are 81% more likely to have an enterprise-wide digital transformation strategy than on-premise users.

- Cloud, robotics, predictive analytics, and artificial intelligence are the top technologies used today.

- Cloud and hybrid users are 70% more likely to deploy artificial intelligence / machine learning solutions over the next three years than on-premise users.

EXECUTIVE SUMMARY

The manufacturing industry today is in a state of rapid, fundamental change. On the demand side, manufacturers face a market that has shifted sharply toward digital, on-demand, and online experiences, which both increases demand volatility and demands shorter lead times to fulfill. On the operational side, they face an array of new tools and opportunities to radically improve their processes and take on the demand challenges—from the digital transformations enabled by the Internet of Things (IoT) to the new operational efficiencies delivered by emerging technologies. Successfully navigating the complexity of these changes could mean pulling ahead of the industry; failure could mean losing market share to more progressive and nimble competitors.

In the consumer packaged goods (CPG) industry, this challenge is particularly evident. A recent research report published by Accenture noted that "the CPG industry will see more change in the next 10 years than it has in the last 40[1]." These changes have already begun reshuffling leaders in the industry—in 2018, the report notes, only 3% of the industry's total sales growth was captured by top-25 CPG companies; the remaining 97% was all achieved by smaller, more nimble companies breaking into the space. These are not insignificant losses: In total, larger and more established companies lost nearly $15 billion in sales to smaller competitors between 2013 and 2018, according to a study from Boston Consulting Group.[2]

To succeed in such a dynamic market, every CPG manufacturer—whether new or established—faces pressure to upend traditional market and operational strategies and to identify new ways to compete. More than ever, the solution to this is being found in cloud services, emerging technologies, and data-based manufacturing practices, from which CPG manufacturers can develop the new capabilities and efficiencies required to achieve the speed and flexibility the market demands.

This drive to technology has pushed the CPG industry right into the forefront of the digital transformation—facing intense competitive pressure, these manufacturers are developing the new mix of advanced technology sets and innovative operational strategies needed to retain (and grow) their market share.

But what does this mix look like in the industry today?

In late 2019, IndustryWeek partnered with Oracle to discover just that. We surveyed 167 of the largest and most profitable CPG manufacturers to uncover the specific technologies, processes, and operational strategies they are deploying to more effectively compete in the industry and thrive in this era of transformation.

Our research uncovered several of these key tactics, including the trend toward mixed-mode manufacturing, the need for real-time visibility and collaboration across the value chain, as well as leveraging cloud and emerging technologies to make smarter decisions faster. This report summarizes those findings and provides a detailed look at what will become the future of CPG manufacturing—data-driven, nimble, and capable of meeting evolving customer demand over ever-increasing channels.

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[1] "Technology Vision 2018 for Consumer Goods." Accenture, September 14, 2018.
[2] "What the Fastest-Growing CPG Companies Do Differently." Boston Consulting Group, June 14, 2018.

THE VALUE OF MIXED-MODE MANUFACTURING

Many consumer packaged goods are produced through a mix-and-pack operation. Most CPG manufacturers need to use both discrete and process manufacturing to make their products in the same plant. Others, in order to meet constant changes in consumer demands, are pressured to take on the role of both a discrete and process manufacturer as they look to provide customers with new competitive products.

Survey results show that 51% of respondents are forced to choose either a discrete or a process manufacturing system to produce their products in a single plant.

