

The background of the slide is a close-up photograph of a laser cutting machine in operation. A bright orange laser beam is focused on a metal surface, creating a shower of bright orange sparks that fan out across the lower right portion of the image. The machine's components are dark and metallic, with some parts appearing to be made of brass or a similar gold-toned metal. The overall lighting is warm, dominated by the orange and yellow tones of the sparks and the machine's components. A solid orange vertical bar is on the left side of the slide, and a red vertical bar is on the right side. A dark grey semi-transparent box is centered over the image, containing the main title in white text.

2020 Middle Market Industry 4.0 Benchmarking Survey

MANUFACTURING CONNECTIVITY

BDO[®]

Table of Contents

03

INTRODUCTION

About the BDO Middle Market Industry 4.0 Benchmarking Survey

27

INDUSTRY 4.0 IMPEDIMENTS

Challenges on the Road to Transformation
Lessons Learned from Failure

05

SNAPSHOT: 2020 DIGITAL OUTLOOK

10

INDUSTRY 4.0 VALUE DRIVERS

Boosting Operational Efficiencies
Revenue Diversification
Market Differentiation
Improving Customer Experience
Supply Chain Optimization

30

BENCHMARKING YOUR INDUSTRY 4.0 EFFORTS

40

CONCLUSION

About BDO Digital

23

POWERING THE DIGITAL THREAD



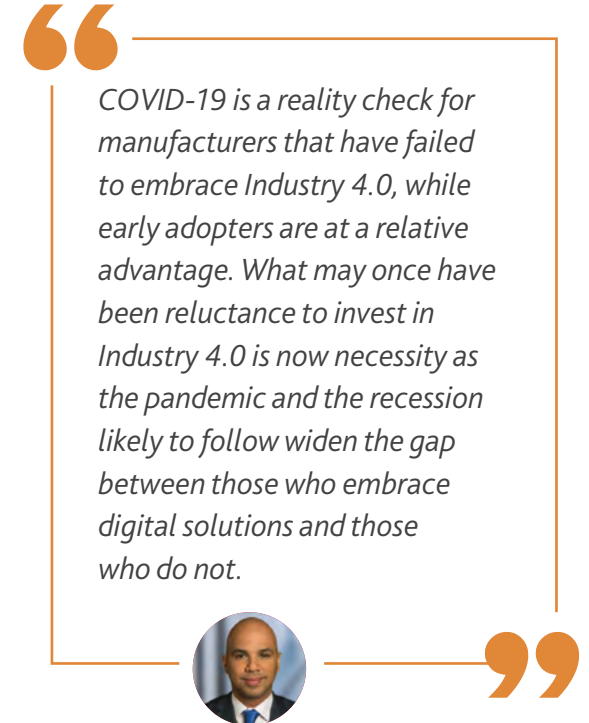
Introduction

Machines paired with humans, services embedded in products, products reimaged as services. This is the essence of Industry 4.0: A radical shift in how manufacturers operate, go to market, compete and serve customers. At the crux of it all is data. Disruptive technologies like artificial intelligence (AI), robotic process automation, advanced analytics, and extended reality, among others, are enabling manufacturers to unleash value from their data in new ways, from unlocking new operational efficiencies to improving risk management to uncovering new sources of revenue—all of which will help businesses as they navigate short and long-term impacts of the COVID-19 pandemic.

The accelerating adoption rate of the digital advancements behind Industry 4.0 leaves no opportunity to wait for precedent. Yesterday's early adopters are better positioned to weather today's storms, while laggards face a particularly steep uphill battle.

Manufacturers that have historically back-burnered innovation will find themselves revamping their priorities if they make it to the other side of the slump. Long-term success for manufacturers hinges not just on developing an Industry 4.0 strategy, but excellence in execution. Opportunity doesn't wait.

This imperative is sinking in: As of the start of 2020, one-third of manufacturers were implementing their Industry 4.0 strategies, up from just 5% in 2019, according to *BDO's 2020 Middle Market Industry 4.0 Benchmarking Survey*.



COVID-19 is a reality check for manufacturers that have failed to embrace Industry 4.0, while early adopters are at a relative advantage. What may once have been reluctance to invest in Industry 4.0 is now necessity as the pandemic and the recession likely to follow widen the gap between those who embrace digital solutions and those who do not.



ESKANDER YAVAR

National Manufacturing Practice
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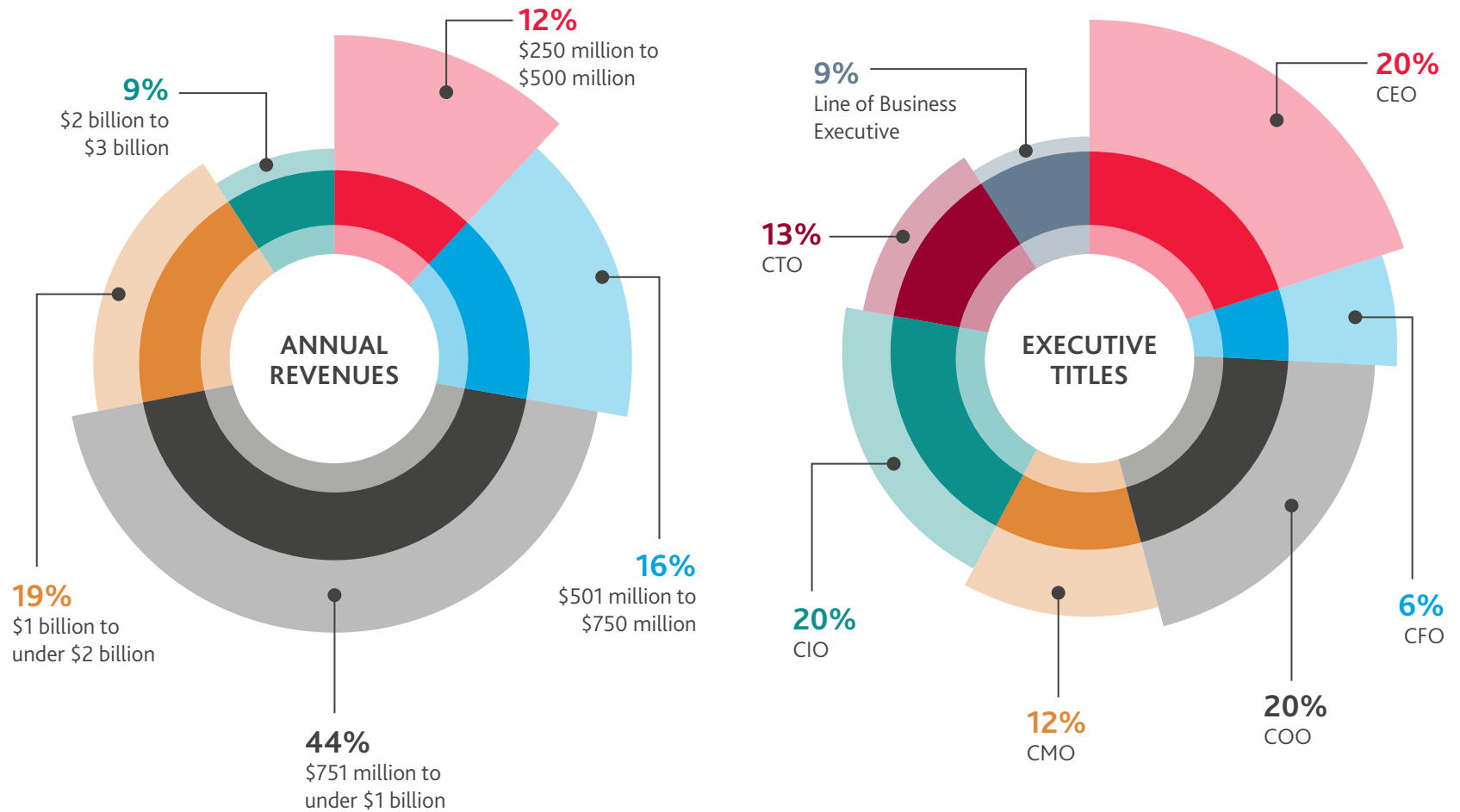
OPPORTUNITY
DOESN'T WAIT.



