IndustryWeek

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Industry Insights:

Manufacturing Operations During the COVID-19 Crisis

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Executive Summary

Make no mistake, Manufacturing 4.0 technologies have played a vital role in manufacturers' ability to remain agile amid the COVID-19 pandemic.

Manufacturers responding to Hitachi Vantara's *Industry Insights: Manufacturing Operations During the COVID-19 Crisis* survey indicated that digitalization was already a part of their long-term strategy prior to the outbreak and it is exactly those implementations that have helped them maximize output and maintain quality during the COVID-19 crisis.

Advanced technologies helped the leaders better manage COVID-19 disruptions

In early 2020, manufacturers were already well rooted in several key Manufacturing 4.0 technologies such as cloud computing, wireless connectivity, cybersecurity, automation and robotics and supply chain technologies. As the coronavirus spread across the world, these IoT technologies directly aided manufacturers' efforts to mitigate many issues related to the COVID-19 shut down, helping them track operations and efficiency to maximize output and maintain quality while also maintaining worker performance, productivity and safety.

The survey also highlighted the importance of cloud, supply chain, predictive analytics, automation/robotics and wireless connectivity as vital tools needed to combat the productivity disruption of COVID-19. But the need for continued investment is evident.

Supply-chains, safety and productivity are critical challenges

Keeping workers safe, managing supply chain disruptions and meeting demand continue to present challenges. Nearly 1/3 of respondents said they in the early stages of implementation and have adopted at least some Manufacturing 4.0 technologies. However, most respondents are far from full implementation, and they indicate they lack many capabilities that are essential for current and future competitiveness as they ramp up operations as the businesses reopen. This includes the need for more edge computing, artificial intelligence, 3D light detection and ranging (lidar) technology, advanced controls, DCS/SCADA and video analytics for worker health and safety.

Nearly three-fourths of respondents (73%) ranked worker health and safety at least a 3 on a scale of 1-5 as a challenge, with 19% saying it's been a significant challenge; two-thirds of respondents ranked productivity at least a 3 on a scale of 1-5 as a challenge; and nearly half of manufacturers rank supply chain challenges at least a 4 or a 5.

Looking ahead, manufacturers realize they need to remain focused on digitalization. Many manufacturers affirmed that they're planning increased investments in wireless, cyber security automation/robotics and supply chain technologies. Plus, nearly 43% of respondents say they plan to increase investments in video and lidar technologies.

Executive Summary (continued)

Innovative technologies like LiDAR and analytics will propel safety and competitive advantage

Continued investments in video-capture systems, lidar, AI and other smart technologies will play an increasing role in manufacturers' ability to remain safe and profitable during the pandemic and beyond. For instance, video-capture systems can detect when worker or pedestrian walks into a restricted or hazardous area. And manufacturers can configure LiDAR to detect behaviors that indicate worker illness or risky behavior, such as slipping on the floor or social distancing, without capturing personally identifying information. These technologies can also help with skills training, root-cause analysis and quality improvements.

While manufacturers may be tempted to slow or halt IoT investments during uncertain times, it's clear that organizations that continue to make Manufacturing 4.0 a priority will have a significant advantage moving forward.

Introduction & Methodology

OVERVIEW

Methodology, data collection and analysis by *IndustryWeek* on behalf of Hitachi Vantara. Data collected May 15 through June 3, 2020.

Methodology conforms to accepted marketing research methods, practices and procedures.

METHODOLOGY

On May 15, 2020, Endeavor Business Media emailed invitations to participate in an online survey to members of the *IndustryWeek* database.

By June 3, 2020, Endeavor Business Media had received 192 completed, qualified surveys. Only respondents whose company has annual revenues of $100 million or more qualified to participate in the study.

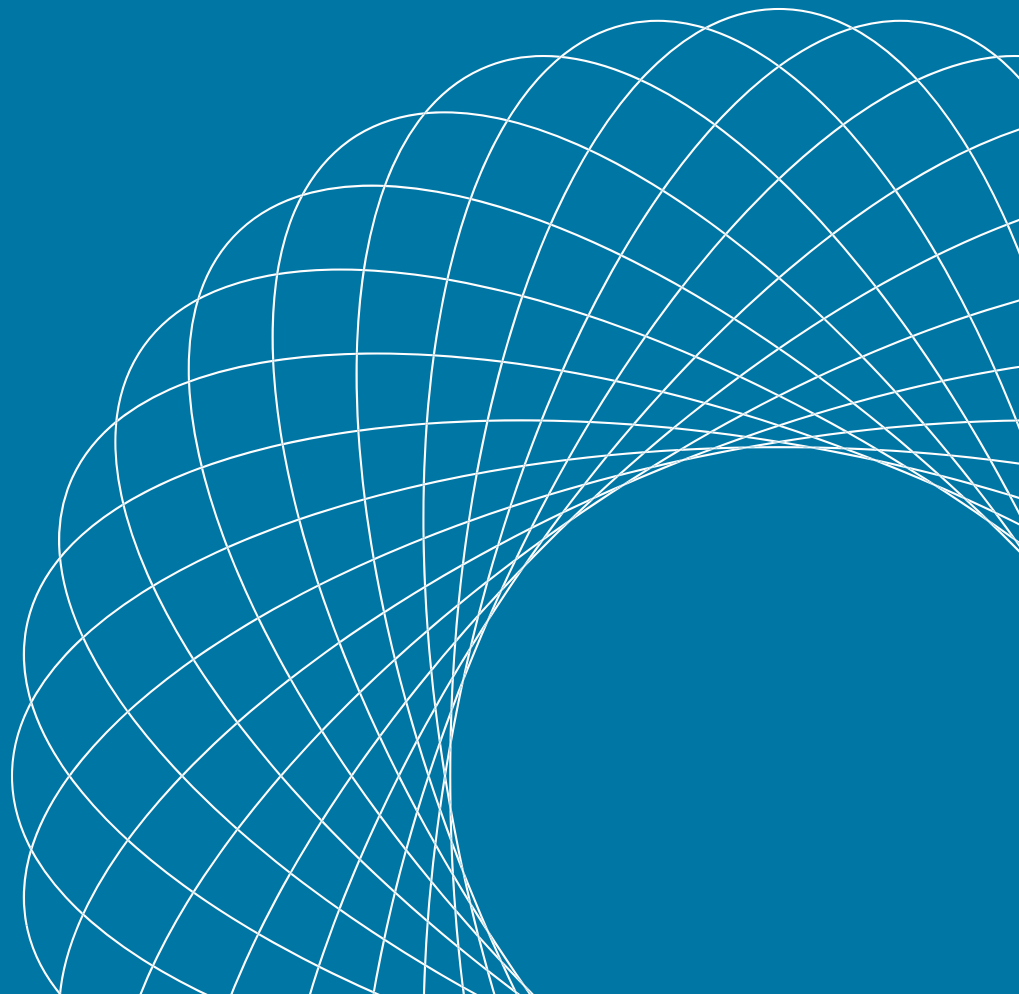
RESPONSIVE MOTIVATION

To encourage prompt response and increase the response rate overall, a live link to the survey was included in the email invitation to route respondents directly to the online survey.

The invitations and survey were branded with the *IndustryWeek* logo in an effort to capitalize on user affinity for this valued brand.

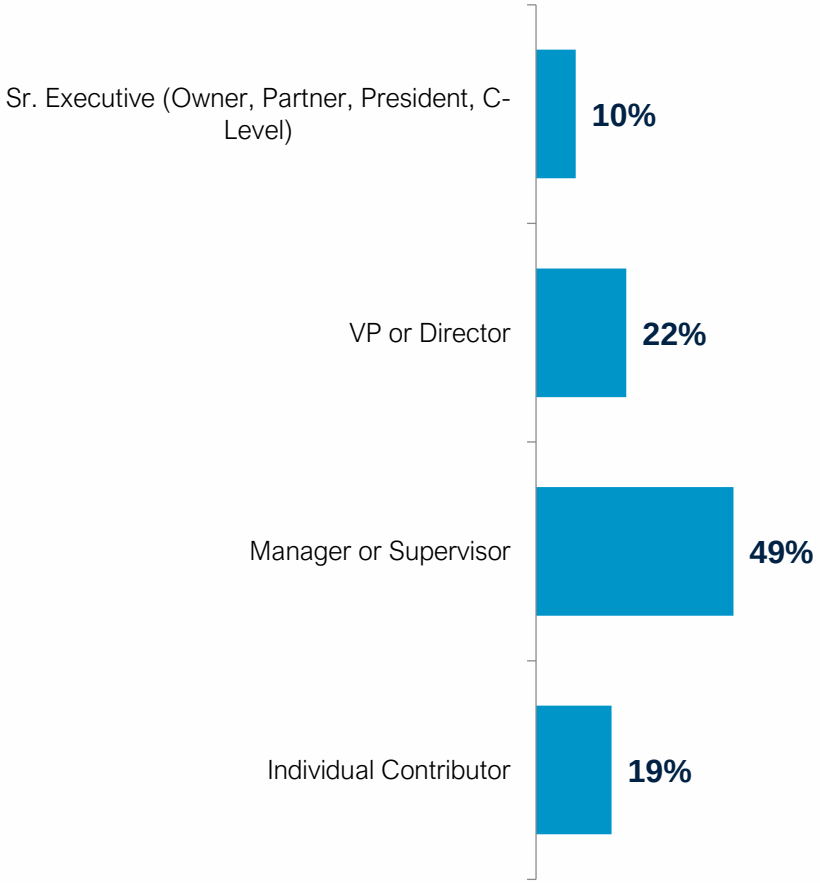
Each respondent was afforded the opportunity to enter a drawing for one of four $100 Visa gift cards.

