PLEX®

6TH ANNUAL

STATE OF SMART MANUFACTURING REPORT

Opportunities & Challenges
for Today's Food & Beverage
Manufacturers →

Participants in a recent global survey of nearly 300 manufacturers, including nearly 60 food and beverage manufacturers, recognized the importance of smart manufacturing to drive agile decision making, process automation, and greater efficiencies.

This study from Plex Systems, in collaboration with Hanover Research, explores how food and beverage manufacturers can use technology to address today's challenges and take advantage of long-term opportunities.

The data reveals a clear need for smart manufacturing technology in order to address current challenges, especially those created or heightened by the COVID-19 pandemic.

- Most food and beverage manufacturers are currently using at least some components of smart manufacturing to achieve their business goals.

- Whether manufacturers build a complete, integrated system or focus on a few key tools or processes, smart manufacturing helps organizations solve business challenges and become more competitive.
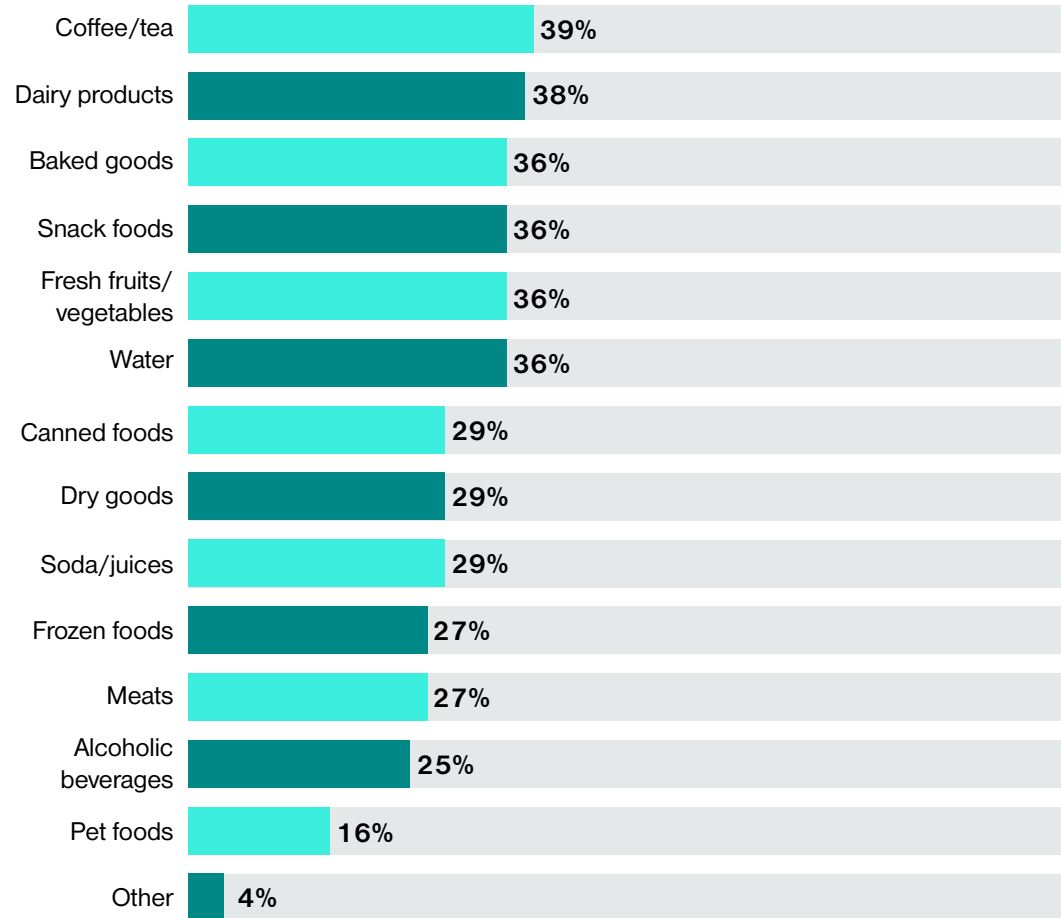
SMART MANUFACTURING:

The intelligent, real-time orchestration and optimization of business, physical, and digital processes within factories and across the entire value chain. Resources and processes are automated, integrated, monitored, and continuously evaluated based on all available information as close to real time as possible.

MESA International

RESPONDENT DEMOGRAPHICS

In which of the following areas does your organization operate?

Area	Percentage
Coffee/tea	39%
Dairy products	38%
Baked goods	36%
Snack foods	36%
Fresh fruits/vegetables	36%
Water	36%
Canned foods	29%
Dry goods	29%
Soda/juices	29%
Frozen foods	27%
Meats	27%
Alcoholic beverages	25%
Pet foods	16%
Other	4%

KEY SOLUTIONS

Enterprise Resource Planning (ERP): Automates front- and back-office processes, including financial management, revenue management, human capital, order management, billing, and inventory

Manufacturing Execution Suite (MES): Tracks and documents the transformation of raw materials into finished goods, providing real-time production management to drive enterprise-wide compliance, quality, and efficiency

Quality Management System (QMS): Standardizes and automates quality documentation, processes, and measurements

Supply Chain Planning (SCP): Combines data from multiple departments across the business to sync demand and supply forecasting to improve inventory accuracy and production management

Industrial IoT (IIoT): Combines process, operational, and machine-level data to improve business performance, automate production and business processes, and increase plant floor production efficiency

Manufacturing Analytics: Provides systematic analysis of data to discover deeper insights, make predictions, or generate recommendations

SMART TECHNOLOGY IN FOOD & BEVERAGE MANUFACTURING TODAY

THE VALUE OF SMART MANUFACTURING

Food and beverage manufacturers have largely positive views on smart manufacturing, and four out of five recognize its link to future success.
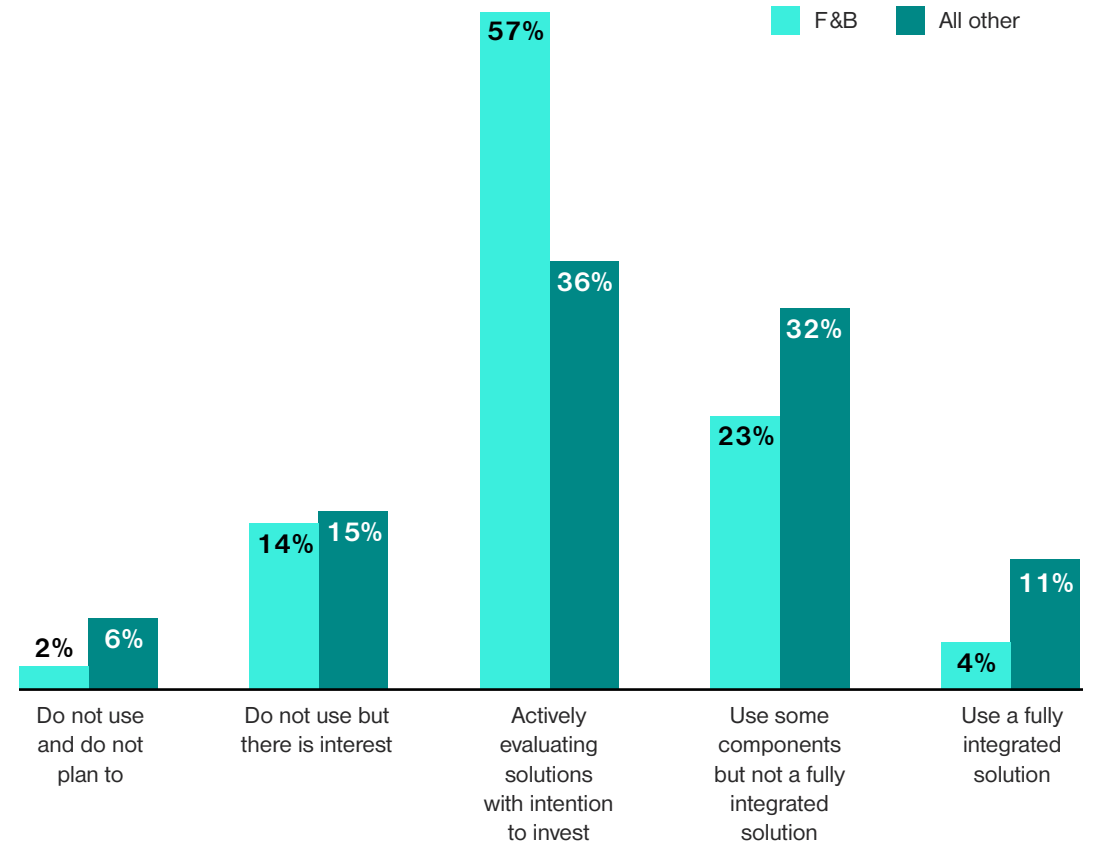
75% of food and beverage manufacturers are optimistic about smart manufacturing.