About the BDO Middle Market Industry 4.0 Benchmarking Survey

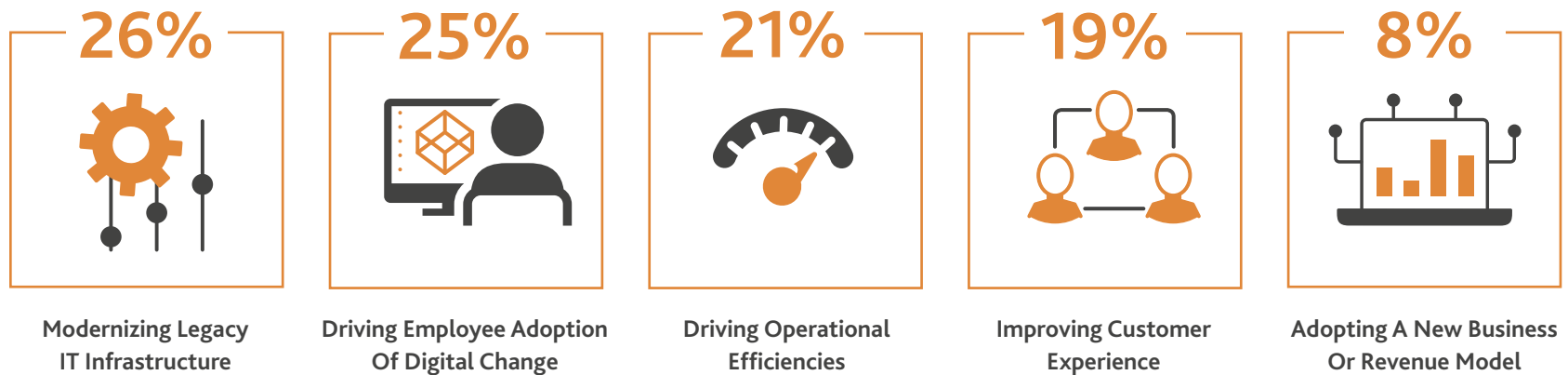
The **2020 BDO Middle Market Industry 4.0 Benchmarking Survey** was conducted prior to the COVID-19 pandemic by Rabin Research Company, an independent marketing research firm. The survey included 100 C-Level executives at manufacturing companies with annual revenues between \$250 million and \$3 billion.

WHO WE SURVEYED



Snapshot / 2020 Industry 4.0 Outlook for the Middle Market

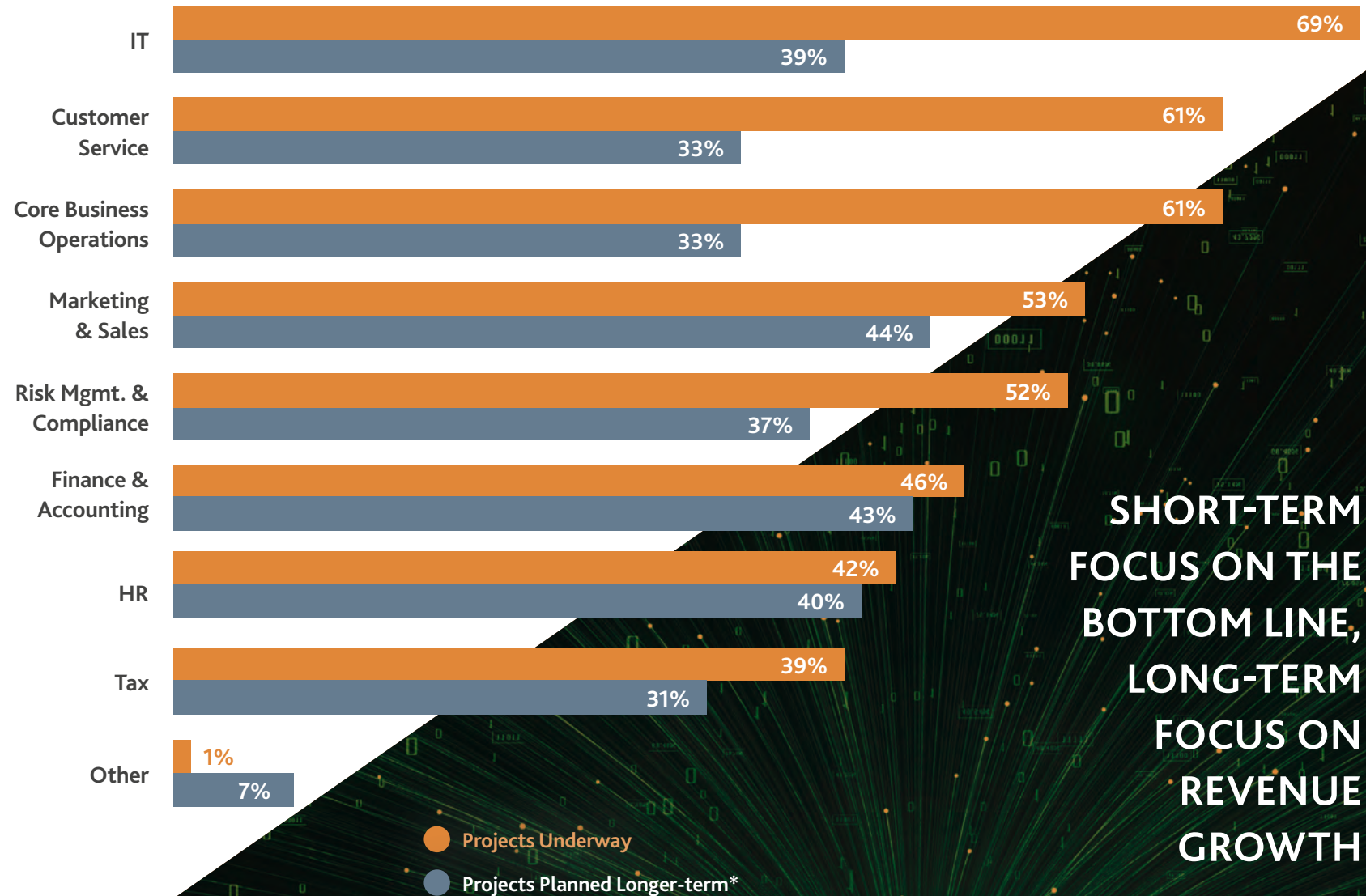
TOP DIGITAL PRIORITY*



**Priorities may have shifted post-COVID-19 with a heightened focus on driving operational efficiencies*

MANUFACTURERS ARE STILL
LAYING THE GROUNDWORK
FOR TRANSFORMATION

TRANSFORMATION FOCUS AREAS



**SHORT-TERM
FOCUS ON THE
BOTTOM LINE,
LONG-TERM
FOCUS ON
REVENUE
GROWTH**

*Longer-term projects (looking at the next 12 months) were planned prior to the COVID-19 outbreak, so some may have been de-prioritized or put on hold.

MANUFACTURERS' SHORT AND LONG TERM OBJECTIVES DIVERGE

BUSINESS OBJECTIVES FOR INDUSTRY 4.0

Short-Term



Long-Term

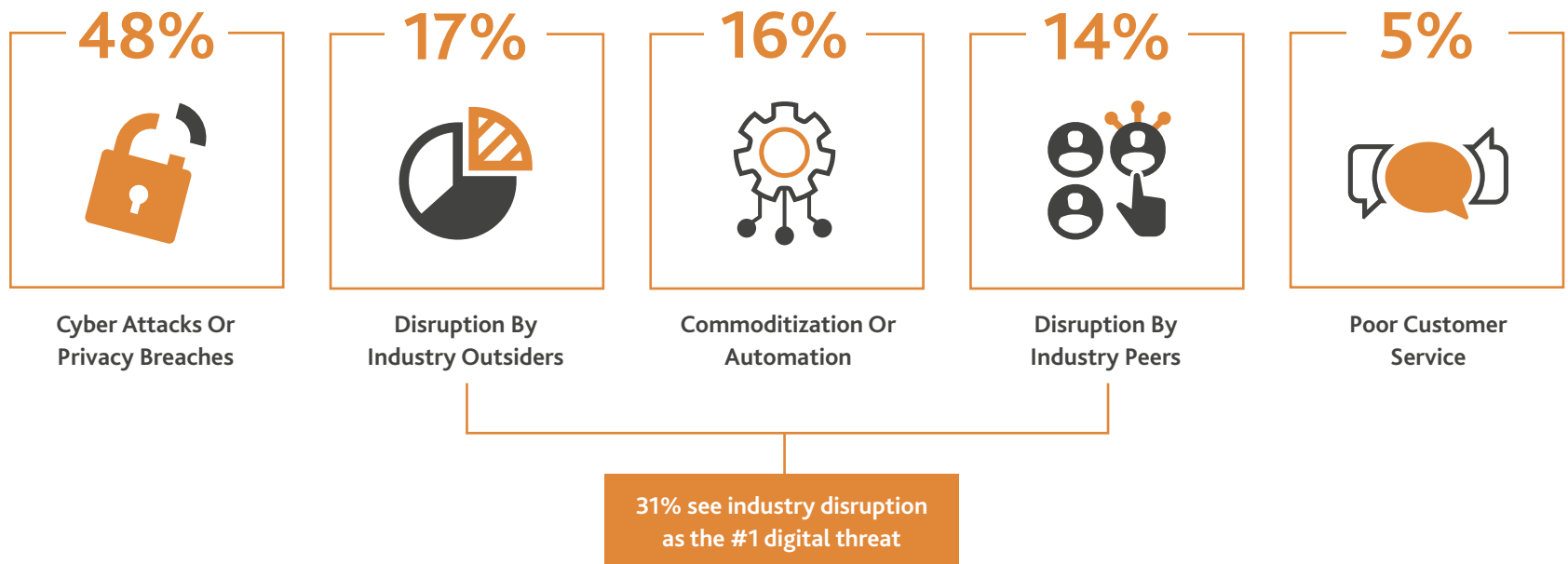


Short-term business objectives may have shifted in the wake of the coronavirus. The objectives aren't going away, but the timing of projects to drive them forward may be delayed.