When asked to list the challenges associated with this compromise, 41% of respondents indicate that it would lead to lost efficiency, 38% that it would make them inflexible or slow to change, and 37% felt it would limit their control of their operations. These inefficiencies all create costly delays that lead to stock-outs of fast-selling products, often resulting in lost revenue and market share as customers seek alternatives. A slow response to signals of slow-moving products causes costly increases in inventory write-offs. These limitations are clearly seen as inhibitors to the growth and progress successful CPG manufacturers require.
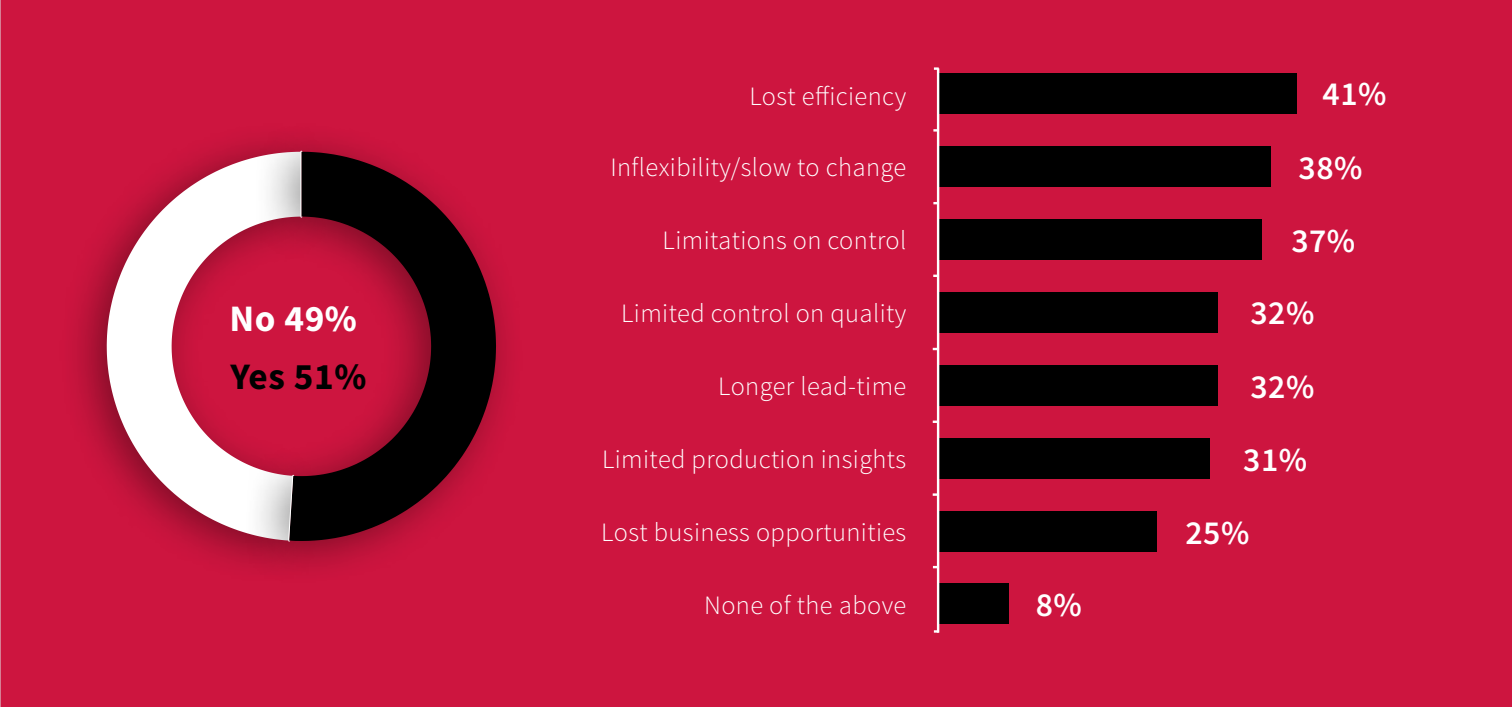
The High Cost of Traditional Practices

In an environment where speed and efficiency define success for CPG manufacturers, survey respondents indicate that traditional software and manufacturing practices offer a direct barrier to progress.

Q1: Do you have to select either a discrete or process manufacturing system to produce your products in a single plant?

Q2: If yes, what are the top three challenges to supporting both discrete and process manufacturing using the same software?