Respondent Profile



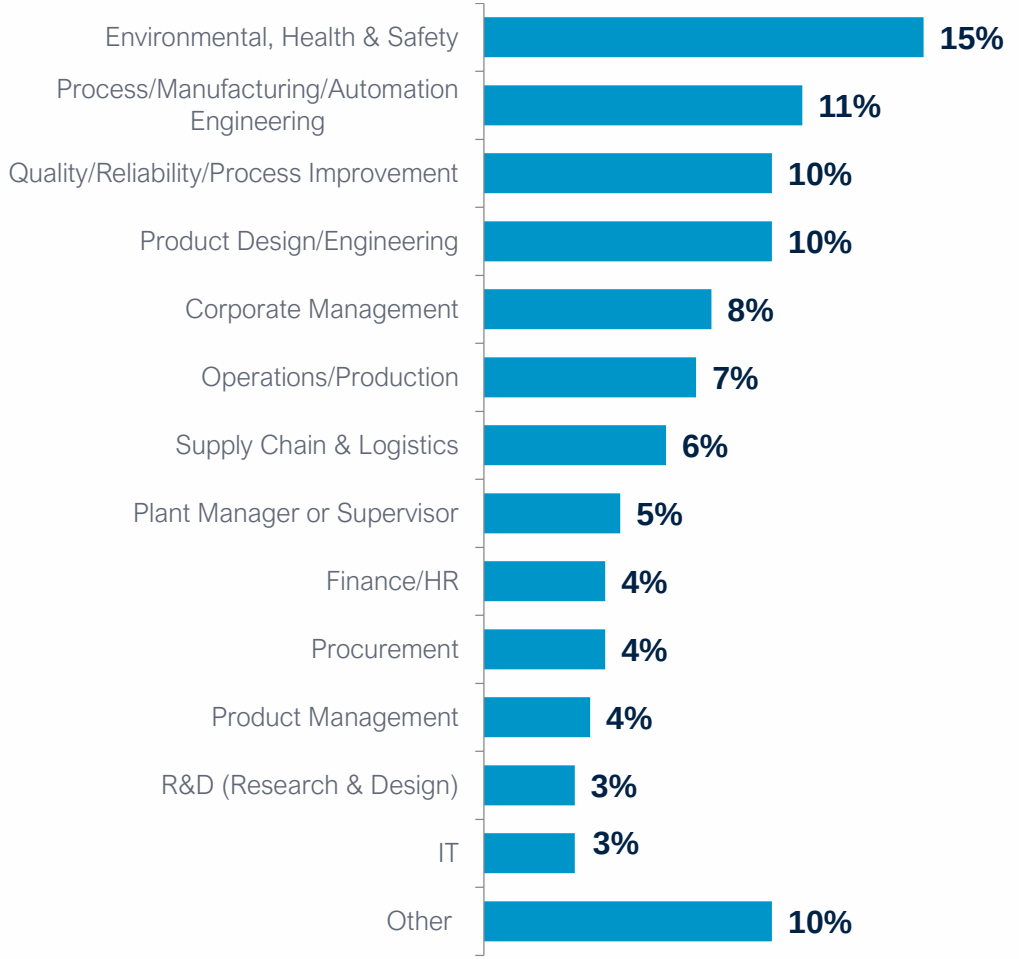
Respondent Profile

The majority of respondents indicate their job level as manager or higher. A variety of job functions are represented by respondents.



Question: Which of the following best describes your job level?

Base: All respondents (n=192).

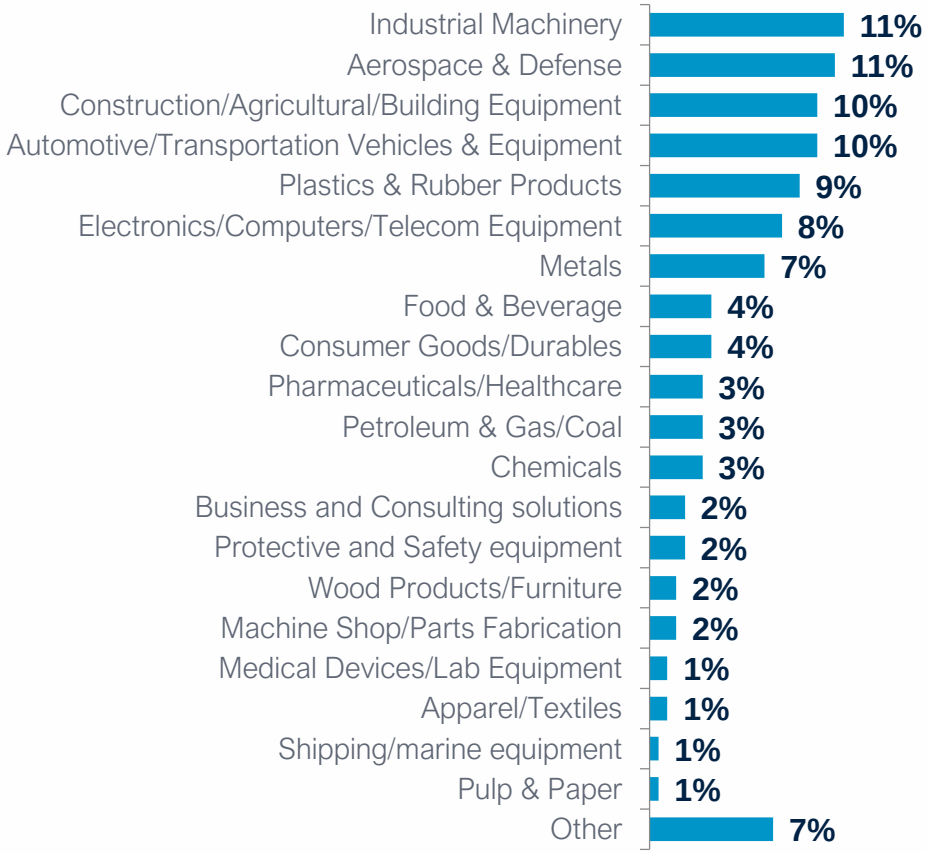


Question: Which of the following best describes your job function?

Base: All respondents (n=192).

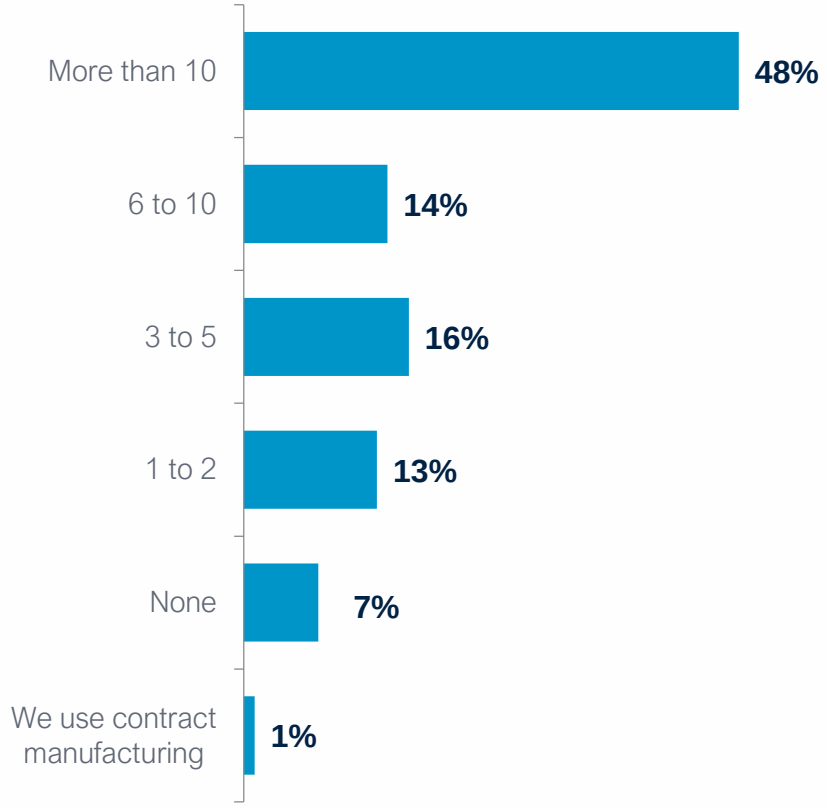
Company Profile

Respondents work in a variety of industries, with the largest percentage in Industrial Machinery. Nearly half of respondents indicate their company operates more than 10 plants.