*Represents a tie in ranking

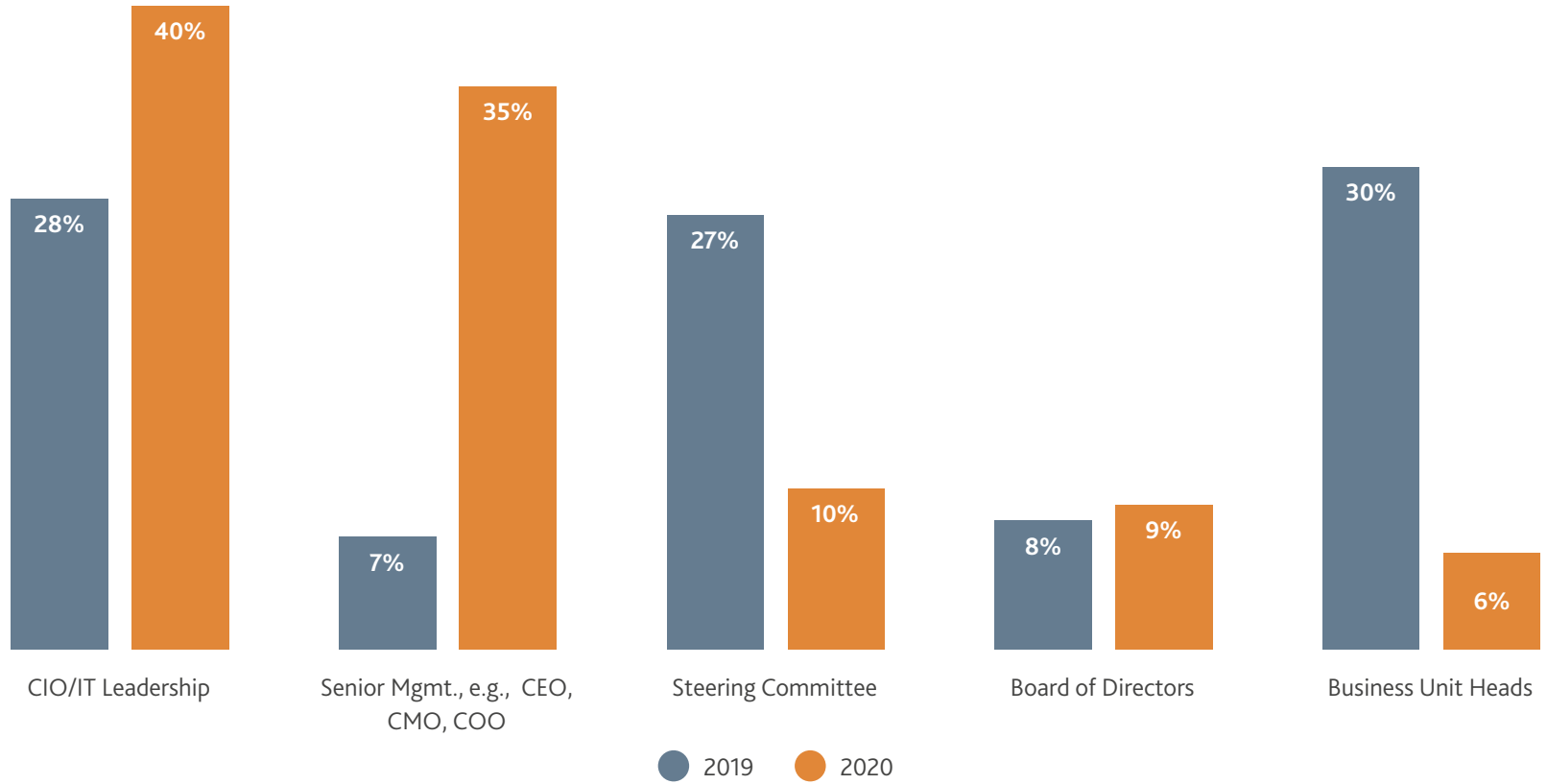
CONNECTED MANUFACTURING CARRIES SIGNIFICANT CYBER RISK

TOP DIGITAL THREAT



As the COVID-19 outbreak has worsened, IT security vendors have reported a sharp increase in cyber threats. Cloudflare noted a **37% increase in cyber-attacks** during the month of March, and Barracuda Networks found a **600% increase in COVID-19-themed phishing emails** during that period.

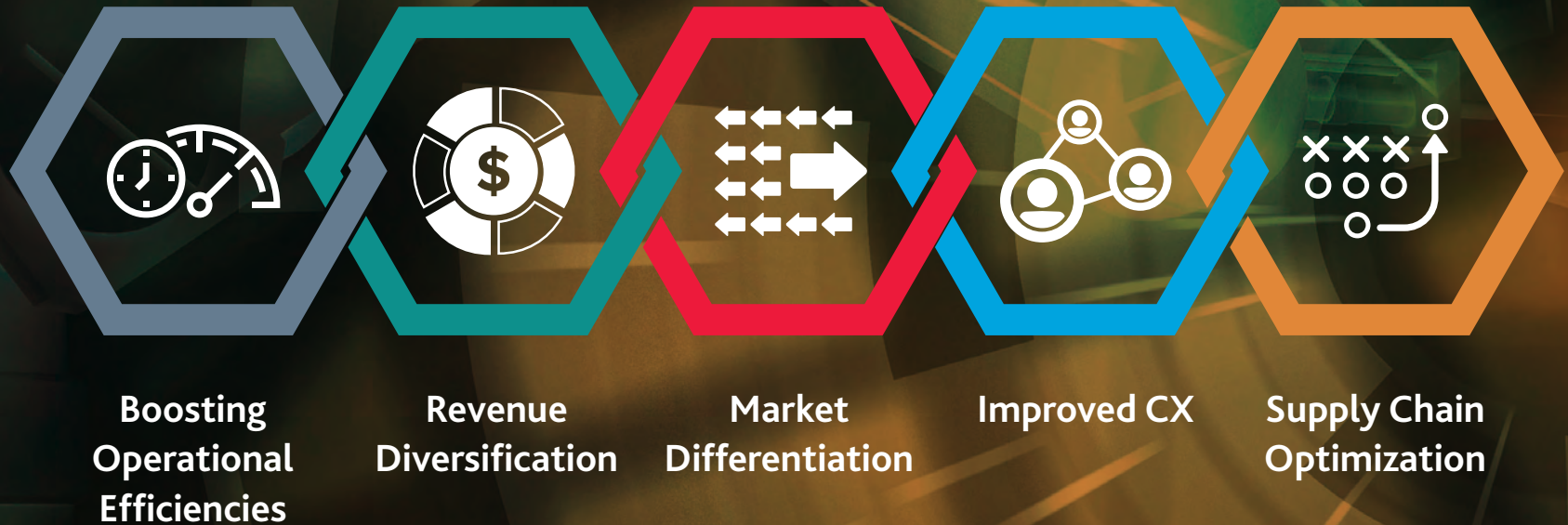
TRANSFORMATION LEADERS



INDUSTRY 4.0 OWNERSHIP
CHANGES HANDS.

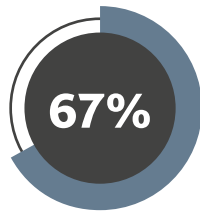


Industry 4.0 Value Drivers



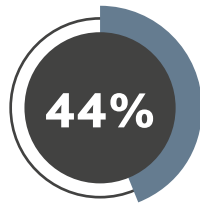
1 / Boosting Operational Efficiencies

Optimizing business processes and driving operational efficiencies is cited as a top business objective by the majority of survey respondents, and has become essential in light of COVID-19 and the subsequent economic downturn. According to research from Harvard Business Review, companies that focus on operational efficiencies over layoffs to manage costs are more likely to experience "breakaway performance" coming out of a downturn. Seeking to be lean is not new for manufacturers, but the tools to achieve it have changed dramatically. Embedded sensor technologies can monitor, collect and report information from the surrounding environment, providing real-time traceability and machine status information. Advanced analytics and machine learning can then be deployed to more accurately measure and manage performance in the field, more reliably forecast demand, flag anomalies or outages, conduct predictive maintenance or perform remote repairs.