No 49%
Yes 51%

Challenge	Percentage
Lost efficiency	41%
Inflexibility/slow to change	38%
Limitations on control	37%
Limited control on quality	32%
Longer lead-time	32%
Limited production insights	31%
Lost business opportunities	25%
None of the above	8%

Given this, it seems only natural that CPG manufacturers would seek a new system. And indeed, 44% of survey respondents indicate that they are doing exactly that—maximizing the advantages and overcoming the shortfalls of exclusively process or discrete systems by moving into mixed-mode manufacturing.

This flexible manufacturing approach allows manufacturers to use one system to manage all production types and determine the best manufacturing method for each stage of production.

The mixed-mode technique can support any of the production practices CPG manufacturers require to achieve the agility to meet market demands, including build to stock, build to order, and configure to order capabilities. In other words, CPG manufacturers currently using this system are finding a complete system that fulfills their most pressing operational needs.

Top Five Benefits of Mixed-Mode Manufacturing

Mixed-mode manufacturing seems to deliver results on CPG manufacturers' most critical metrics—profits, growth, and efficiency—while better enabling them to proactively meet the shifting demands of the market.

Q: What would be the top three advantages of changing to a mixed-mode manufacturing system in order to respond to customer demand for discrete items or bulk products within a single facility?

Grow revenue	36%
Grow distribution and market share	35%
Reduce costs while ensuring quality	33%
Increase business agility and responsiveness to changing market demands	33%
Improve operational efficiency and maximize flexibility	32%

Simply put, mixed-mode manufacturing has become a critical functionality as CPG manufacturers adapt to the fast-paced shifts that today's market demands.

DEVELOPING REAL-TIME VISIBILITY AND COLLABORATION ACROSS THE SUPPLY CHAIN

Demanding customers, agile competitors, proliferating sales channels, and changing business models are just a few of the forces conspiring to cause market disruption and dislocation within the CPG industry. To succeed in this environment, manufacturers require direct access to data not only across the entire production process but all the way to the end customer, whose feedback is essential to everything from product development and manufacturing to successful order fulfillment.

In the CPG industry, this means development of seamless, end-to-end connectivity across the entire supply chain that can ensure market signals are instantly communicated and acted upon with the speed and agility the market demands.
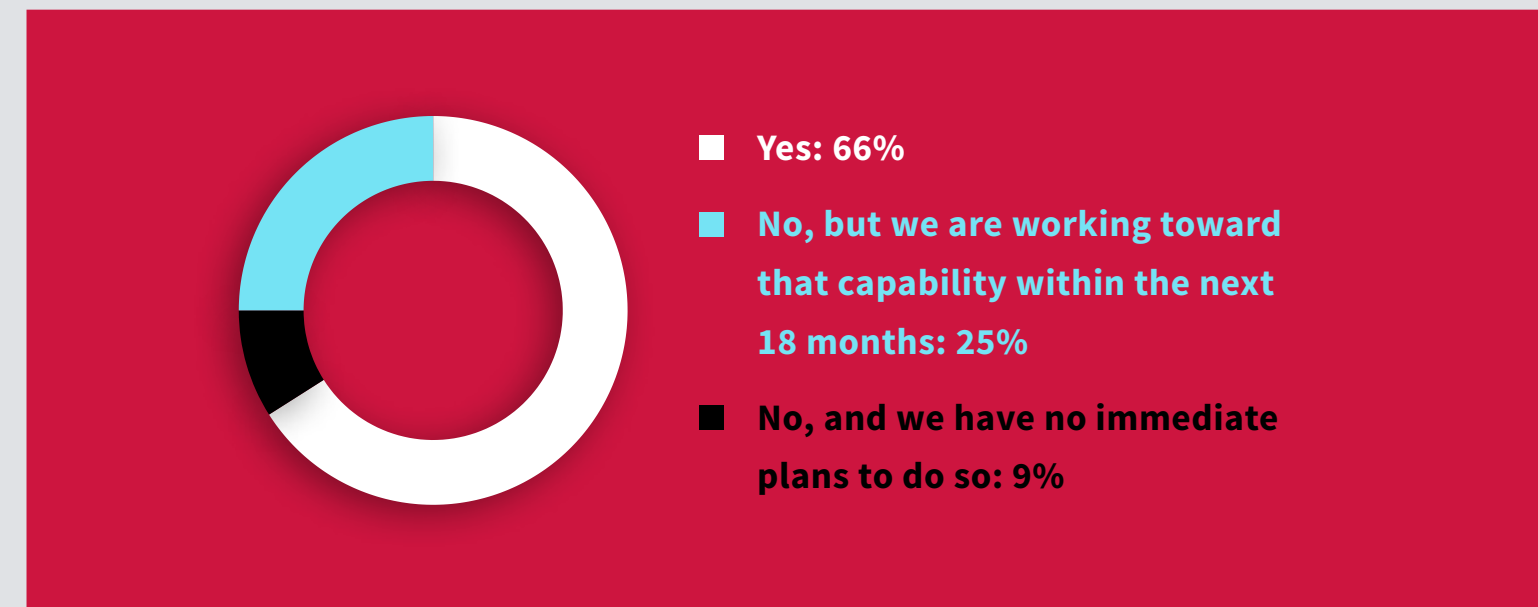
The need for this real-time visibility registers strongly with survey respondents. In total, 60% indicate that they have "complete visibility and traceability throughout the supply chain, allowing for precise recall," and 80% identify leveraging real-time data as either "very important" or "critical" to their decision-making process. Even more notable, 91% of respondents indicate that they either have access to this data today or will have access to it within the next 18 months.