Question: What is your company's primary product at your location/division?

Base: All respondents (n=192).

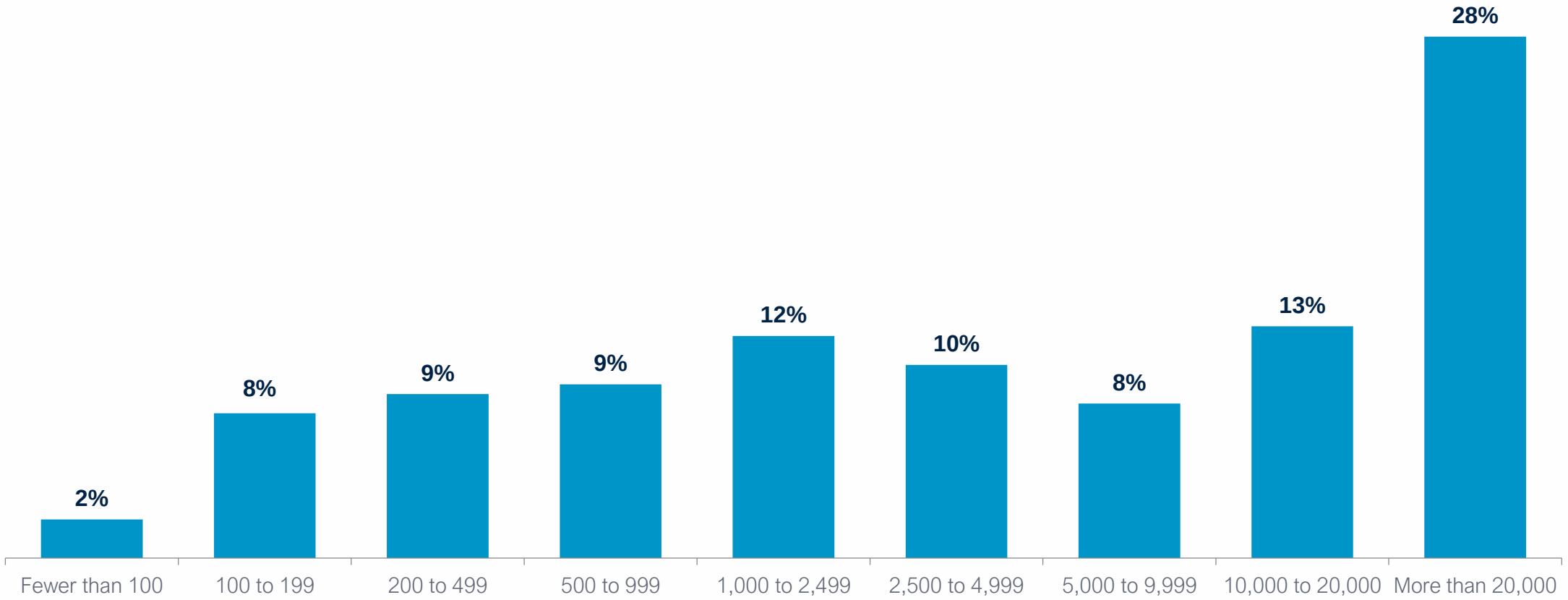


Question: How many plants does your company operate?

Base: All respondents (n=192).

Company Size – Employees

Nearly three in four respondents indicate their company has 1,000 or more employees, including 41% whose companies have more than 10,000 employees.

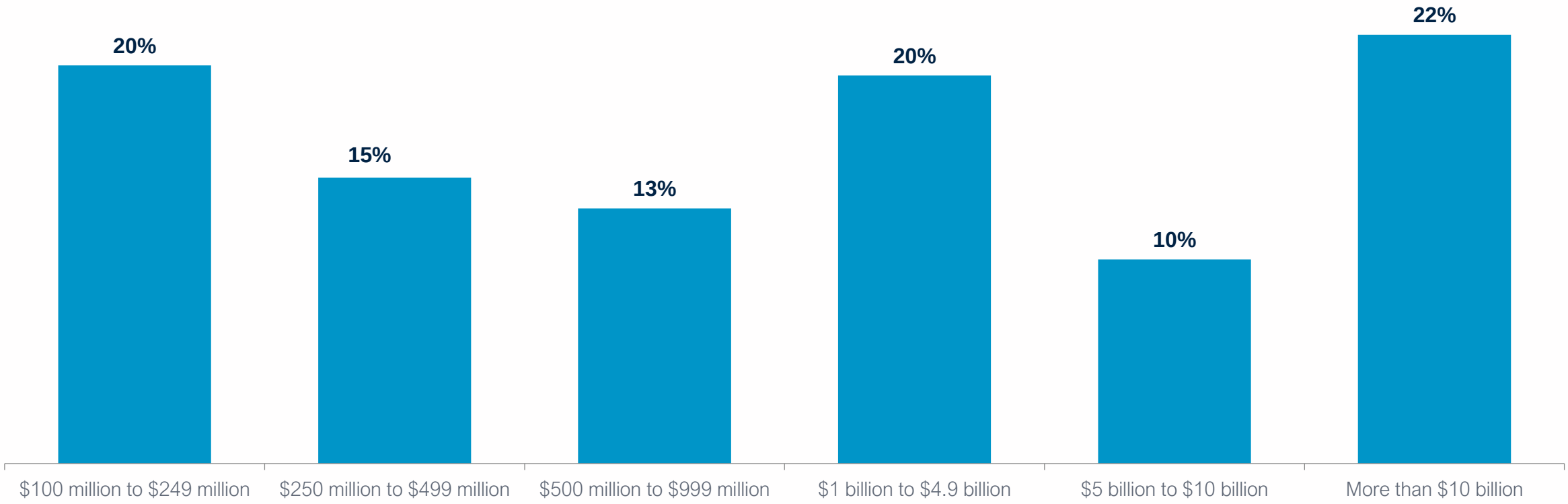


Question: What is the number of employees in your company globally?

Base: All respondents (n=191).

Company Size – Annual Revenue

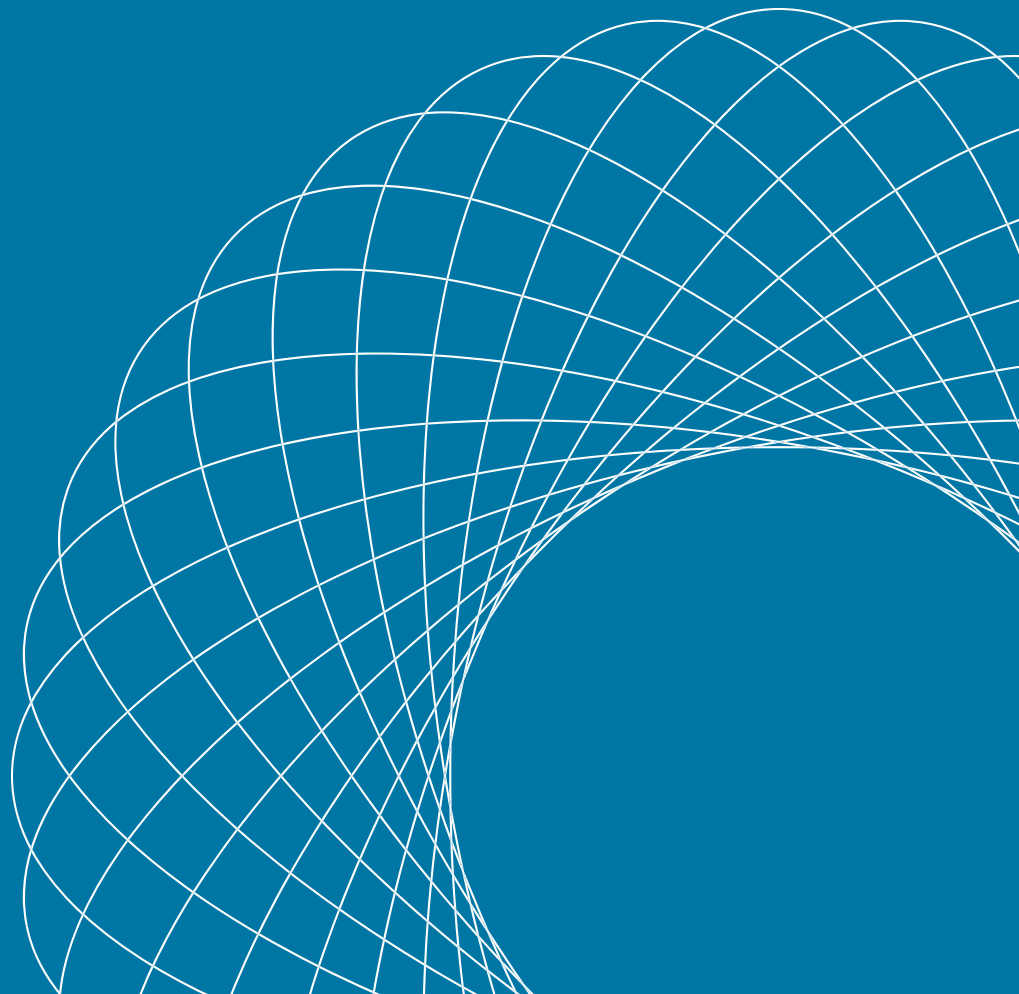
Only respondents who work for companies with $100 million or more in revenue are included in the survey results. Fifty-two percent of respondents indicate their company has annual revenue of $1 billion or more. Data on the following pages is presented in total and compares large companies ($1 billion + in revenue) to mid-sized companies (annual revenue between $100 million and $999 million).