Many manufacturers are actively using smart manufacturing technologies, but food and beverage organizations tend to lag behind other industries in adoption.

43% of manufacturers are using at least some components of smart manufacturing, compared to only 27% of food and beverage manufacturers.
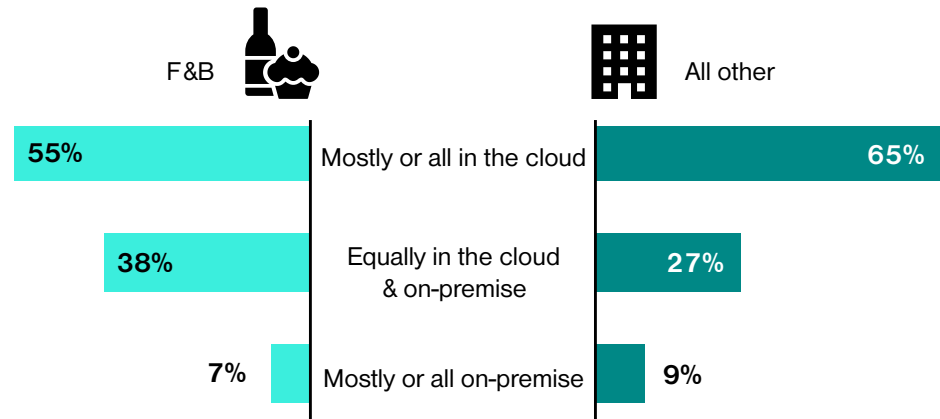
Despite this lag in adoption, a large percentage of food and beverage manufacturers are actively evaluating solutions, and very few indicate they have no plans to use it in the future.

To what extent is your organization using smart manufacturing?

Legend: F&B, All other

	Do not use and do not plan to	Do not use but there is interest	Actively evaluating solutions with intention to invest	Use some components but not a fully integrated solution	Use a fully integrated solution
F&B	2%	14%	57%	23%	4%
All other	6%	15%	36%	32%	11%

Cloud technology is foundational to smart manufacturing initiatives and adoption within the manufacturing industry is at an all-time high. Food and beverage manufacturers are moving to the cloud, but their progress is slower and less comprehensive than other industry verticals.
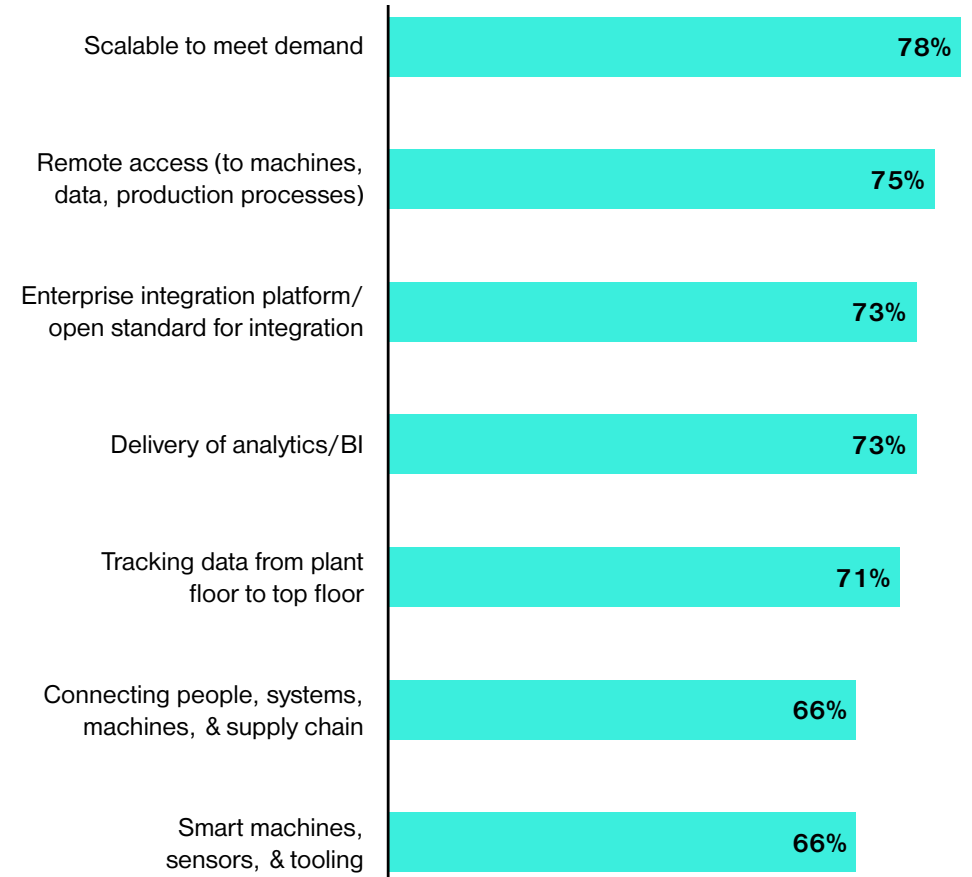
How much of your enterprise software is in the cloud vs. on-premise?

F&B

All other

55%	Mostly or all in the cloud	65%
38%	Equally in the cloud & on-premise	27%
7%	Mostly or all on-premise	9%

Looking forward, nearly a third of F&B manufacturers are planning to increase their investment in cloud technologies.

Food and beverage manufacturers' desire for agility is reflected in the high value they place on smart manufacturing technology's scalability, accessibility, and ability to integrate and connect various areas of the business.

How important are the following smart manufacturing features or capabilities?

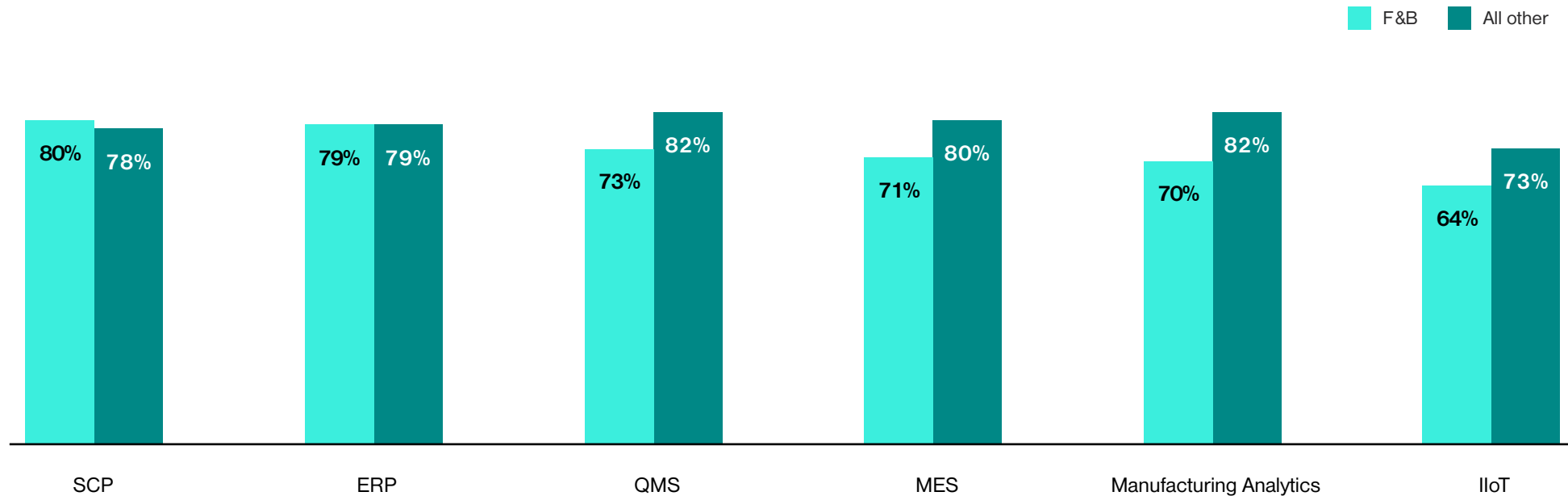|	
Scalable to meet demand	78%
Remote access (to machines, data, production processes)	75%
Enterprise integration platform/ open standard for integration	73%
Delivery of analytics/BI	73%
Tracking data from plant floor to top floor	71%
Connecting people, systems, machines, & supply chain	66%
Smart machines, sensors, & tooling	66%

At a high level, food and beverage manufacturers place higher value on business solutions that have broad, enterprise-wide impact, such as Enterprise Resource Planning (ERP) and Supply Chain Planning (SCP).