Real-Time Data Is King

An overwhelming majority of CPG manufacturers are either using or plan to use real-time data to drive their businesses.

Q: Is your company leveraging real-time data in decision making?

- **Yes: 66%**
- **No, but we are working toward that capability within the next 18 months: 25%**
- **No, and we have no immediate plans to do so: 9%**

Given this near consensus, data and visibility are clearly crucial components for CPG manufacturers trying to manage today's complicated supply chains.

However, there is one critical divergence among survey respondents regarding the implementation and strategies behind these data-driven initiatives: cloud vs on-premise users.

An almost even split exists in the software solutions utilized by respondents—31% use exclusively on-premise solutions, 34% are exclusively cloud-based, and 26% use a hybrid of the two. Broken down across those lines, an interesting pattern emerges along the data-tracking needs and capabilities of the whole.

The starkest difference deals with the company-scale digital transformations required to fully implement data and supply chain visibility strategies. Only 27.5% of on-premise users say their companies currently have an enterprise-wide strategic roadmap for this, compared with 51% of cloud and 43% of hybrid solution users.

Digital Transformation: On-Premise vs Cloud

While nearly every manufacturer surveyed for this report indicates that data is a vital part of their business, a wide variance appears in their efforts to incorporate these tools into their enterprise-wide strategies. Companies using cloud-based tools are 81% more likely to have a formal digital transformation strategy to put this data to work.

Q: Has your company adopted a strategy for digital transformation?

	All Respondents	On-premise	Cloud-based	Hybrid
Yes, we have an enterprise-wide strategic roadmap to drive digital transformation	**40.1%**	**27.5%**	**50.9%**	**43.2%**

Digging deeper, 39.2% of respondents who use an on-premise system cite a struggle with "limited production insights" as one of their biggest challenges, compared with only 19.3% of respondents using a cloud-based solution.

The capability to collect and harness real-time data across the supply chain is widely accepted as foundational to achieving ongoing production improvements in quality, efficiency, and utilization. Crucially, having clear production insights is also a prerequisite for gaining the ability to quickly shift production to meet the rapid changes in market demand or supply chain disruption common in the CPG industry. With cloud-based technology, manufacturers can build end-to-end visibility and deliver access to real-time, actionable production data across all value-chain functions from the supplier to the consumer.

Other results show that cloud users are positioned to outpace on-premise users in integrating contract manufacturers into their extended value chain. While both on-premise and cloud users report similar progress (49% and 53% respectively), there is a significant gap between respondents indicating that their companies are pursuing plans to connect operations and supply chain process with these partners. In total, nearly 32% of cloud users are pursuing such plans, compared to 19.6% of on-premise users.