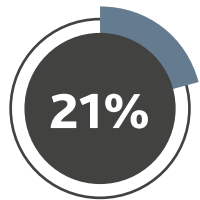


cite **operational efficiencies** as a top short-term business objective (next 12-18 months)

▶ **37%** say it's a top long-term business objective (next 18 months-3 years)



say **interoperability with legacy technology and processes** is the biggest reason Industry 4.0 initiatives fail



say **optimizing business processes** is their #1 digital priority

BDO INSIGHT

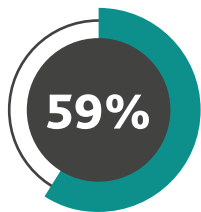
In the face of unprecedented economic disruption, manufacturers need to find ways of doing more with less, regardless of the pandemic's impact your business:

- ▶ If you've seen spikes in demand, it's more output and speed with less human contact and process friction.
- ▶ If demand has slowed or production has ceased entirely, it's more innovation with lower operating expenses.

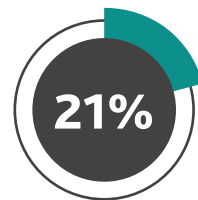
In either scenario, maximizing operational efficiency is key. To optimize processes and reduce waste, artificial silos must be broken down and collective intelligence must be embraced across the business—and entire supply chain—to enhance decision-making and maintain profit margins.

2 / Revenue Diversification

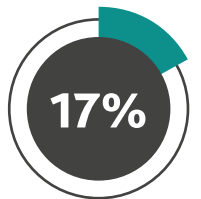
Even prior to COVID-19, just over a third (36%) of middle market manufacturers were focused on revenue diversification. But now more than ever, the need to protect revenue and diversify risk is paramount. As Industry 4.0 becomes increasingly intrinsic to the way business is conducted and the economy begins to recover, more manufacturers will shift their focus from optimization to reinvention. In some cases, however, plans for reinvention may need to be fast-tracked or take on new forms, particularly for manufacturers whose businesses haven't been deemed essential. Driven by both necessity and opportunity during the pandemic, a growing number of manufacturers have introduced new business offerings to stay afloat and meet new demands—evolutions that may become permanent services moving forward.



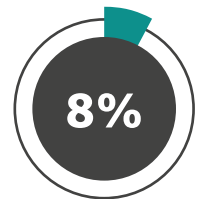
say **diversifying revenues** is their #1 long-term Industry 4.0 objective



believe **new products or services** is at the top of customers' wish lists



cite **disruption by industry outsiders** as their #1 digital threat



say **adopting a new business or revenue model** is their #1 digital priority



Innovating in Crisis / Examples of Business Model Reinvention

Braskem

The Problem

In order to produce medical-grade respiratory masks and protective gear, medical manufacturers need polypropylene raw materials. Polypropylene fibers are capable of filtering out **95% of small airborne particles** while still allowing for breathability. This material, critical to keeping healthcare workers safe and reducing infection rates, is currently in short supply.

How Braskem Is Helping

Braskem is one of the largest polyolefins producers in America and a leading producer of biopolymers in the world. They've gone above and beyond the call of duty by creating **volunteer "live-in" manufacturing teams**. These teams live at the factory for 28 days at a time so they can keep up with demand from their medical manufacturing customers for raw polypropylene materials and minimize the risk of infection to their families.

Long Island Racing

The Problem

As hospitals see patient surges due to the spread of COVID-19, healthcare workers are struggling with a **serious shortage of PPE**. Healthcare workers are exposed to COVID-19 repeatedly during the course of their shifts, **resulting in increasing numbers of workers becoming ill**, putting their health seriously in jeopardy and further straining America's already-struggling healthcare system.

How Long Island Racing is Helping

Long Island Racing, a machine and engine shop in Brentwood, NY, has pivoted production to support the fight against COVID-19. They typically produce motorcycles and other racing machines as well as mechanically engineered parts, but have shifted to 3D printing reusable face masks and shields that will be distributed to **healthcare workers in need**.

Millikin & Company

The Problem

Health workers across the country are **reporting critical shortages** of personal protective equipment (PPE) amid an influx of COVID-19 patients. PPE includes protective masks, suits and other equipment that are critical to ensuring the health and safety of frontline health workers. In some cases, health workers are forced to make a difficult choice—stop going to work or perform duties without adequate protection, risking their own health. On April 6, the Department of Health and Human Services inspector general released a report that it found severe shortages of PPE in hospitals across the country.

How Milliken is Helping

Milliken & Company is a global textile manufacturer that announced it will **increase domestic production** of anti-microbial fabric for medical products such as scrubs, lab coats and privacy curtains. They are scaling up their manufacturing and distribution channels to ensure there is a ready supply of these much-needed products available to frontline medical workers.

Copper Bottom Distillery

The Problem

An influx of demand **has caused nationwide hand sanitizer shortages**, as people race to stock up and protect themselves from getting sick. Both in stores and online, hand sanitizer is becoming more expensive and harder to come by.

How Copper Bottom is Helping

Copper Bottom Distillery in Daytona Beach, Florida shifted their production from spirits to hand sanitizer. They've opened their doors for people to come in and fill up bottles of hand sanitizer and are helping supply local healthcare organizations as well.

EMERGING INDUSTRY 4.0 REVENUE MODELS

**SUBSCRIPTION SERVICES**

The appeal of the subscription model, where customers pay a recurring fee for continued access to a product or service, isn't hard to grasp. Recurring revenue offers more stability and predictability, and also fosters stronger relationships with customers through more frequent and consistent engagement. It's also not an either/or—you can continue to sell your product in one-time transactions and create a new revenue stream via a subscription service.

Customer Benefits:

- ▶ Convenience
- ▶ Lower upfront investment
- ▶ Faster access

Business Benefits:

- ▶ Customer engagement
- ▶ Recurring revenue
- ▶ Behavioral insight
- ▶ Vertical supply chain integration

**PRODUCT-AS-A-SERVICE**

"Product-as-a-service" reimagines value in terms of the benefits of a product rather than the product itself. In its purest form, the service replaces the product: instead of purchasing a car, the customer pays for the ride. Physical products can also become a platform for service delivery, vastly expanding the aftermarket opportunity to a whole new realm of digital services. Think of the Peloton stationary bike – customers don't just buy the bike (a one-time upfront expense), they buy the monthly subscription to live-streamed and on-demand classes.

Customer Benefits:

- ▶ Outcomes-based pricing
- ▶ Frictionless
- ▶ On-demand access

Business Benefits:

- ▶ Improved customer engagement
- ▶ Lower inventory
- ▶ Recurring revenue
- ▶ Upsell opportunities

**PAY-PER-USE**

Pay-per-use models provide a variable cost structure tailored to individual need: Customers are charged based on usage or consumption levels, offering them greater flexibility. Access to a product or service can be provided on an on-demand basis (like a Zipcar) or capacity can be scaled up or scaled down (like data storage or computing power—think Amazon Web Services). Billing is contingent on the ability to meter use—but with the advent of the Internet of Things, the universe of what can be metered is pretty much unlimited.

Customer Benefits:

- ▶ Greater flexibility
- ▶ Lower upfront investment
- ▶ Faster access

Business Benefits:

- ▶ Low-cost experimentation
- ▶ Market expansion
- ▶ Supplemental revenue

**DATA-AS-A-SERVICE**

Data-as-a-service reimagines information as an asset that can be monetized by selling access via the cloud. What distinguishes DaaS from SaaS is that the data can be decoupled from a specific platform, though it doesn't have to be. The value to the customer is in aggregating and distilling large data sets into meaningful information that can be published using an API. Additional data services, such as predictive modeling or custom reports, can also be sold to the customer.

Customer Benefits:

- ▶ Higher data quality
- ▶ Agility
- ▶ Actionable insight

Business Benefits:

- ▶ Cost-effective setup
- ▶ Competitive differentiator
- ▶ Supplemental revenue

“

Manufacturing organizations with more channels to market and a stronger digital presence to foster engagement with clients and prospects will prevail in a post-COVID-19 world. New business models and better e-commerce capabilities are as critical as operational efficiencies and resiliency today. Manufacturers need to harness the power of foresight and take bold, but necessary risk.

**MALCOLM COHRON**

National Digital Transformation
Services Leader, BDO USA

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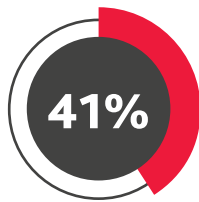
BDO INSIGHT

The “shut-in” economy is a prelude to Industry 4.0, as manufacturers are forced to shift as much of their operations as they can to function virtually, and both inbound and outbound logistics must be contactless. Looking toward the digital economy of the future—one dominated by services and ideas rather than goods—the greatest opportunity for value creation may come from business model innovation, either through diversification or total business reinvention, in a way that fundamentally changes outputs, outcomes and stakeholder relationships.