By contrast, those in this sector currently place lower value on solutions that are either core to manufacturing operations or may be viewed as ancillary.

This gap suggests that food and beverage manufactures may not fully understand how smart manufacturing technology on the plant floor can solve business challenges and drive ROI.

How valuable do you find the following components of smart manufacturing for your organization's success?
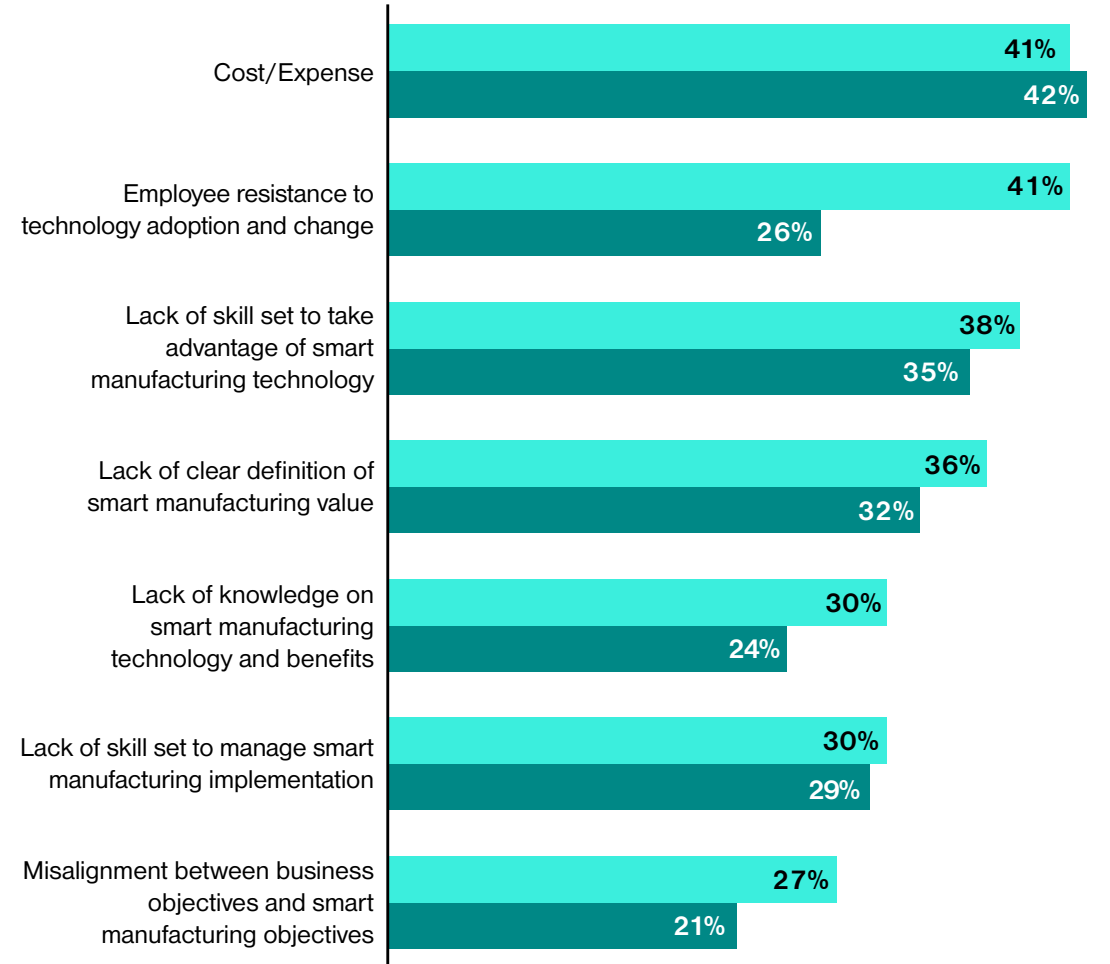

Legend: F&B | All other

SCP: 80% / 78%
ERP: 79% / 79%
QMS: 73% / 82%
MES: 71% / 80%
Manufacturing Analytics: 70% / 82%
IIoT: 64% / 73%

OVERCOMING BARRIERS TO CLOSE THE ADOPTION GAP

Companies are looking to adopt smart manufacturing solutions but face some roadblocks. Cost and lack of clarity around value are the top two barriers to adoption—when the value is not understood, the cost is perceived as high.

- **Lack of clarity around value and lack of knowledge of benefits** are notably higher in the food and beverage industry, likely contributing to their hesitance to invest in areas that have less obvious links to their immediate business challenges such as automation, Industrial IoT, and other plant floor technologies.

- Food and beverage manufacturers are significantly more concerned about **employees' resistance to technology adoption and change** which, when coupled with their overall workforce challenges, reflects a need for robust education and training programs.

What are the barriers to adopting smart manufacturing?

Legend: F&B | All other

Barrier	F&B	All other
Cost/Expense	41%	42%
Employee resistance to technology adoption and change	41%	26%
Lack of skill set to take advantage of smart manufacturing technology	38%	35%
Lack of clear definition of smart manufacturing value	36%	32%
Lack of knowledge on smart manufacturing technology and benefits	30%	24%
Lack of skill set to manage smart manufacturing implementation	30%	29%
Misalignment between business objectives and smart manufacturing objectives	27%	21%

Short-term focus on supply chain technologies may help food and beverage manufacturers weather the current disruption but failure to innovate in their production processes could hurt them long-term.

Multiple points of entry to smart manufacturing are possible with a lower initial investment that scales over time, including machine integration, IIoT, and manufacturing analytics.

- These investments help manufacturers decrease waste, improve resource efficiency, and enhance operational performance—thereby improving customer satisfaction and market competitiveness.

- Early wins then help build the business case for additional investment and scaled expectations.

ADDRESSING CHALLENGES HEAD-ON

With the COVID-19 pandemic impacting nearly every industry, the past year has tested manufacturers' preparedness to manage unexpected change and has shed more light on existing challenges.

Four out of five food and beverage manufacturers have experienced significant adverse effects on their operations due to the pandemic. They were more likely than any other manufacturing sector to suffer from a shortage of skilled workers and experience supply chain disruptions.