Taken together, these findings offer fascinating insight into the market. First, it is clear that in order to manage the complexities of the modern supply chain, CPG manufacturers need real-time data and visibility across operations and the value chain. On that, nearly every survey respondent agrees. The surprising point is the unevenness of their ability to fully leverage these capabilities, which appears to be largely dependent on their technology stack. Specifically, these results suggest that manufacturers leveraging cloud solutions are far better positioned to successfully take on today's supply chain challenges than those using traditional systems.

EMBRACING EMERGING TECHNOLOGIES

Unsurprisingly, the key issue for CPG manufacturers across all the various challenges detailed in this report comes down to technology. The top needs—from finding the right production system to harnessing real-time data, from flexibility and agility to quality assurance and supplier integration—all depend on companies developing and efficiently deploying the correct mix of emerging technologies to make smart decisions faster.

The business case for this is plain: In a world of minute-to-minute news cycles and consumers with nearly unfettered access to e-commerce platforms and options, CPG manufacturers need to be able to act (and react) quickly. Seamless, end-to-end connectivity across the entire supply chain is key to this, as we previously discussed. But it is equally important to identify and integrate the right mix of today's emerging technologies that allow CPG manufacturers to detect issues and opportunities within and outside the enterprise, decide the best course of action, and execute end-to-end businesses processes that address them. This is the challenge at the very heart of the digital transformation.

Moreover, the challenge is compounded by the sheer number of new production tools and data-driven technologies coming online today. With solutions ranging from blockchain and artificial intelligence (AI) to 3D printing and robotics, CPG manufacturers face an ever-growing menu of viable options, all of them promising to improve their efficiency and quality baselines, to streamline their operations, or to radically transform their products.

Given this, a key objective of our survey was to identify the progress CPG manufacturers have made in implementing these technologies and determine which particular technologies they are currently using to drive their transformation.