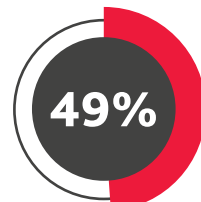


3 / Market Differentiation

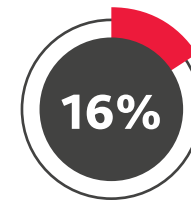
Barriers to entry in manufacturing are coming down, leading industry peers and outsiders alike to infiltrate the market and challenging businesses to stand out. Achieving recovery and growth—and even just maintaining business operations—amid a recession that brings increased automation and commoditization requires heightened focus on the efforts that drive the most value. Though it may seem counterintuitive, an economic downturn is ripe with quick-win opportunities to gain a competitive edge. Over time, these early wins can translate into a sustainable lead over the competition.



say increasing market differentiation is a top **short-term business** objective (12-18 months)



say increasing market differentiation is a **longer-term objective** (18 months-3 years)



cite **commoditization and automation** as their #1 digital threat for 2020

The Commodity Trap

When price is the only differentiator

The threat of commoditization ranks as survey respondents' third greatest digital threat in the next 12 months.



DRIVERS

- ▶ Economic downturn
- ▶ Cheap labor overseas
- ▶ Foreign infringement on IP
- ▶ Market saturation
- ▶ Robotic process automation
- ▶ Routinization of complex processes via specialized tools or standard designs



CONSEQUENCES

- ▶ Undercutting competitors
- ▶ Downward pricing pressures
- ▶ Industry consolidation
- ▶ New cost structures
- ▶ Thinning profit margins
- ▶ Lower barriers to market entry



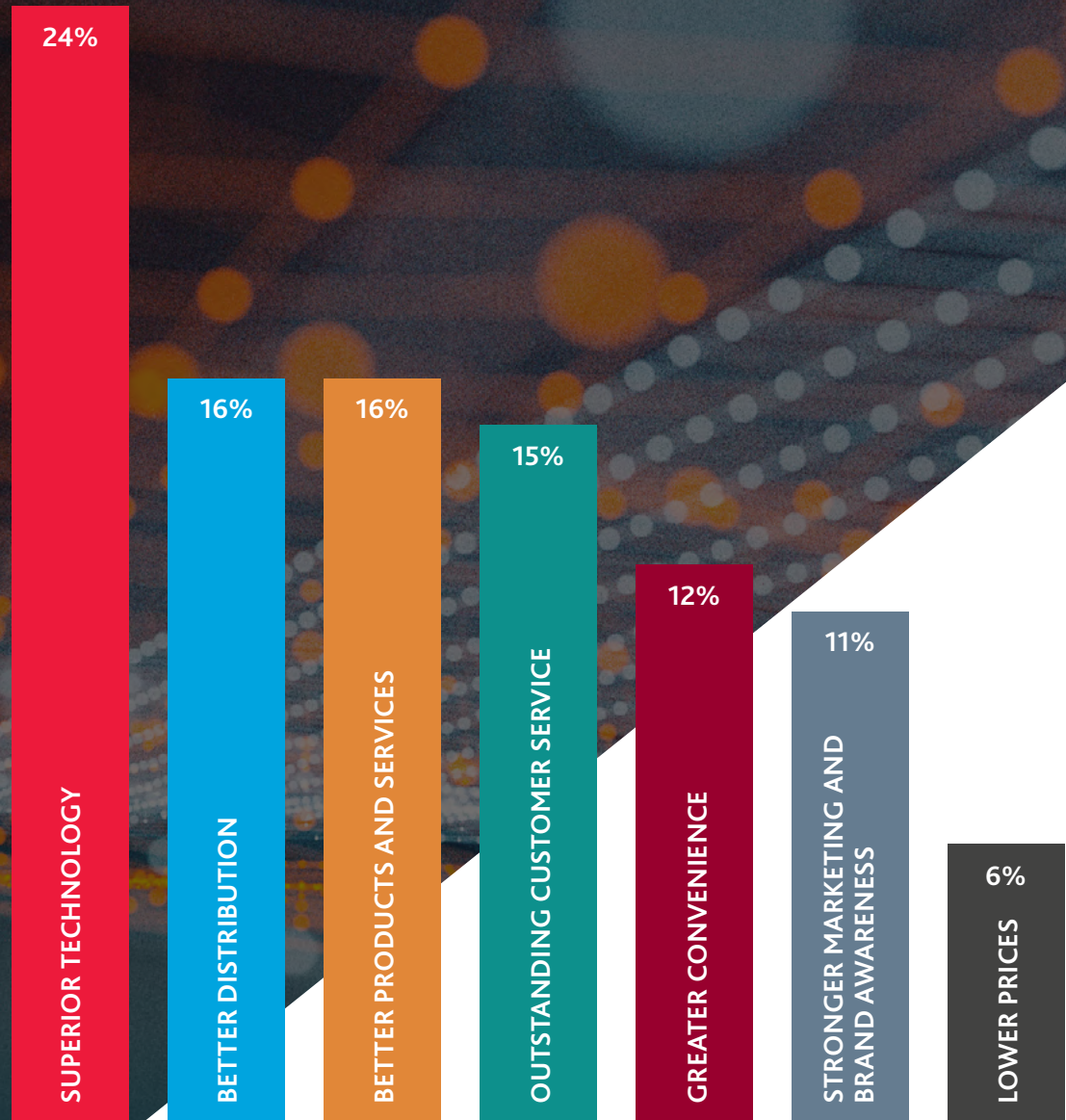
WAYS TO DIFFERENTIATE

- ▶ Superior product performance
- ▶ Product customization
- ▶ New product feature
- ▶ New pricing model
- ▶ Faster delivery
- ▶ Greater reliability
- ▶ Better customer service

How are manufacturers **currently** differentiating themselves in the market?

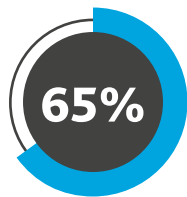
BDO INSIGHT

The highest percentage of survey respondents (24%) see superior technology as their core competitive advantage, but the flash of technology is fleeting on its own. Opportunities for differentiation in the near-term could include flexible pricing models for customers that suddenly find themselves illiquid, faster delivery to fill gaps left by Amazon, or strong brand recognition by helping those most impacted by the pandemic.

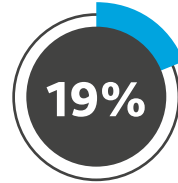


4 / Improving Customer Experience (CX)

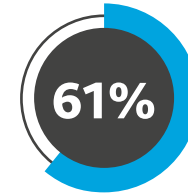
Navigating the immediate impacts of COVID-19 includes implementing strategies to retain customers and build loyalty. Past recessions have shown that focusing on CX is more effective in retaining customers than new product innovation. When resources are constrained, improvements in CX should be concentrated on “A” customers—those driving the greatest share of revenue—by ensuring they receive the highest levels of service. Those “A” customer relationships can then be leveraged to gain insight into shifts in demand and emerging needs.



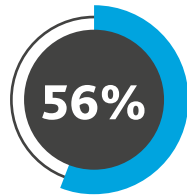
said improving CX was one of their **top short-term business goals** at the start of 2020



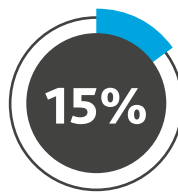
said improving CX was their **#1 digital priority** at the start of 2020



had **customer service-related** Industry 4.0 projects underway at the start of 2020

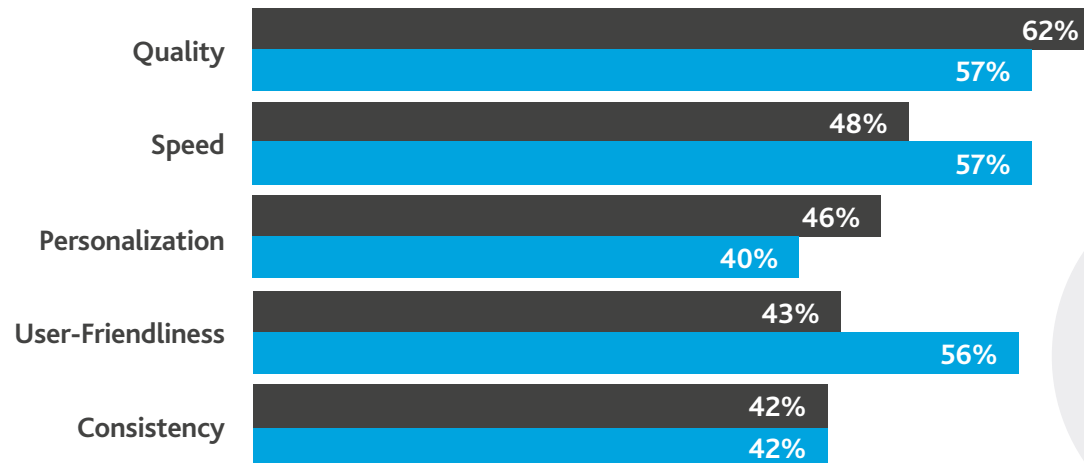


sell **direct-to-consumer**



say their companies are differentiated by **outstanding customer service**

THE ELEMENTS OF CX



● Current Focus Area for Improvement
● Future Focus Area for improvement



Shifts in Customer Behavior Expected to Impact Manufacturers

Emerging Customer Behavior

Implications for Manufacturers

E-commerce Acceleration



- ▶ Potential opportunity to increase sales and wallet share, break into new markets or develop new products
- ▶ Opportunity to use data to more effectively serve customers and hyper-customize products
- ▶ Increasing supply chain disintermediation as more manufacturers go direct to the end-customer