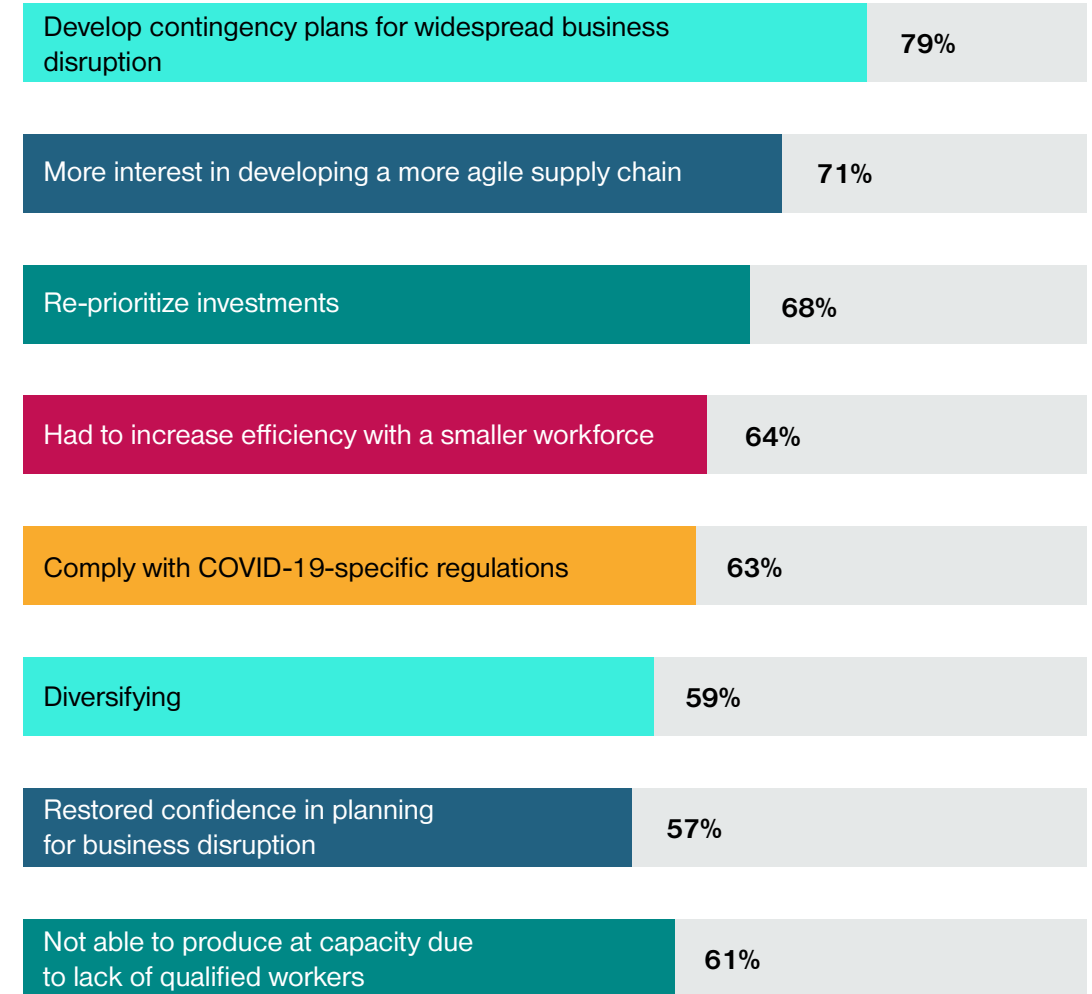**1/5** also note that the pandemic has increased concerns around product quality.

Which obstacles has the COVID-19 pandemic exacerbated for your organization?

F&B

Supply chain disruptions	**54%**
Shortage of skilled workers	**30%**
Product quality	**20%**

All other

Supply chain disruptions	**41%**
Shortage of skilled workers	**21%**
Product quality	**16%**
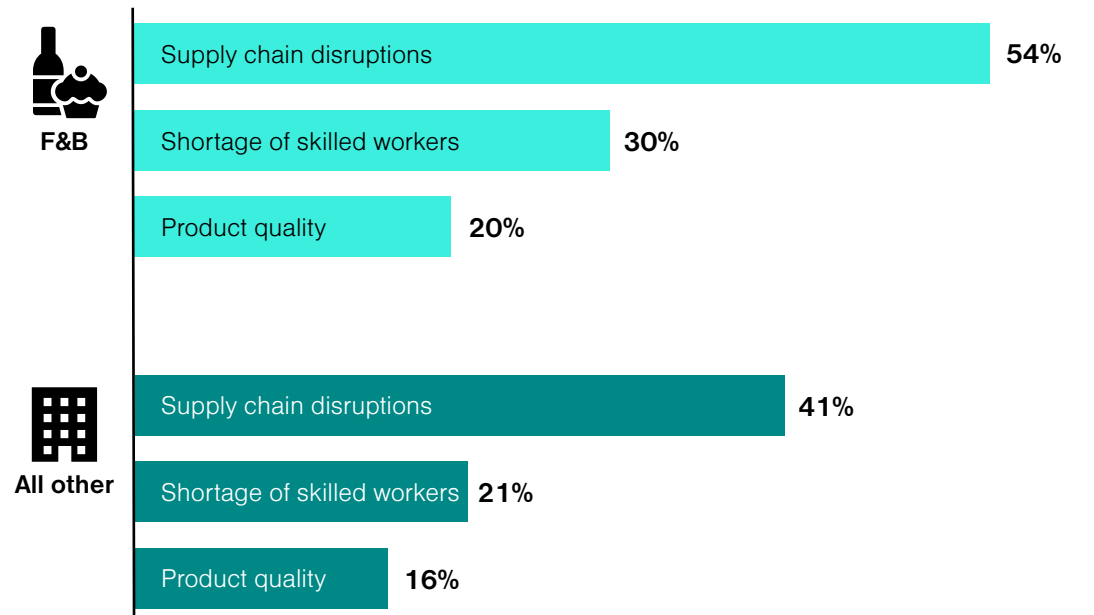
While these challenges are not new to food and beverage manufacturers, the heightened urgency caused by the pandemic has led to an increased focus on better planning, more agility, and greater efficiency across their operations.

These challenges are expected to continue affecting food and beverage manufacturers through the next year.

How has the COVID-19 pandemic affected your organization?

| Response	Percentage
Develop contingency plans for widespread business disruption	79%
More interest in developing a more agile supply chain	71%
Re-prioritize investments	68%
Had to increase efficiency with a smaller workforce	64%
Comply with COVID-19-specific regulations	63%
Diversifying	59%
Restored confidence in planning for business disruption	57%
Not able to produce at capacity due to lack of qualified workers	61%

NAVIGATING SUPPLY CHAIN DISRUPTION

Unsurprisingly, many manufacturers have been impacted by supply chain challenges due to the COVID-19 pandemic. This disruption has emphasized the need to develop a more agile supply chain and contingency plans for unforeseen shutdowns. Forced closures in some regions and reduced staff per shift no doubt contributed to some supply chain fluctuation.

The majority of food and beverage manufacturers (88%) perform supply chain planning but are more likely to be using manual or homegrown solutions than the broader industry, putting them at high risk for data inaccuracies and inefficiencies.

70%
of F&B manufacturers use manual or homegrown SCP solutions compared to 53% of other manufacturers.

Supply chain agility is especially important for food and beverage manufacturers due to the often perishable nature of their materials.
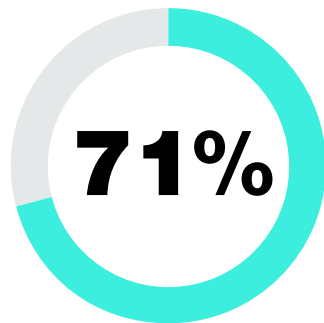
71%
of food and beverage manufacturers say the pandemic has increased their interest in developing a more agile supply chain.

Connected supply chain planning solutions that are cloud-based, scalable, and able to connect business and operational data enable manufacturers to:

Navigate supply chain disruption

Remain steady amidst a changing market

Use data to understand where and how to pivot their operations
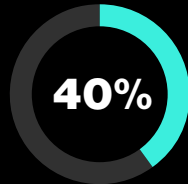
PROOF POINT: OLDE THOMPSON

Olde Thompson implemented the Plex DemandCaster Supply Chain Planning solution before the onset of the COVID-19 pandemic.

Olde Thompson makes spices for the consumer market, and demand rose significantly when the pandemic began as more people were cooking at home. As a result, Olde Thompson had the opposite experience of many other food and beverage companies, experiencing surging demand instead of suffering a drop-off.

Since they were using sales and operations planning (S&OP) and connected planning with regular reviews, Olde Thompson was able to course-correct to capitalize on the opportunity, ultimately leading to significant growth and savings early in the pandemic.

"Plex has given us the **visibility to know exactly who's ordering what, the status of our supply chain and production, and what it's going to take for us to keep service levels at 99% for a growing customer base.** It's an essential platform for the future of our business."