Question: Into which of the following ranges does your company's annual revenue fall?

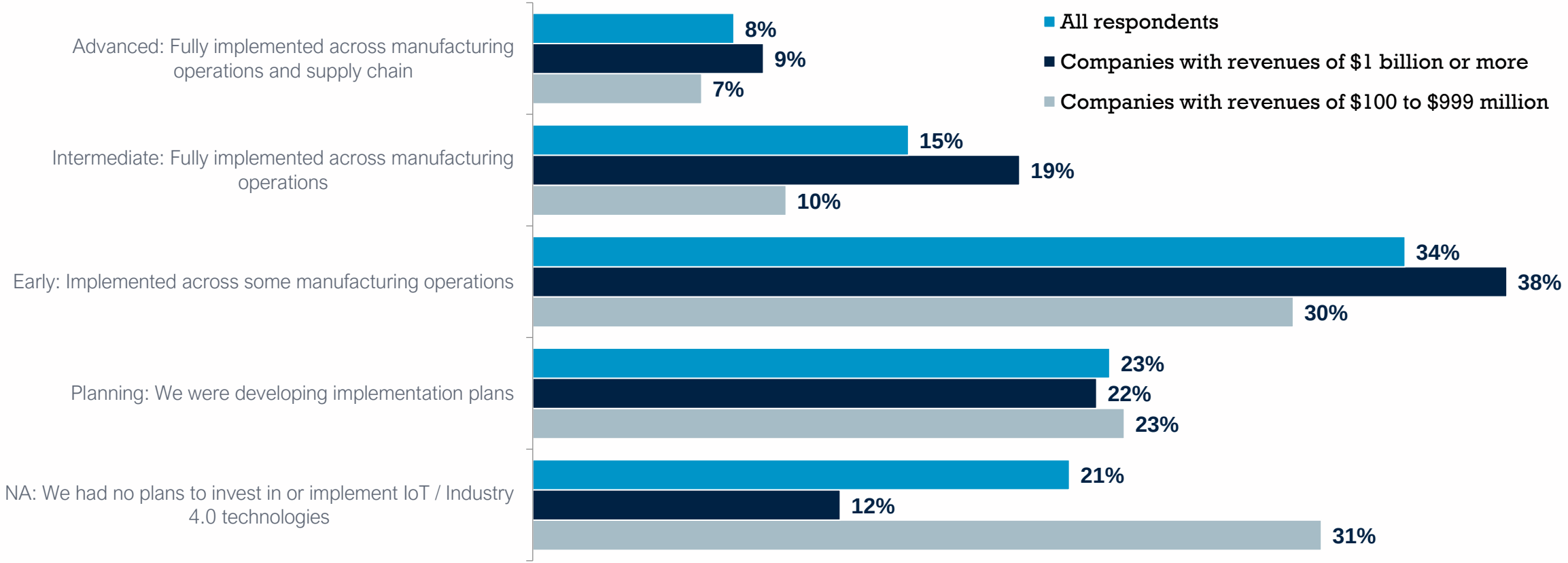
Base: All respondents (n=192).

Key Findings



Pre-Pandemic State of IoT/Industry 4.0

The majority of respondents indicate their company had begun implementing IoT/Industry 4.0 technologies in their operations before the COVID-19 crisis. Two-thirds of companies with $1 billion or more in annual revenue had begun the implementation process, while 47% of respondents from mid-sized companies had begun implementing these technologies.

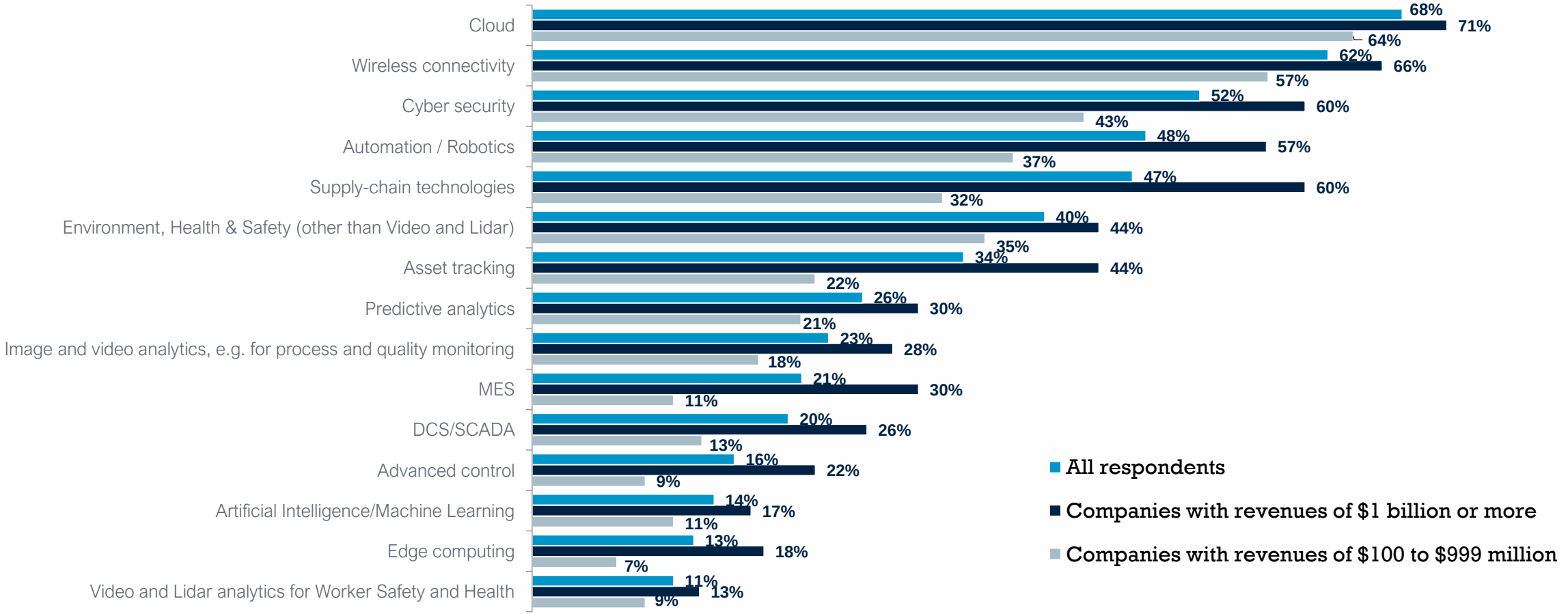


Question: Which of the following best describes the state of IoT / Industry 4.0 technologies in your operations before the COVID-19 crisis?

Base: All respondents (n=191).

Specific Technologies Used

Cloud, wireless connectivity, and cyber security technologies were each used by a majority of respondents prior to COVID-19. Each technology listed is more likely to be used by large companies than mid-sized companies.