Contactless delivery options



- ▶ Potential to impact last-mile logistics for DTC manufacturers if contactless delivery becomes the preferred standard
- ▶ New technologies will need to be implemented to make contactless delivery feasible

Greater focus on spending less and saving more



- ▶ Elastic vs. inelastic demand in a recession can cause the demand for some manufacturers' products to shift.
- ▶ Manufacturers producing high-quality, reasonably-priced, durable goods will be poised to thrive.

Bulk buying



- ▶ Just-in-time stocking does not serve well during a pandemic, and as customers continue to bulk-buy in the future, manufacturers may need to reassess their stocking strategies.
- ▶ Moving to a bulk sales model can reduce packaging costs—good news for CPG manufacturers but bad news for some packaging manufacturers.
- ▶ The bulk buying trend may increase DTC sales for manufacturers.

Digital customer service interactions

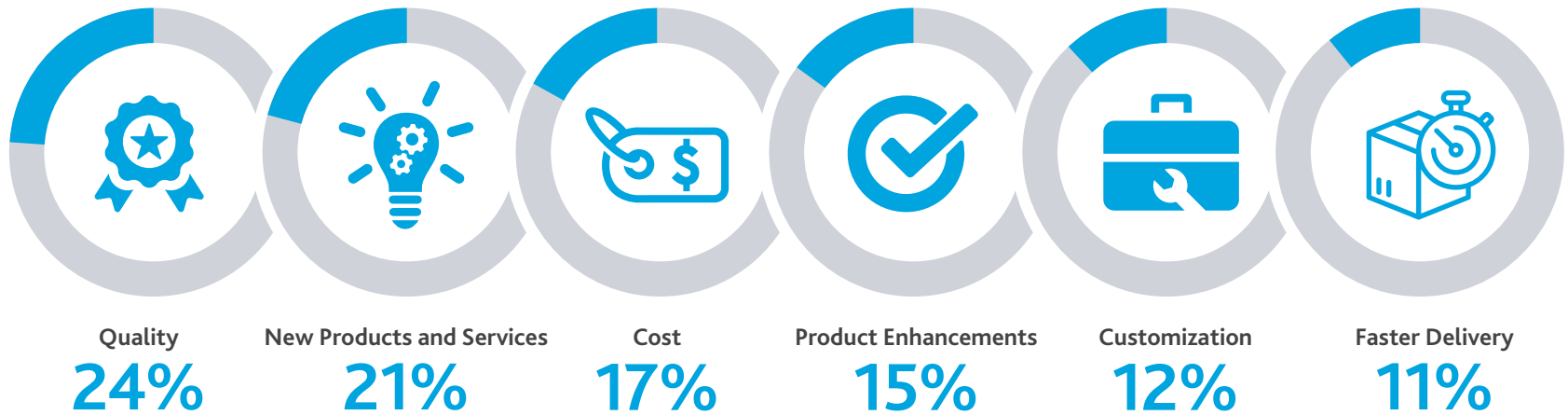


- ▶ Automation via chatbots and online forms can help manufacturers more easily receive and address customer complaints and questions, which leads to better and ultimately more cost-effective customer service.
- ▶ Manufacturers should take a page from their retail brethren and focus on seamless omnichannel experiences

WHAT CUSTOMERS WANT

Manufacturers must be responsive to shifts in customer demand—and that extends not only to the customer experience, but to the products developed and sold. So what do manufacturing executives think their customers want?

CUSTOMERS' WISH LISTS, ACCORDING TO MANUFACTURERS:



BDO INSIGHT

Customer needs look different today than even three months ago. Savvy manufacturers may have an opportunity to deepen customer relationships by responding to those changes in behavior. This means eliminating points of friction, enabling more personalization and potentially retrofitting supply chains to meet unmet demand for essential goods.

5 / Supply Chain Optimization

For many manufacturers, supply chain disruption resulting from COVID-19 has meant supply shortages, fulfillment delays, increased prices for high-demand goods and heightened transportation costs. Mitigating these and other supply chain risks are today's top priority for manufacturers. Implementing technologies such as cargo-tracking, cloud-based GPS and RFID can help increase visibility into nearly every part of the supply chain. Real-time transparency can help companies more proactively identify specific areas of risk early on, or more quickly notice and respond to disruption that occurs.

Beyond mitigating the risk of disruption, nearly one-in-four manufacturers cited customer service as a top target for supply chain improvement in early 2020, up significantly from the 10% who said the same in 2019. This leap in prioritization illustrates how strongly manufacturers are impacted by The Amazon Effect. Amazon set the standard for convenience and has continued to raise the bar, challenging manufacturers to evolve the way they sell and distribute goods. In a pandemic, convenience and speed may be deemed a luxury and temporarily de-prioritized in favor of availability and security, but the post-COVID-19 world is unlikely to be forgiving as customers seek to make up for lost time.

TOP TARGETS FOR SUPPLY CHAIN IMPROVEMENT*



Customer Service
24%



New Product Introductions
20%



Performance to Plan
17%



Total Delivered Cost
16%



Customer Order Cycle Time
12%



Inventory Turnover
11%

*COVID-19 may cause manufacturers that produce non-essential goods to focus more on improving inventory turnover in the short term. However, supply chain objectives for the longer term are likely to hold steady.

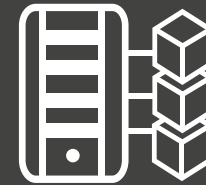
BDO INSIGHT

Inconsistent customer service levels is a major pain point for many manufacturers—one that often comes down to unforeseen delays, which is fundamentally a supply chain issue. Failure to deliver—even if that failure is due to forces beyond the company's control—can seriously harm a manufacturer's reputation and may result in lost customers or even legal consequences. The way companies manage product or service shortages or delays will be an important dimension of longer-term brand preservation.

Many manufacturers make the mistake of allocating equal effort to all customers. According to the Pareto principle—and borne out by experience—roughly 80% of sales come from just 20% of customers. If you can pinpoint your top customers, you can develop a differentiated supply chain strategy focused on on-time order fulfillment to those priority customers first.

Blockchain for Supply Chain

Blockchain may help solve two major supply chain pain points: traceability and transparency. For example, IBM made its Food Trust blockchain, a system for tracking and tracing food between retailers and suppliers, commercially available in October 2018. Albertsons Companies, the second largest supermarket company, launched a pilot involving suppliers of romaine lettuce. Even the U.S. government is hopping aboard the supply chain-on-blockchain train: U.S. Customs and Border Protection has been trialing a blockchain shipment tracking system to support the verification process for certificates of origin from various free trade agreement partners.