Results for this show an interestingly even mix of established technologies and cutting-edge innovations being deployed across the industry. For example, robotics and automation,
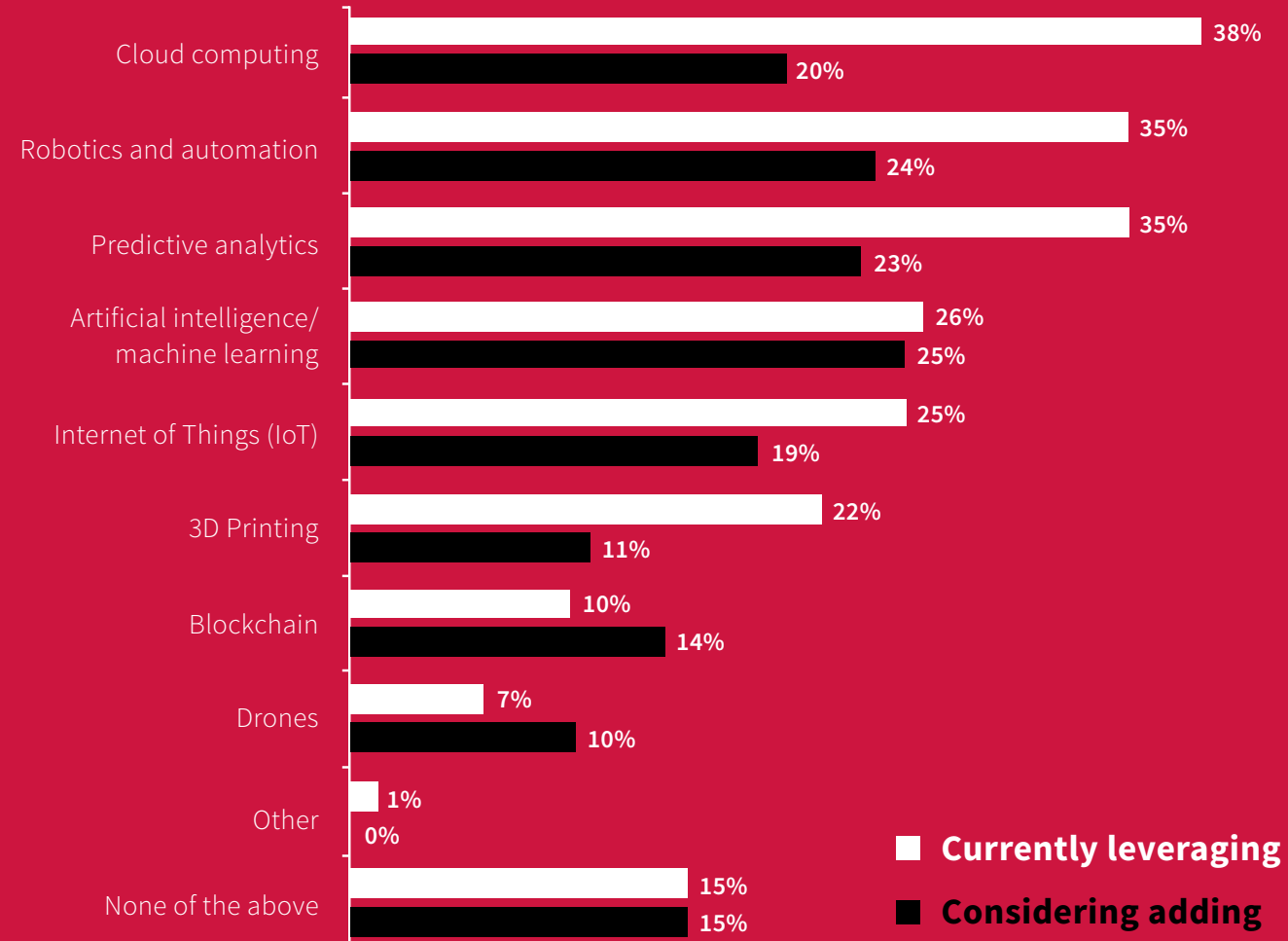
relatively mature technologies, are currently in use by 35% of respondents—the very same percentage of respondents currently tapping into predictive analytics, a far more nascent field. This is followed closely by users of AI and machine learning at 26% and IoT technologies at 25%.

The Winning Technology Mix

Driving CPG manufacturers' operational transformation is a mix of established and nascent technologies with a strong emphasis on solutions focused on data collection and analytics.

Q: Which smart manufacturing/Industry 4.0 technologies are your company currently leveraging? Considering adding within the next three years?

Technology	Currently leveraging	Considering adding
Cloud computing	38%	20%
Robotics and automation	35%	24%
Predictive analytics	35%	23%
Artificial intelligence/machine learning	26%	25%
Internet of Things (IoT)	25%	19%
3D Printing	22%	11%
Blockchain	10%	14%
Drones	7%	10%
Other	1%	0%
None of the above	15%	15%

The reason for this odd mix likely goes back to the criticality of data in modern CPG operations—any technologies that help manufacturers gather information and form actionable intelligence from it are quickly becoming vital tools in the tech arsenal, no matter how long they may have been on the market. This is pushing solutions like AI and predictive analytics right to the top of the stack with robotics and the cloud—a trajectory we can expect to continue as digital transformation strategies take hold.

Another notable finding is that we found a divergence between the capabilities of on-premise and cloud or hybrid solution users in their abilities to capitalize on these technologies. For example, 41.6% of cloud and hybrid users are leveraging predictive analytics today compared to only 31.4% of on-premise users, 30.7% of the cloud users are harnessing AI compared with just 21.6% of on-premise users, and nearly 13% of cloud/hybrid users are already exploring the bleeding-edge blockchain technologies compared with 7.8% of on-premise users.

Emerging Technologies: On-Premise vs Cloud

Cloud and hybrid users seem to be harnessing emerging technologies at a far greater scale than on-premise users. As plans to integrate future technologies over the next three years come to fruition, we can expect to see this capability gap widen even further.

Q: Which smart manufacturing/Industry 4.0 technologies are your company currently leveraging?