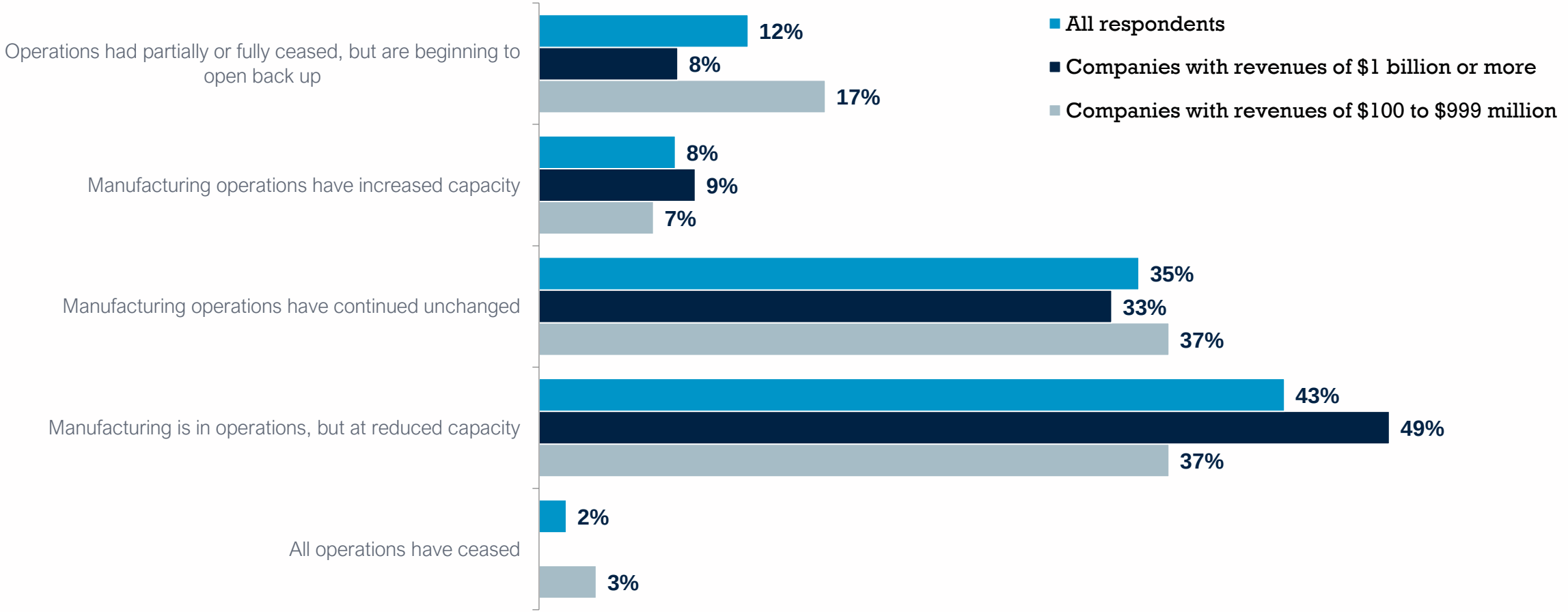


Question: What specific technologies were you using before COVID-19?

Base: All respondents (n=191). Multiple answers allowed.

Operations During COVID-19 Crisis

While few respondents indicate operations have completely ceased during COVID-19, the majority experienced at least some slow-down.

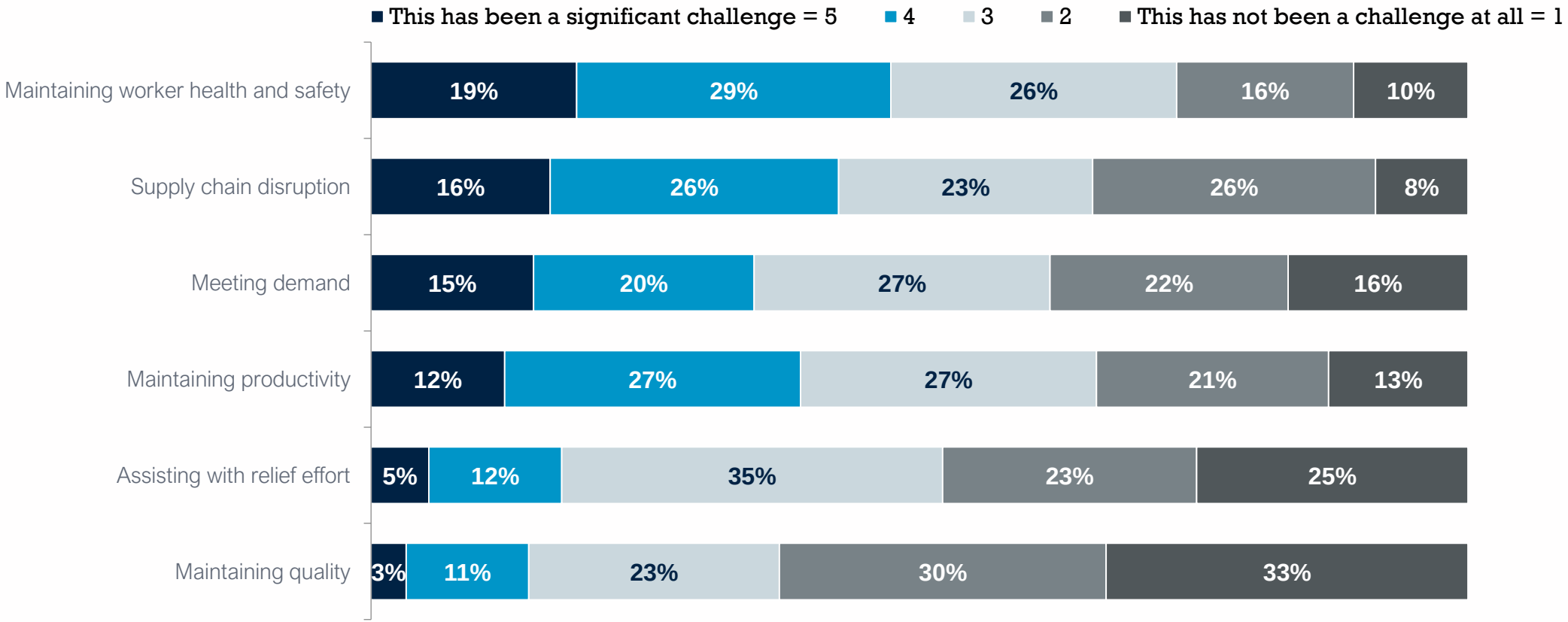


Question: Are you still in operation during COVID-19?

Base: All respondents (n=191).

Challenges During COVID-19 Crisis

Maintaining worker health and safety, supply chain disruption, meeting demand, and maintaining productivity have been the most challenging aspects of business operations during the COVID-19 crisis. Respondents are less likely to report a challenge with assisting with the relief effort or maintaining quality.

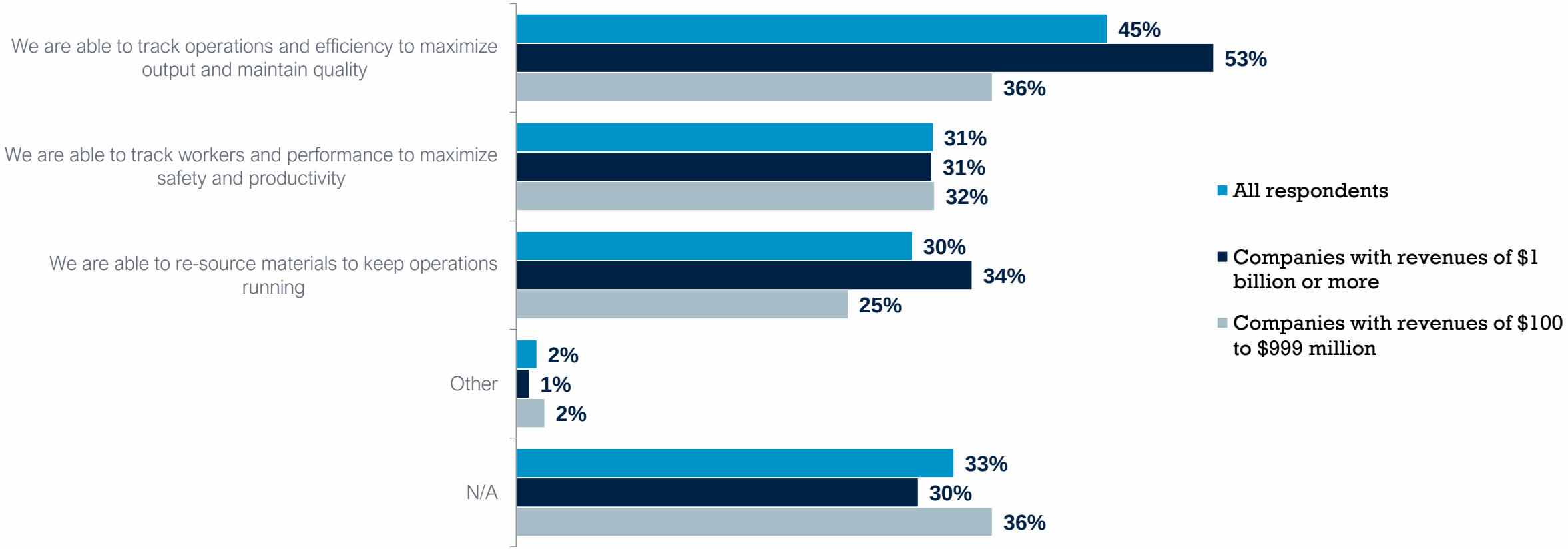


Question: To what extent has COVID-19 caused each of the following to be a challenge for your operations?

Base: All respondents (n varies from 188 to 192).