38%

are currently deploying
blockchain technology

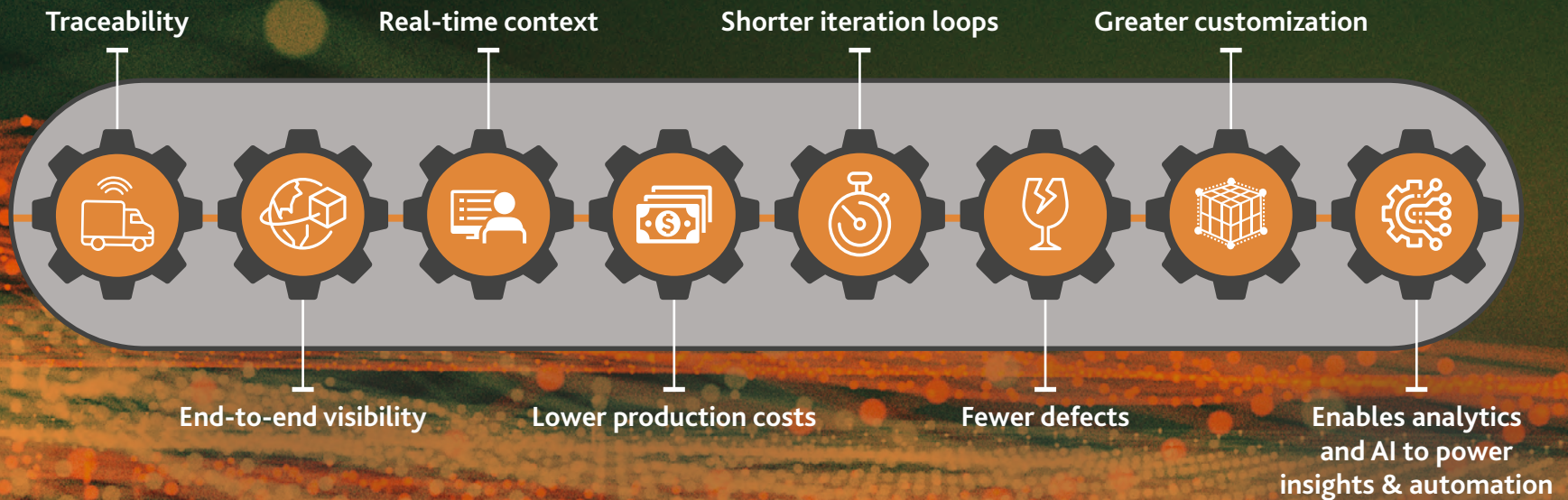


Powering the Digital Thread

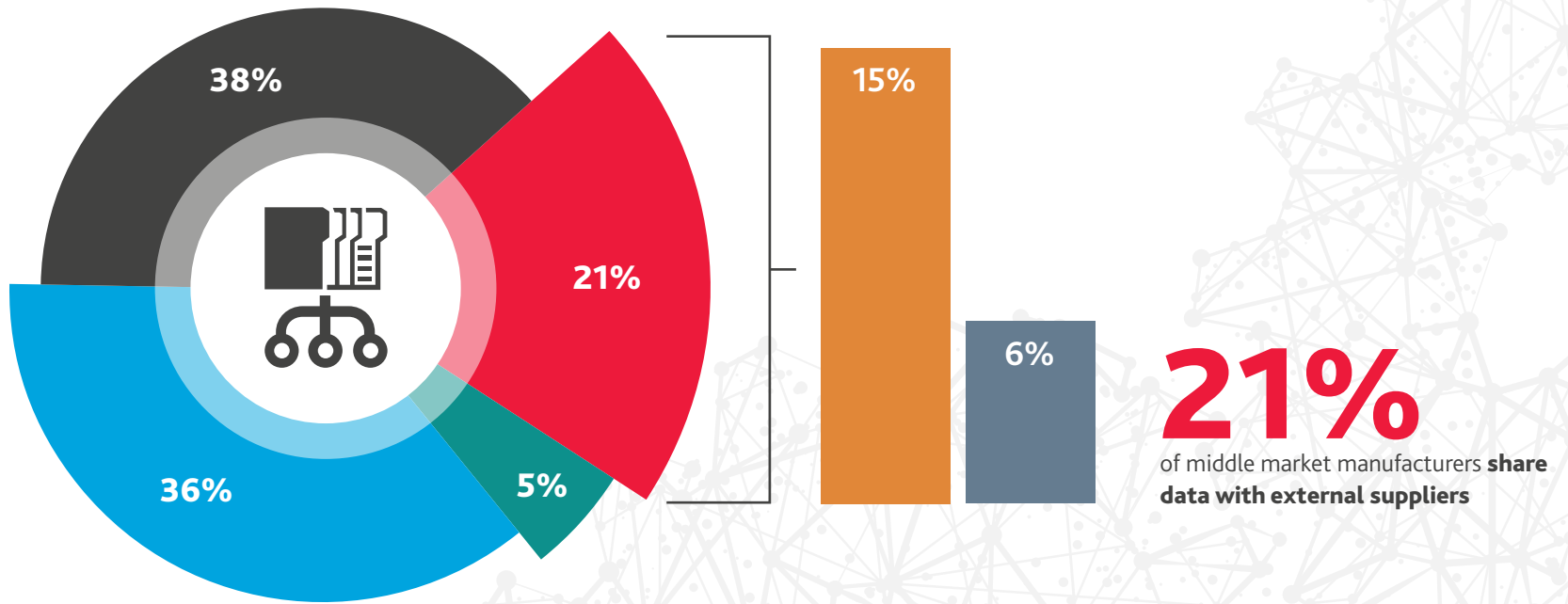
The digital thread is a communication framework for connecting data flows across the supply chain ecosystem, providing an integrated view of an asset throughout the product lifecycle.

The goal is to improve the way in which people work together to generate collective intelligence and solutions that extend beyond the limited view of a single person, function or entity. However, it's still early days in digital thread implementation: Many manufacturers are still struggling to manage the data housed within their own walls, let alone the data outside it.