Marcus Merchant
*Director of IT at **Olde Thompson***

$10
MILLION

reduction in inventory costs due to initial implementation

40%

Exceeded previous monthly revenue record by **40%** in March 2020

2X
GROWTH

in sales volume at the onset of the pandemic

ADDRESSING WORKFORCE CHALLENGES

Some notable challenges for food and beverage manufacturers have been related to the workforce, including health and safety concerns, forced closures in some regions, and reduced staff per shift to meet regulatory guidelines.

Pandemic-related workforce challenges exacerbated existing issues around a lack of skilled workers for food and beverage manufacturing.
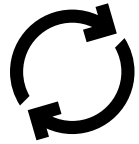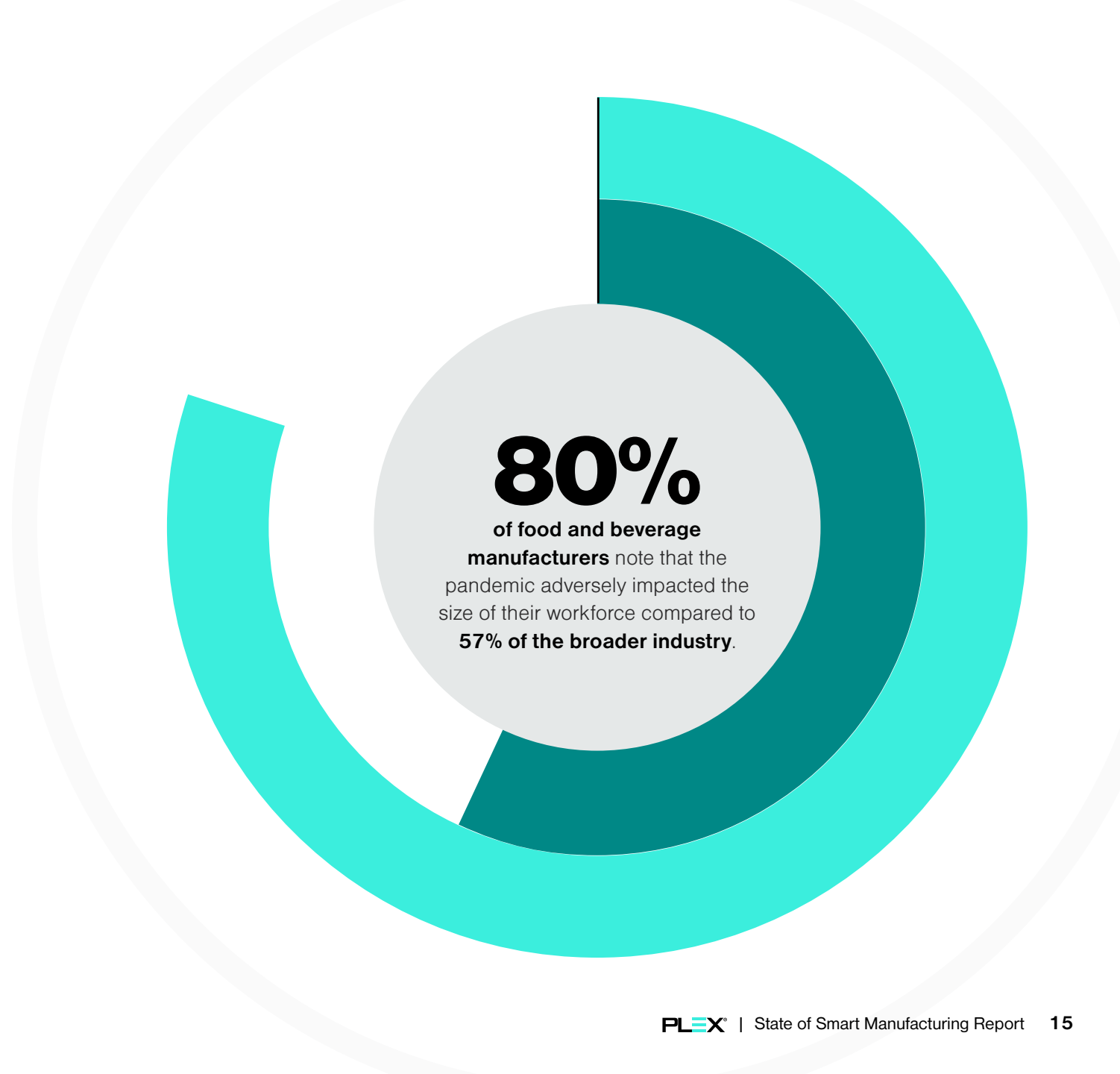
61% were not able to produce at capacity due to lack of qualified workers.

Additionally, automation provides a significant opportunity for food and beverage manufacturers to achieve greater efficiency with the team they currently have.

Only **48%** of food and beverage manufacturers are currently using technology to automate processes compared to **75%** of the broader industry.

80%

of food and beverage manufacturers note that the pandemic adversely impacted the size of their workforce compared to **57% of the broader industry**.
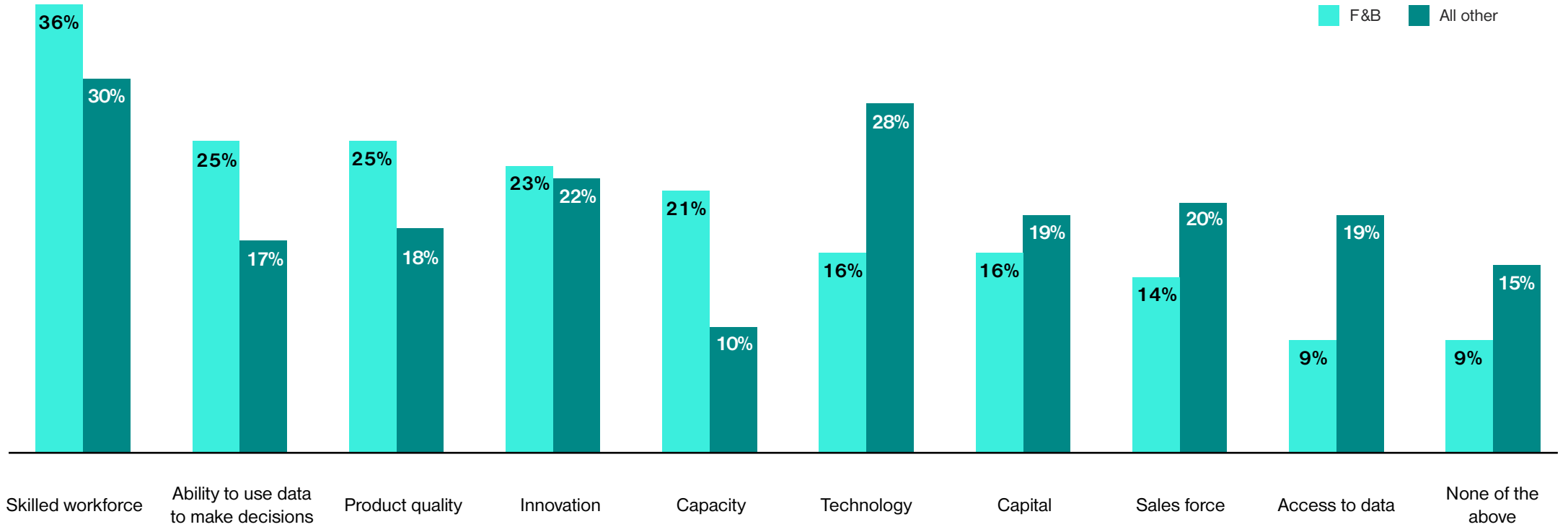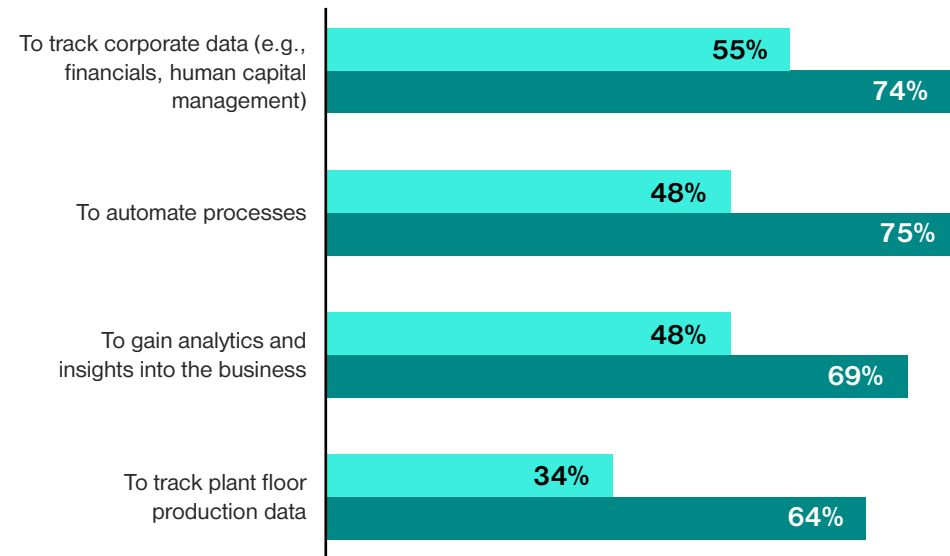
COMPETING IN A VOLATILE MARKET