Use of Technology to Overcome Challenges

Forty-five percent of respondents indicate that IoT/Industry 4.0 technologies give their company the ability to track operations and efficiency to maximize output and maintain quality during the COVID-19 crisis.

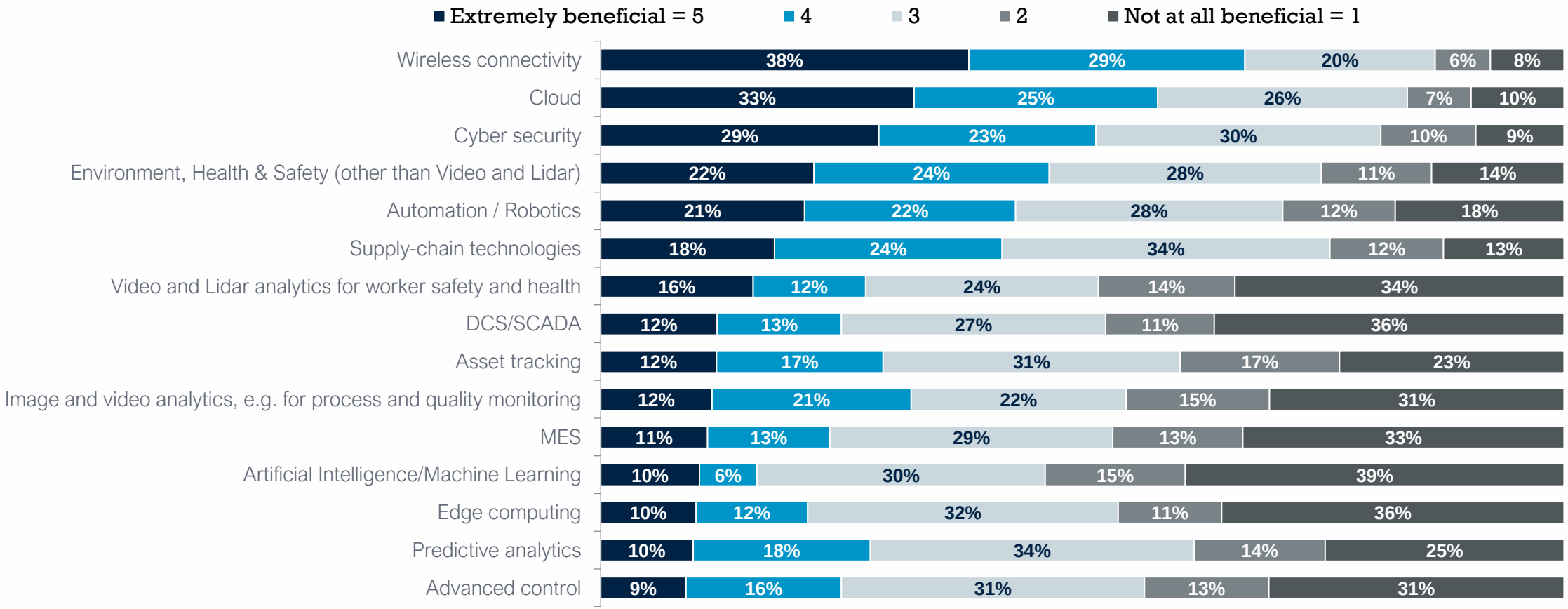


Question: How have IoT / Industry 4.0 technologies helped overcome these challenges?

Base: All respondents (n=191). Multiple answers allowed.

Benefit of Specific Technologies

A majority of respondents rate wireless connectivity, cloud, and cyber security technologies as 4 or 5 on a five-point scale in terms of being beneficial in overcoming challenges caused by COVID-19.

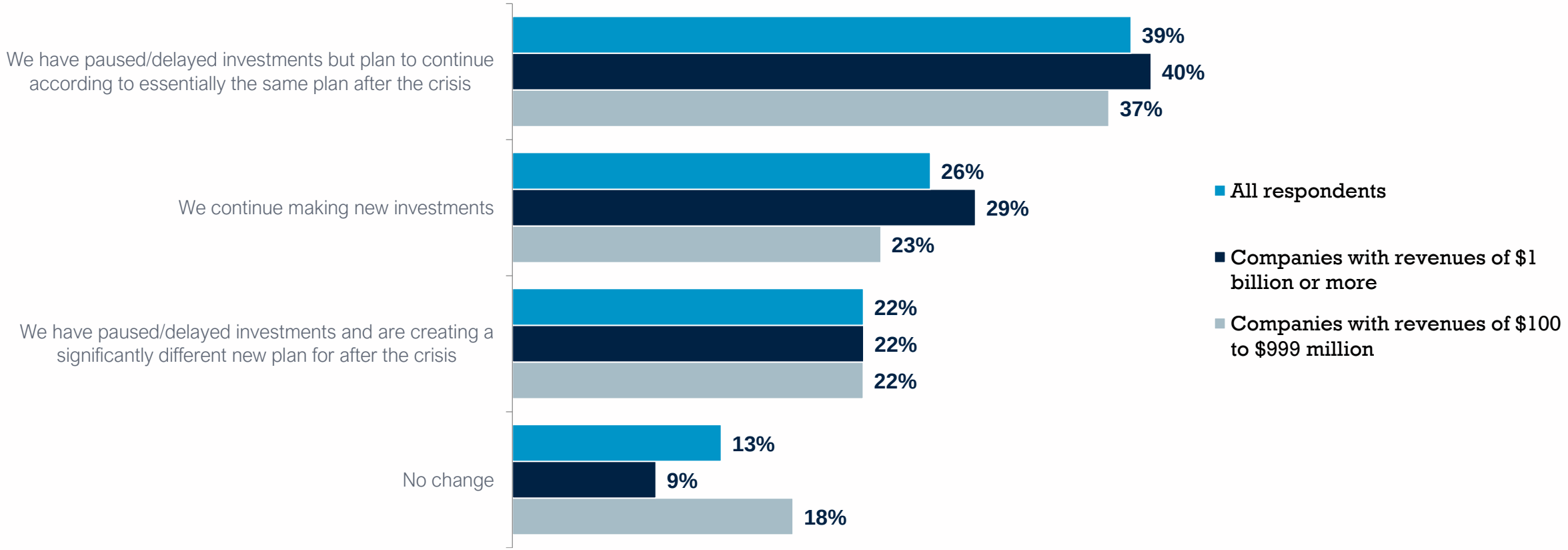


Question: How beneficial have each of the following technologies been in overcoming challenges caused by COVID-19?

Base: All respondents from large companies (n varies from 117 to 166).

Technology Investment Plans

Sixty-one percent of respondents indicate that the COVID-19 crisis caused technology investments to be paused/delayed. Thirty-nine percent plan to continue with the same plan after the crisis, while 22% are creating a significantly different plan to implement after the crisis.