Technology	Software Solution	
	On-premise	Cloud-based or Hybrid
Predictive Analytics	**31.4%**	**41.6%**
Artificial Intelligence / Machine Learning	**21.6%**	**30.7%**
Blockchain	**7.8%**	**12.9%**

Q: Which smart manufacturing/Industry 4.0 technologies are your company considering adding within the next three years?

Technology	Software Solution	
	On-premise	Cloud-based or Hybrid
Internet of Things (IoT)	**11.8%**	**23.2%**
Artificial Intelligence / Machine Learning	**13.7%**	**29.3%**
Robotics and Automation	**15.7%**	**27.3%**
Blockchain	**11.8%**	**17.2%**

Another, more critical gap between cloud and on-premise users surfaces in how respondents rate the effectiveness of the capabilities made possible by emerging technologies. For example, predictive maintenance—predicting asset failure before it occurs—involves the tight interplay of several technologies, including predictive analytics, artificial intelligence/machine learning, Internet of Things, and real-time actionable data. These technologies enable companies to monitor their assets in real time, integrate data from many different sources, analyze and translate that data into meaningful insights, and automatically turn those insights into prescriptive actions to optimize maintenance. Cloud users rating the effectiveness of their predictive maintenance capability as "excellent" or "very good" outnumber their on-premise peers by 68.4% to 43.1%.

Predictive Maintenance: On-Premise vs Cloud

In total, 68.4% of cloud users rate their ability to predict equipment failures as "excellent" or "very good," compared to just 43.1% of on-premise users. This gap puts cloud users much further along the journey to true predictive maintenance practices than their on-premise peers.

Q: How would you rate your company's ability to predict equipment failures before they occur, enabling predictive maintenance?

Rating	Software Solution		
	On-premise	Cloud-based	Hybrid
Excellent	**13.7%**	**33.3%**	**13.6%**
Very good	**29.4%**	**35.1%**	**43.2%**

Why is predictive maintenance so critical to CPG manufacturers? Consider the financial impact: On average, a downtime outage can cost a stunning $260,000 per hour, according to a report from Aberdeen.[3] Multiply that by the four-hour length of time the outages last on average, and the cost of one episode adds up to $1,040,000. In addition, poor maintenance strategies can reduce the overall productive capacity of a plant by 5% to 20% (Deloitte).[4]

Given this, the fact that cloud users are more likely to effectively implement emerging technologies that deal with data collection and analytics and attain predictive maintenance capability is not surprising. To deliver their intended results, these technologies rely on steady, real-time data being fed to them across scores of machines, operations, facilities, and systems—a carefully choreographed synthesis of information that is nearly impossible for standalone or on-premise solutions to accommodate. Cloud users can take advantage of IoT, machine learning, AI, and blockchain capabilities quickly and easily since they are embedded in manufacturing and supply chain applications, and automatically updated so that these capabilities are always current. In this sense, cloud solutions are an essential component and enabler of the successful technology mix.

[3] "The (Rising!) Cost of Downtime." Aberdeen, November 8, 2019.
[4] "Predictive Maintenance: Taking pro-active measures based on advanced data analytics to predict and avoid machine failure." Deloitte, 2017.

BOTTOM LINE

In the end, one thing is clear: The CPG industry is in the midst of dynamic, unprecedented change. The digital market has opened consumers up to a whole new world of options, putting the ability to satisfy demand and produce quality products quickly as the top ingredients for success. Brand recognition and historical leadership in the industry are no longer the deciding factors. To win in this environment, manufacturers require incredible speed and agility backed by the ability to make smart, data-driven decisions.

Successful strategies to accomplish this are only now starting to take shape in the CPG industry, as we have explored throughout this report. These new strategies require a flexible manufacturing approach, an utterly reimagined supply chain concept, and full use of today's smartest tools and technologies. Success in this endeavor means developing the capability to collect and intelligently use key production and customer data to streamline your operations, improve your products, and quickly adapt to today's complex market to outpace change.

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