The COVID-19 pandemic has increased competition and elevated the need for manufacturers to address gaps hindering their success. Compared to other sectors, food and beverage manufacturers see a greater need for a skilled workforce, the ability to use data effectively, improved product quality, and innovation in order to gain a competitive edge.

"My organization lacks the _____ to outpace the competition."

F&B   All other

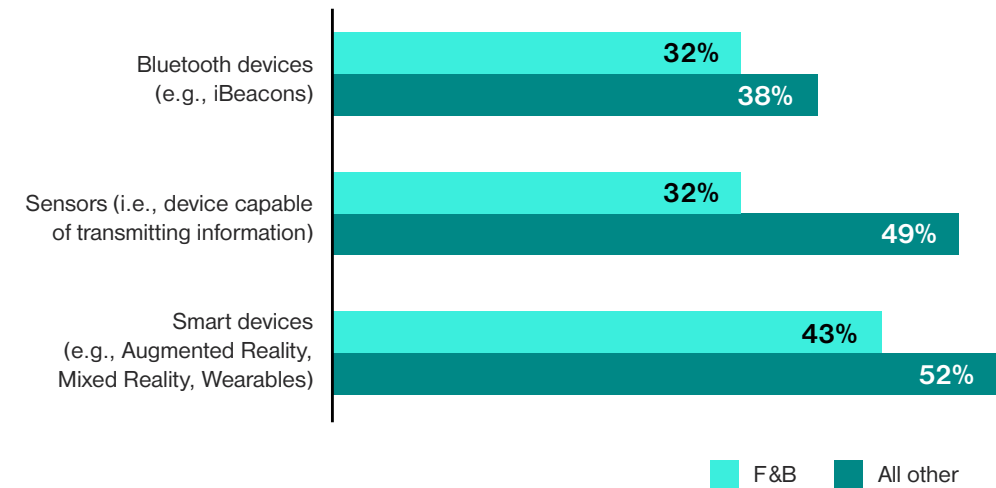| Category	F&B	All other
Skilled workforce	36%	30%
Ability to use data to make decisions	25%	17%
Product quality	25%	18%
Innovation	23%	22%
Capacity	21%	10%
Technology	16%	28%
Capital	16%	19%
Sales force	14%	20%
Access to data	9%	19%
None of the above	9%	15%

Given their ongoing workforce challenges and the self-identified need for actionable data and improved product quality, it's not surprising that food and beverage manufacturers have been slow to adopt technology that addresses these key areas, such as automation, connected devices, and manufacturing analytics.

Food and beverage manufacturers lag behind the industry overall in using smart manufacturing in some key areas:

To track corporate data (e.g., financials, human capital management)
- 55%
- 74%

To automate processes
- 48%
- 75%

To gain analytics and insights into the business
- 48%
- 69%

To track plant floor production data
- 34%
- 64%

Those in other sectors lead food and beverage manufacturers in their use of several connected technologies:

Bluetooth devices (e.g., iBeacons)
- 32%
- 38%

Sensors (i.e., device capable of transmitting information)
- 32%
- 49%

Smart devices (e.g., Augmented Reality, Mixed Reality, Wearables)
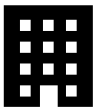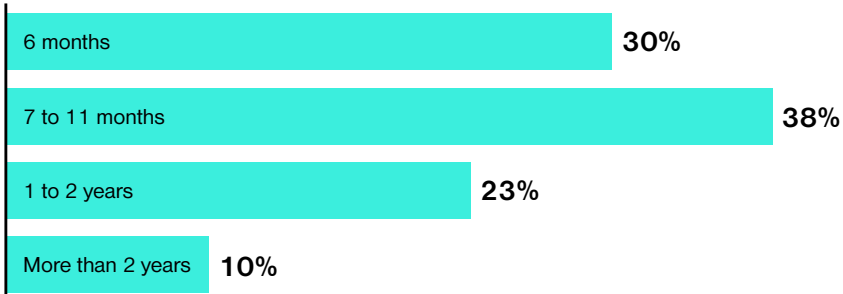- 43%
- 52%