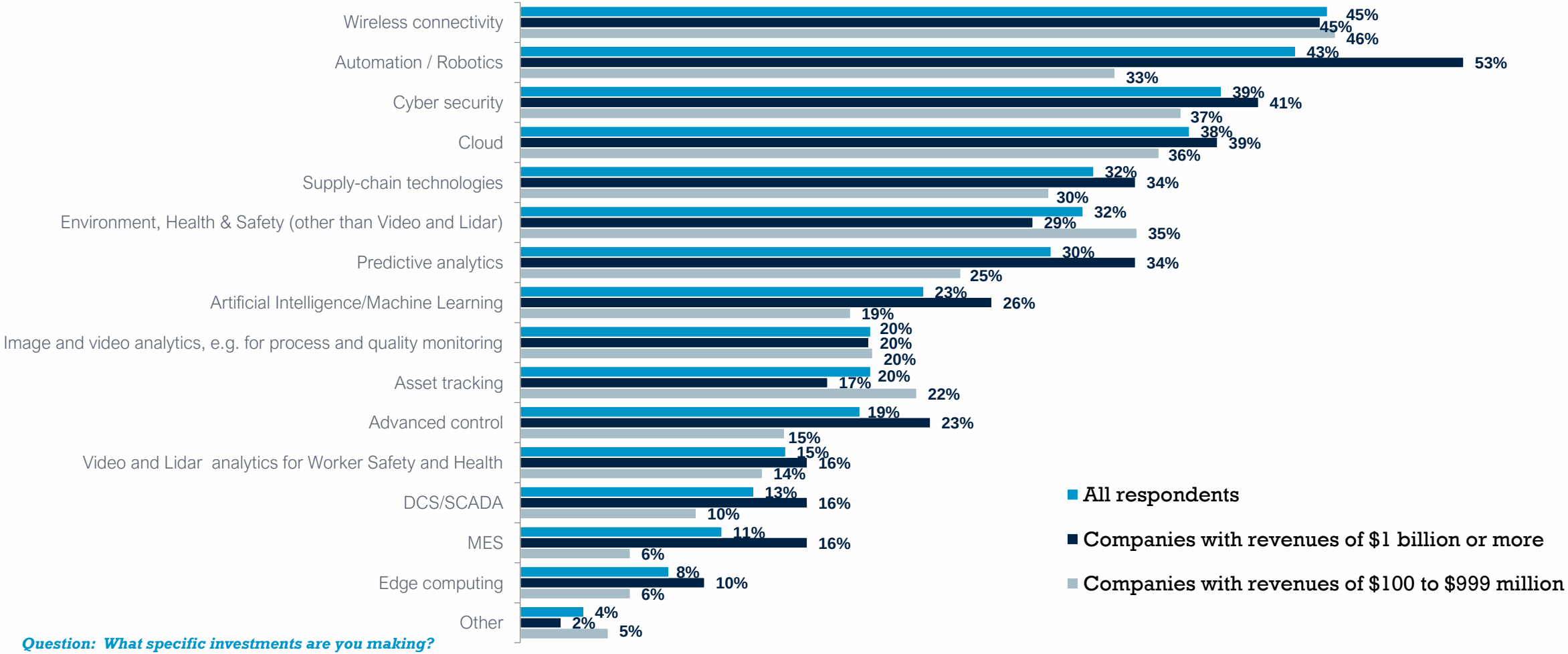


Question: How has COVID-19 affected your technology investment plans?

Base: All respondents (n=191).

Specific Technology Investments

Forty-five percent of respondents are investing in wireless connectivity. Large companies are most likely investing in automation/robotics.

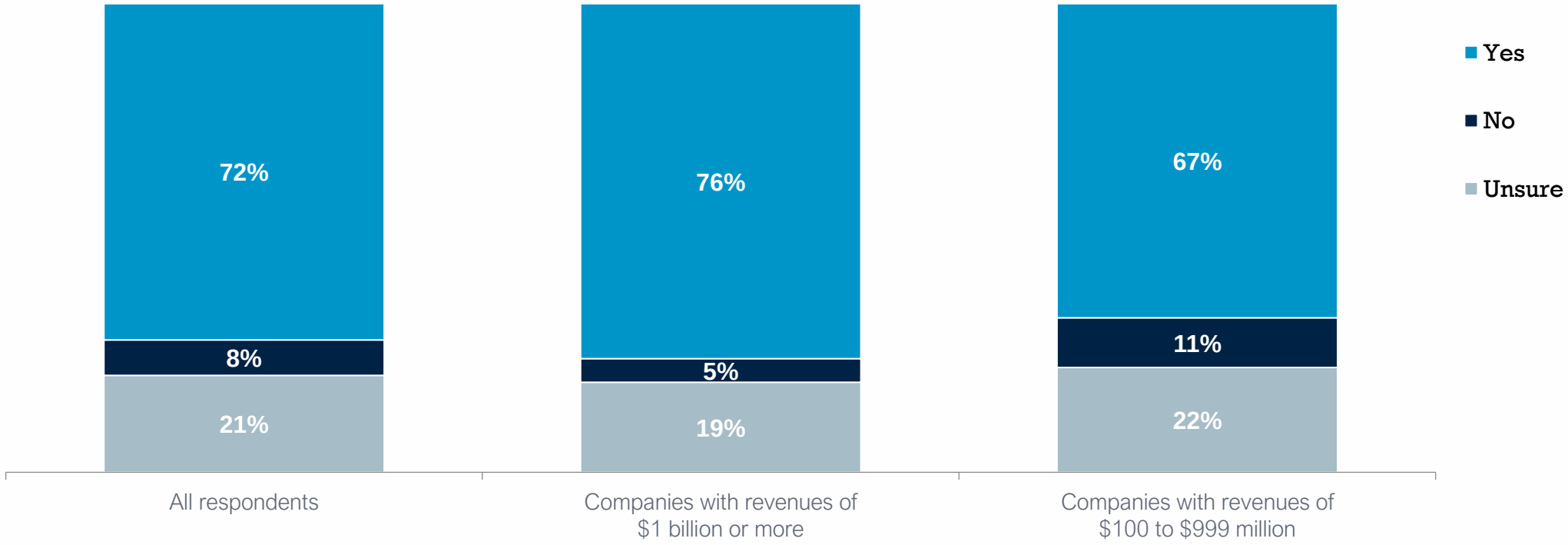


Question: What specific investments are you making?

Base: All respondents (n=168). Multiple answers allowed.

Coping with COVID-19 Crisis

The majority of respondents believe they are equipped with the tools and technologies necessary to cope with the COVID-19 crisis.

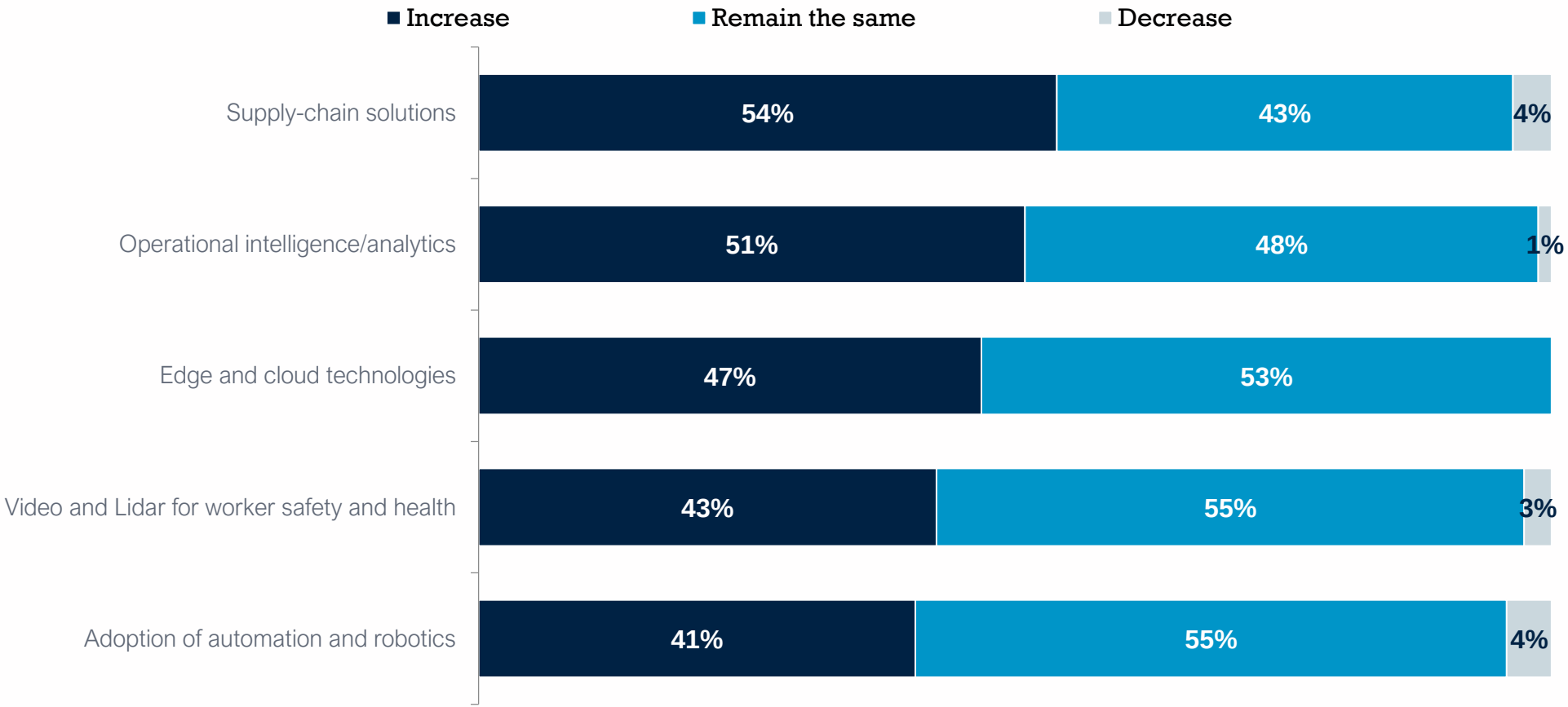


Question: Do you feel that you have the tools and technologies necessary to cope with the COVID-19 crisis?

Base: All respondents (n = 184).

Change in OT Investments

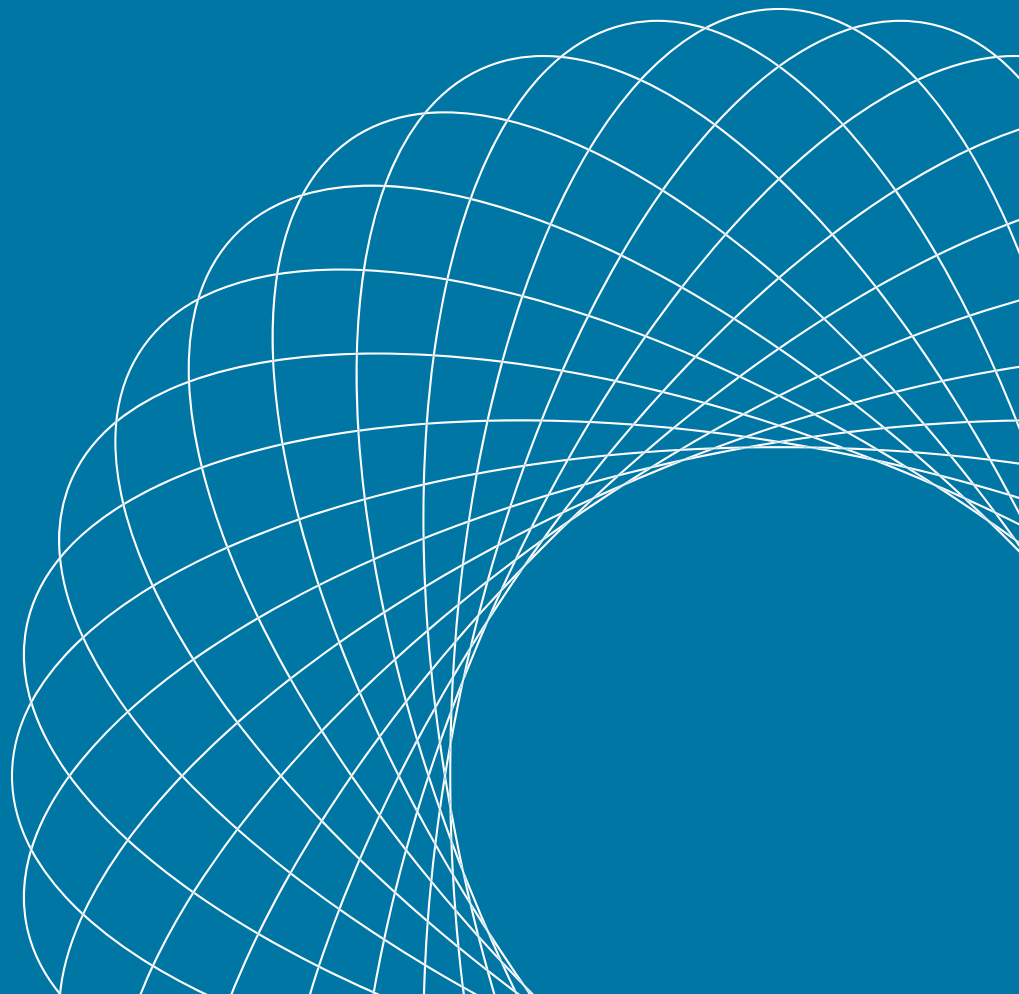
Respondents expect the adoption of OT investments to increase or remain the same when manufacturing resumes/ramps up in the aftermath of the COVID-19 crisis. Respondents are most likely to expect an increase in supply-chain solutions and operation intelligence/analytics.



Question: Post manufacturing restart and ramp up, how do you expect adoption of the following OT investments to change?

Base: All respondents from large companies (n varies from 157 to 167).

Write-in Comments



Write-in Comments

Which of the following best describes your job function? Other responses:

- All operations
- Commercial Operations
- Commissioning/Due Diligence
- Construction Management
- Consulting
- Engineering
- Facilities Manager
- Facilities supervisor
- Factory worker
- Fleet Manager
- Internal Audit
- Legal
- Maint. Supv.
- Maintenance Manager
- Operational excellence
- Overall Site Business
- Product Data
- Safety
- Strategic marketing

What is your company's primary product at your location/division? Other responses:

- Advertising, Broadcasting & Media
- City Government (municipality)
- Government
- Hospitality
- Packaging
- Recyclables
- Software
- Software applications
- Technical college
- Wastewater utility
- Wholesale Trade

Write-in Comments

How have IoT / Industry 4.0 technologies helped overcome these challenges? Other responses:

- Communication and access to any data remotely is as good as in the office
- Introduction of IoT/Industry 4.0 are stopped due to COVID-19

How beneficial have each of the following technologies been in overcoming challenges caused by COVID-19? Other responses:

- Communication technologies allowing social distancing
- Zoom

What specific investments are you making? Other responses:

- Equipment
- Future Products
- We are moving our ERP to SAP
- We're purchasing more efficient machining equipment.

Post manufacturing restart and ramp up, how do you expect adoption of the following OT investments to change? Other responses:

- Zoom – web conference

Write-in Comments

What capabilities do you wish you'd had in place before COVID-19?

- 2FA or MFA for VPN connections
- A plan
- A remote IT strategy to disperse workers easily and effectively.
- Ability to monetize digital content
- Accurate & Precise Forecasting
- Additional VPN service for remote working
- Additional, validated, back-up vendors for materials and supplies.
- Ai
- All possible tolls to cope with COVID-19 caused challenges
- AR/VR
- Artificial Intelligence
- Associate safety practices
- Augmented reality
- Automation, Distance monitoring, End-to-End Supply Chain visibility
- Automation, SCADA and edge computing
- Availability of masks and more sanitizer.
- Better access control
- Better distance learning - Blackboard and Zoom
- Better facility access and control. Temperature testing has created a new requirement for facility access allowance.
- Better information on the severity of the virus. Also, the impact of global policies that over-estimated the pandemic and caused global panic.
- Better inventory of key raw materials and packaging supplies
- Better IT infrastructure for teleworking (VPN, bandwidth)
- Better PPE supply
- Better remote monitoring tools
- Better remote working capability with full access to network drives
- Better wireless connectivity and supply chain
- Better wireless network.
- Body Temp Scanners at Entrances for health monitoring employees (we have since bought and installing now), and Microsoft Teams for document sharing and meetings online (which we have now rolled out). Also starting to buy and learn more about AI technologies.
- Cloud
- Cloud and/or Application based reporting, recording and analysis
- Company wide ability to work from home to minimize contact.
- Connectivity with individuals
- Crisis Management, more effective IoT, Automation
- Disinfection equipment, Covid-19 testing kits
- Diversification on other services in other to keep business
- Enlightened management
- Everything we had in place worked during Covid 19.
- Full MES with forecasting and scheduling
- Greater bench strength in occupational health
- Greater emphasis on Technology
- Health monitoring for those over 62
- Higher degree of automation
- I wish I had a better supply chain model. We had a lot of trucks we had to turn away after the fact.
- Implemented best practices ongoing. Already had TEAMS and cloud video conferencing. Additional laptops for WFH would have helped.
- Infrastructure to allow all associates to seamlessly work from home.
- Integrated E2E control tower
- Leased/contract assets rather than owning so many
- Less capabilities once compared.

Write-in Comments

What capabilities do you wish you'd had in place before COVID-19?

- Lidar technologies for Health and safety
- More advanced wi-fi capability.
- More attention to employee safety and flexibility to work remotely
- More automation – 3 mentions
- More Automation and digitalization capabilities
- more automation/robotics
- More capacity for virtual work.
- More masks, more PPE on hand.
- More PPE and social distancing in place.
- More remote based work
- More remote work set up
- More resilience in supply chain network
- More robust vpn servers
- More video monitoring
- COVID-19 has not been an issue aside from decreased consumer demand due to shutting down the economy
- Network Optimization, End to End visibility,
- Operational Intelligence/Analytics
- Organized sales & operations planning, equipment utilization tracking
- Pandemic and remote working plan.
- Post COVID-19 return-to-work policies, procedures, and plans
- Pretty unsure but confident of overcoming.
- Preventive measures technology on OH&S
- Process monitoring app
- Productivity tracking
- Protocols and emergency processes
- Reliable meeting technologies such as virtual meetings, video, and audio. Smart glass technology for process interfacing remotely.
- Remote collaboration infra
- Remote collaboration of shop-floor operations Staff engagement - Technical and Functional Customer Responses methods
- Remote health monitoring solutions
- Remote work capacity for office workers.
- Robust Microsoft Teams app. VPN Teams service is intermittent due to firewall conflicts.
- Safety's technology
- Screening for virus capability
- Staff quarters
- Stock piles of PPE
- Strategic Plans to cope with if and when there is a disaster as this.
- Stronger work from home policies
- Supply chain tracking
- Temperature monitoring
- Temperature monitoring/health questioning; tracking/tracing methodology; sanitizing stations; housekeeping/cleaning methodology
- Temperature scanning for employees
- Thermal scanners for general employee well being
- Video conferencing and up to date laptops w/ VPN for the staff to work from home.
- We currently do not have an adequate capacity planning tool for our machining and fabrication shop. I wish we had that as well as some more efficient equipment and a larger shop. If we had that we could have accomplished more in the last several weeks.
- We were ok.
- Worker monitoring
- Worker spacing
- Worker testing

Thank you!