F&B   All other

Ultimately, 84% of food and beverage companies agree that the pandemic has increased the need to adopt smart manufacturing, with 68% saying they plan to adopt it in the next twelve months.
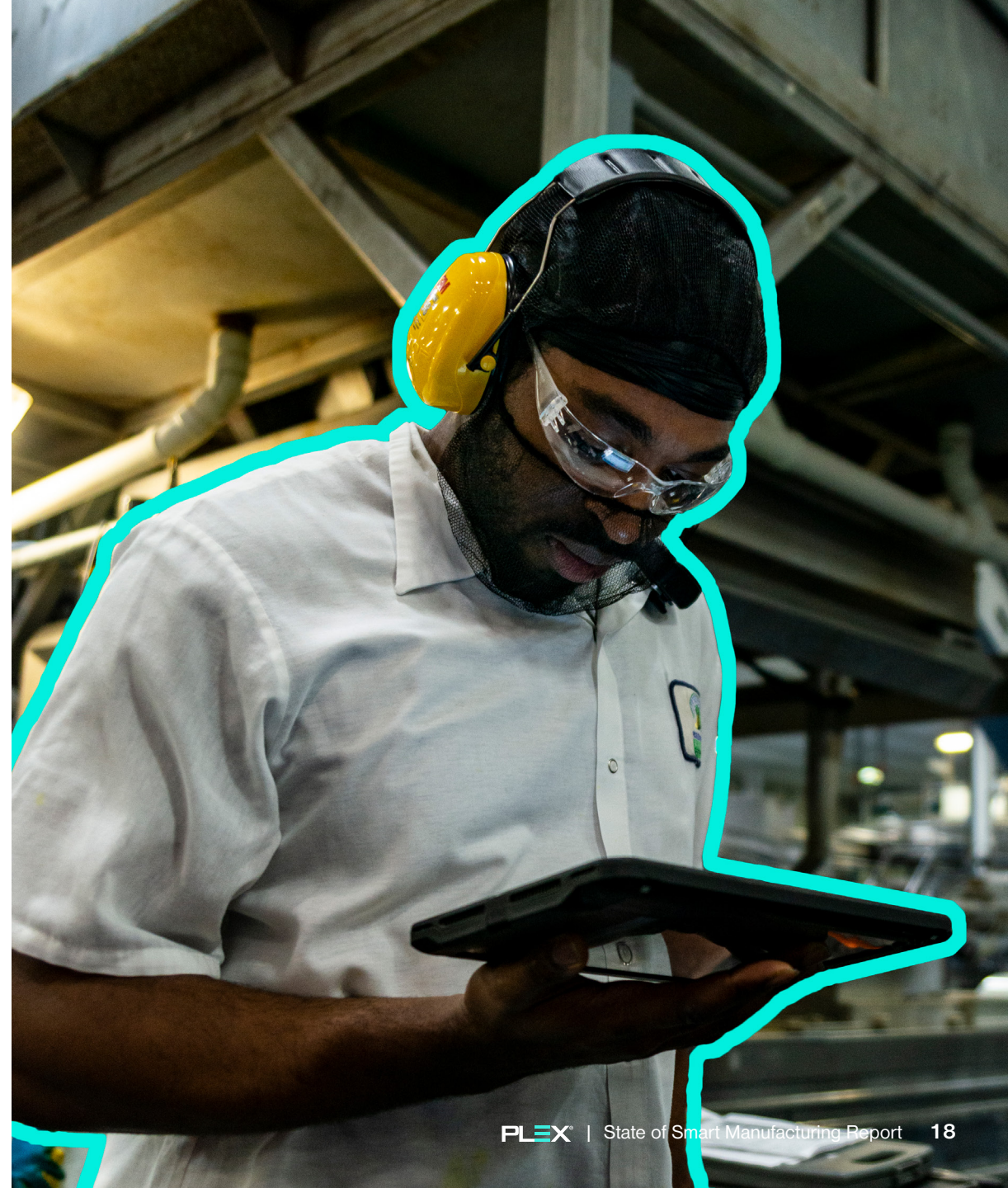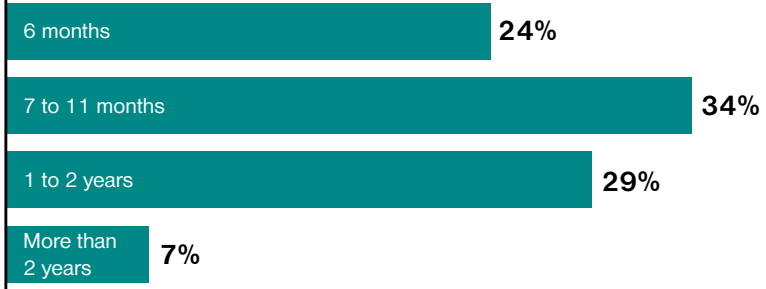
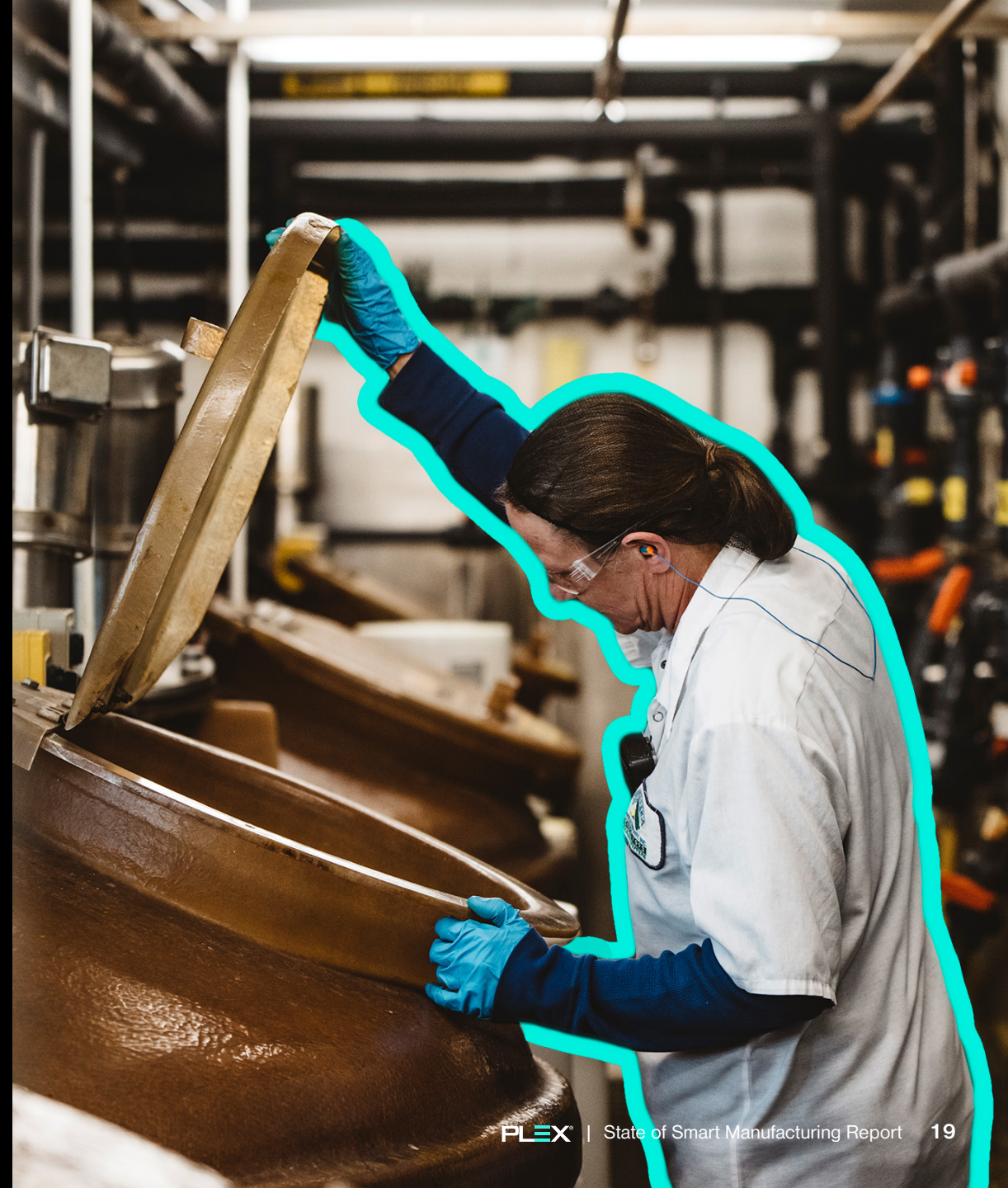**When does your organization plan to adopt smart manufacturing?**

F&B

6 months	30%
7 to 11 months	38%
1 to 2 years	23%
More than 2 years	10%

All other

6 months	24%
7 to 11 months	34%
1 to 2 years	29%
More than 2 years	7%

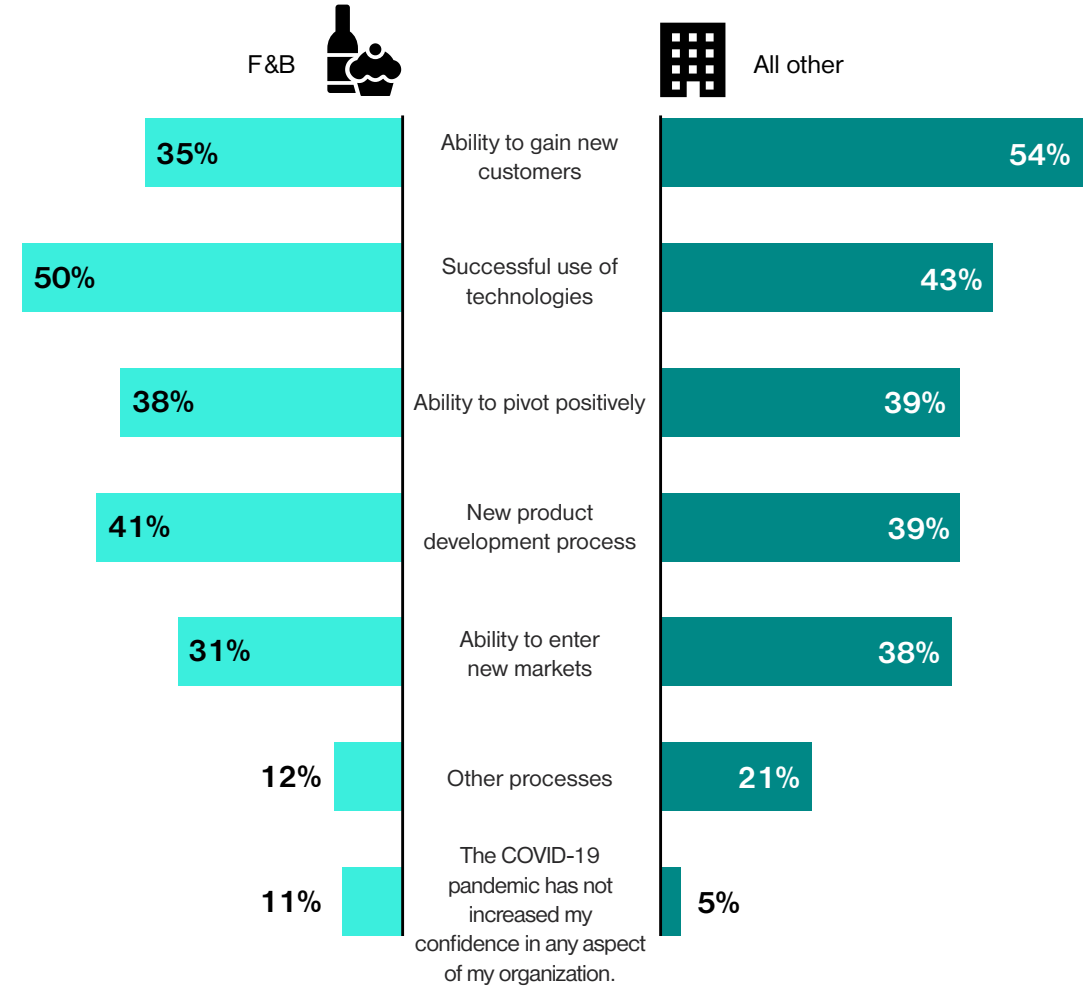# LOOKING AHEAD TO FUTURE OPPORTUNITIES

BEYOND COVID-19

Given the level of disruption caused by the pandemic, it's no surprise that COVID-19 has shed light on the need for smart manufacturing processes and technologies across industries.

Overall, there appears to be optimism as respondents report increased confidence in their organization due to their response to COVID-19.

95% of food and beverage manufacturers report that the COVID-19 pandemic increased their confidence in at least one aspect of their organization.
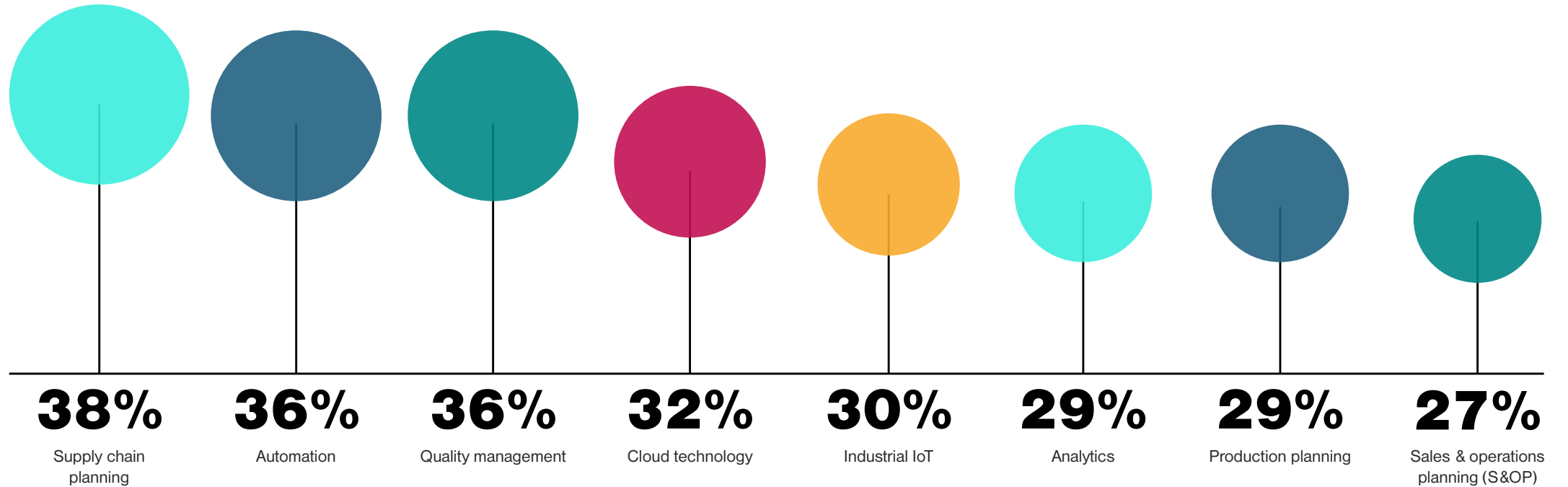
1/2 Nearly half feel increased confidence in their organization's ability to successfully use technologies.

Based on your organization's response to COVID-19, how has the pandemic increased confidence in your organization in any of the following areas?

F&B | All other

Area	F&B	All other
Ability to gain new customers	35%	54%
Successful use of technologies	50%	43%
Ability to pivot positively	38%	39%
New product development process	41%	39%
Ability to enter new markets	31%	38%
Other processes	12%	21%
The COVID-19 pandemic has not increased my confidence in any aspect of my organization.	11%	5%

Though food and beverage manufacturers have lagged behind the broader industry in smart manufacturing adoption, they have navigated incredible disruption and clearly recognize the gaps that need to be addressed. These manufacturers have grown in their understanding of smart manufacturing's many benefits and are especially ready to invest in technologies that will support supply chain agility, operational efficiency, quality, and data-driven decision making.

Where do you plan to increase tech spend in the future?

38%	36%	36%	32%	30%	29%	29%	27%
Supply chain planning	Automation	Quality management	Cloud technology	Industrial IoT	Analytics	Production planning	Sales & operations planning (S&OP)

TAKING ACTION

Smart manufacturing adoption is driven by business challenges, including competitive threats, fluctuating demand, and workforce availability. Manufacturers need to pragmatically invest in technology and build towards a culture of data-driven operations in order to boost ROI and adapt to ever-changing conditions.

"The digital world has enabled a new reality. It will be the companies with the right mix of talent and software tools that will be best able to recover and thrive in these changing conditions."

IDC MarketScape: Worldwide SaaS and Cloud-Enabled Medium-Sized/Midmarket Business ERP Applications 2020 Vendor Assessment (doc #45972120, July 2020)

IDC ANALYZE THE FUTURE

THE WAY TO MANUFACTURING SUCCESS

Smart manufacturing is essential for future success. Manufacturers will be able to adapt in a changing market and unlock long-term opportunities by connecting and automating their business.

- Incremental adoption of smart technologies can help manufacturers gain value over time.

- Many possible entry points to smart manufacturing exist, and manufacturers should weigh their options and prioritize improvements that will yield the greatest value.

STARTING YOUR SMART MANUFACTURING JOURNEY

What are the operational challenges you're trying to solve?
Identify challenges with the greatest financial and productivity impacts, then prioritize those that are highest in value and attainable through technology.

Where are your information gaps?
Identify the essential information you need to solve your operational challenges and develop key use cases to collect and analyze that information.

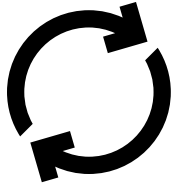**Which use cases offer the right balance of value creation and time-to-value?**
Invest in the smart manufacturing solutions that deliver results for your highest-priority use case.

MAKING THE BUSINESS CASE FOR SMART MANUFACTURING

Smart manufacturing provides the following key benefits:

Efficiency
- Production efficiencies through process automation
- Human resource efficiencies from a single source of accurate, trustworthy data
- Continuous operational improvements driven by real-time, data-backed insights

Achievable ROI
- A pragmatic, stepwise approach lowers adoption risk while providing returns to fund future smart manufacturing initiatives

Risk Mitigation
- Reduced exposure to IT vulnerabilities including system downtime, security breaches (cyber attacks), and application currency

Making a business case for smart manufacturing can help communicate the benefits, gain approval, and accelerate adoption and time-to-value. Plex can help.

ABOUT PLEX

Plex is the leader in cloud-delivered smart manufacturing solutions and has been helping manufacturers improve their businesses for decades. Plex has resources and deep industry expertise in defining business value from technology, and we're ready to assist manufacturers in adopting smart manufacturing technology and processes to achieve their business goals.

Learn how to achieve your business goals using smart manufacturing at Plex.com

PLEX MAKE IT SMART™

www.plex.com