BENEFITS OF THE DIGITAL THREAD



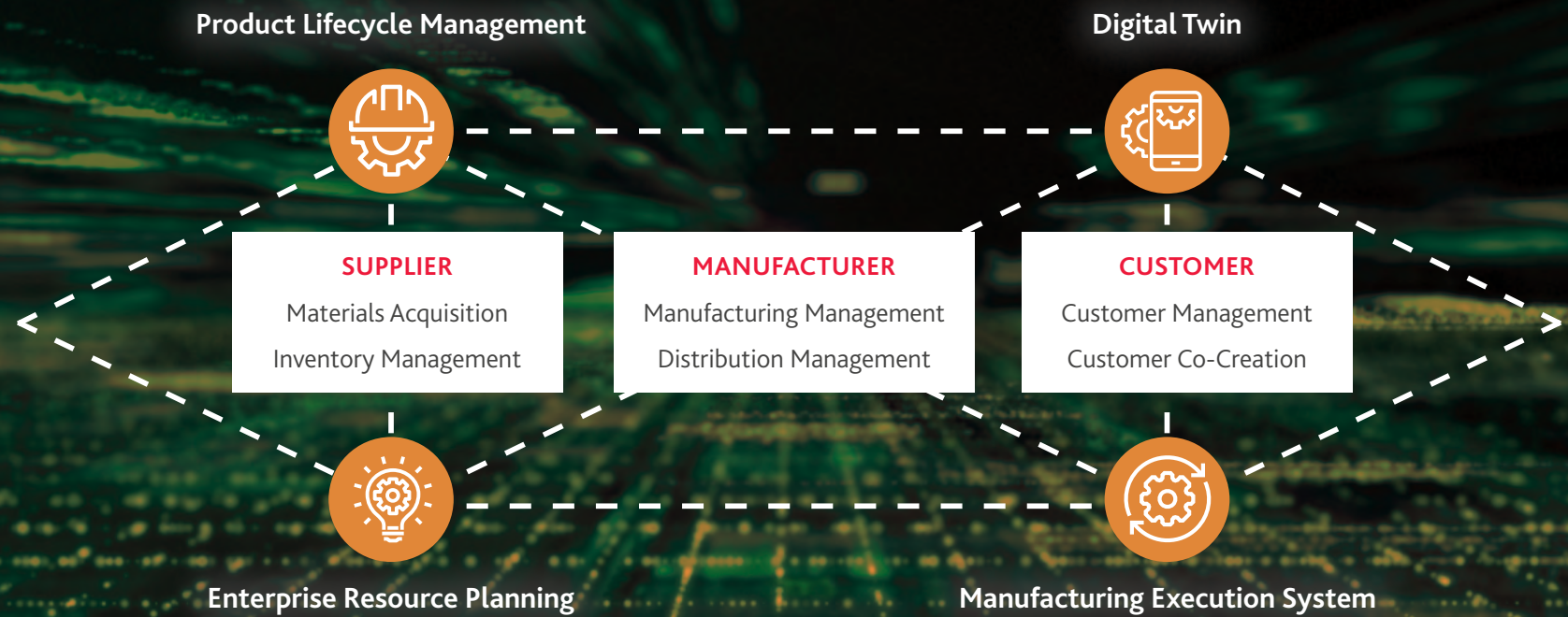
INFORMATION SHARING & TRANSPARENCY



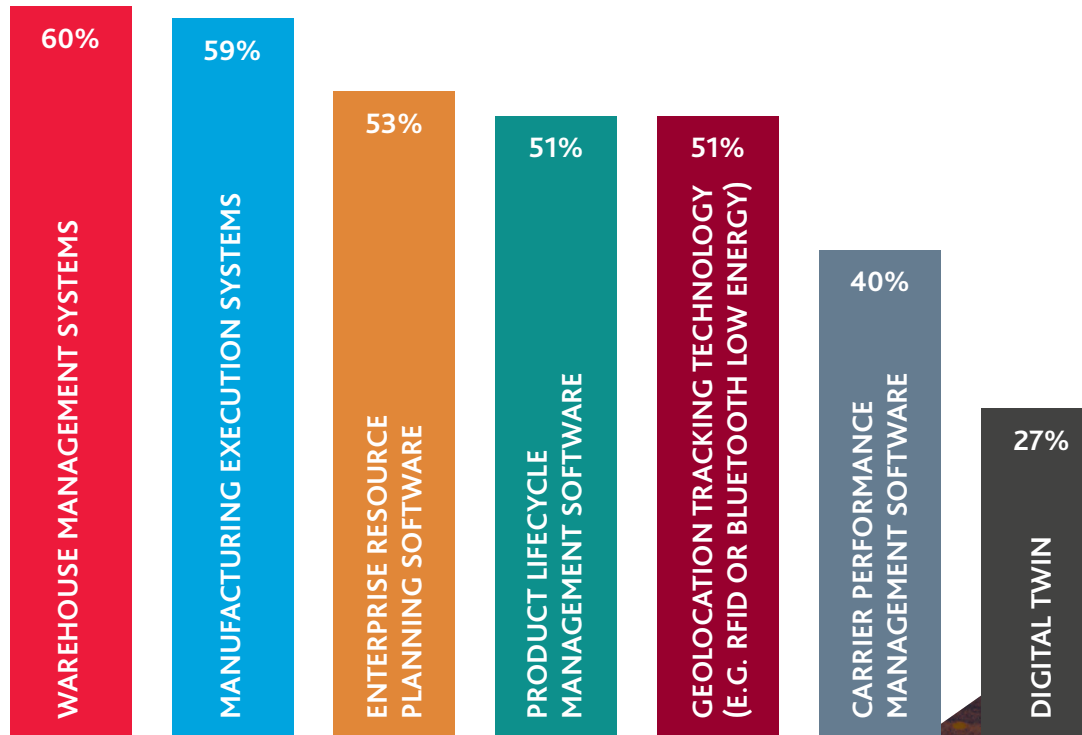
- Data in silos
- Data shared upstream and downstream within the organization
- Data consolidated in a central location
- Data consolidated and shared with some vendors
- Transparency across the business ecosystem



The digital thread lays the necessary foundation for the cognitive technologies that will enable autonomous decision-making and self-optimization, ushering in the next wave of efficiency and uncovering new value. Unfortunately, no plug-and-play solution yet exists. The best available approach today requires weaving together multiple software tools and applications with complementary functionalities.



To **power the digital thread**, manufacturers are currently using:



BDO INSIGHT

How can you reengineer your supply chain to be resilient by design, factoring in increased complexity and uncertainty in the new normal? In the months and years ahead, effective supply chain risk management will be all about agility and systems thinking. The supply chain itself must be viewed as an interconnected, interdependent network. Truly agile supply chains require end-to-end visibility across the entire supplier ecosystem, relying on real-time data to identify shifts in demand or disruptions faster and adapt to sudden changes faster. Enabled by the digital thread, the agile supply network will eventually replace traditional lean approaches. To realize the full value of the digital thread—and the full value of the data across the supply chain ecosystem—you need to incrementally build a digital thread platform. Each increment should deliver greater connectivity and immediate ROI.

DIGITAL THREAD SOLUTIONS DEFINED

Warehouse management systems:

Manages movement, functionality and productivity of warehouse and distribution center resources and inventory

Manufacturing execution systems:

Connects, tracks, and controls the transformation of a product from order release to delivery of finished goods

Enterprise resource planning software:

Integrates data from all core business components into a single place to automate decisions and streamline operations

Product lifecycle management software:

Integrates all product development and configuration data from conception to end-of-life

Geolocation tracking technology (e.g. RFID or Bluetooth low energy):

Sensors used for asset tracking and tracing

Carrier performance management software:

Manages and assesses carrier performance throughout the full shipment lifecycle from order receipt to reporting

Digital twin:

Dynamic digital model of a physical asset or system of interconnected assets constructed from real-time sensor data.

Industry 4.0 Impediments

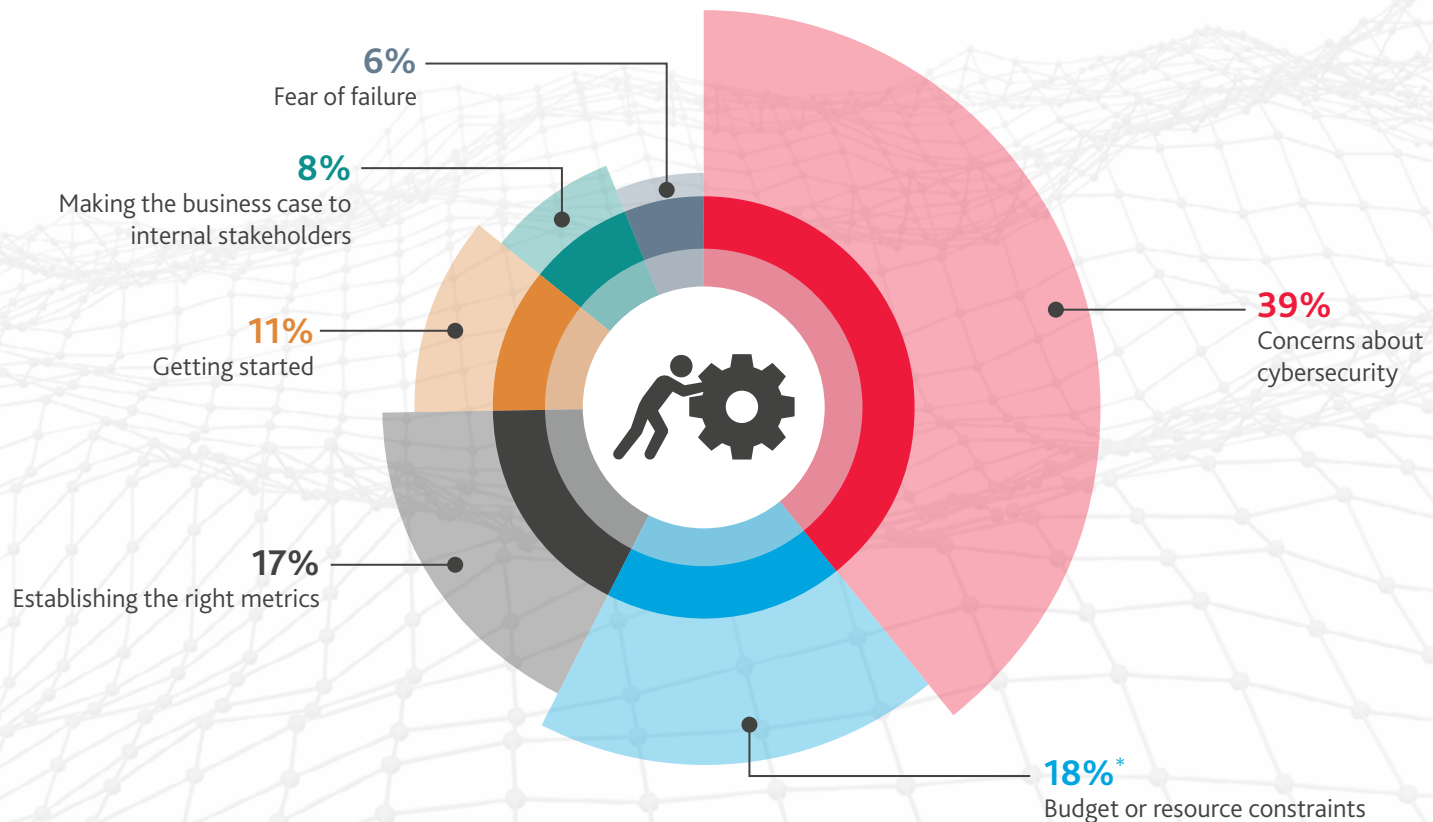
WHAT CAN
THREATEN
OR DERAILED
INDUSTRY 4.0
EFFORTS?



Challenges on the Road to Transformation

Even though COVID-19 has caused cash flow issues and budget constraints, Industry 4.0 investments will be an even more important area to focus resources on now and going forward. From automation that enables lights-out factories, to sensors that help increase supply chain agility, there are countless business cases for how spending on digital initiatives can help preserve revenue and capital to make the entire business more resilient. However, middle market manufacturers point to a range of issues that serve as roadblocks to getting new digital initiatives from idea to execution, with cybersecurity as the top concern. While cybersecurity vulnerabilities can lead to devastation for any business, manufacturers have the added pressure of protecting against industrial espionage and managing potential national security threats.

THE BIGGEST CHALLENGES IN MOVING FORWARD WITH A NEW INDUSTRY 4.0 INITIATIVE

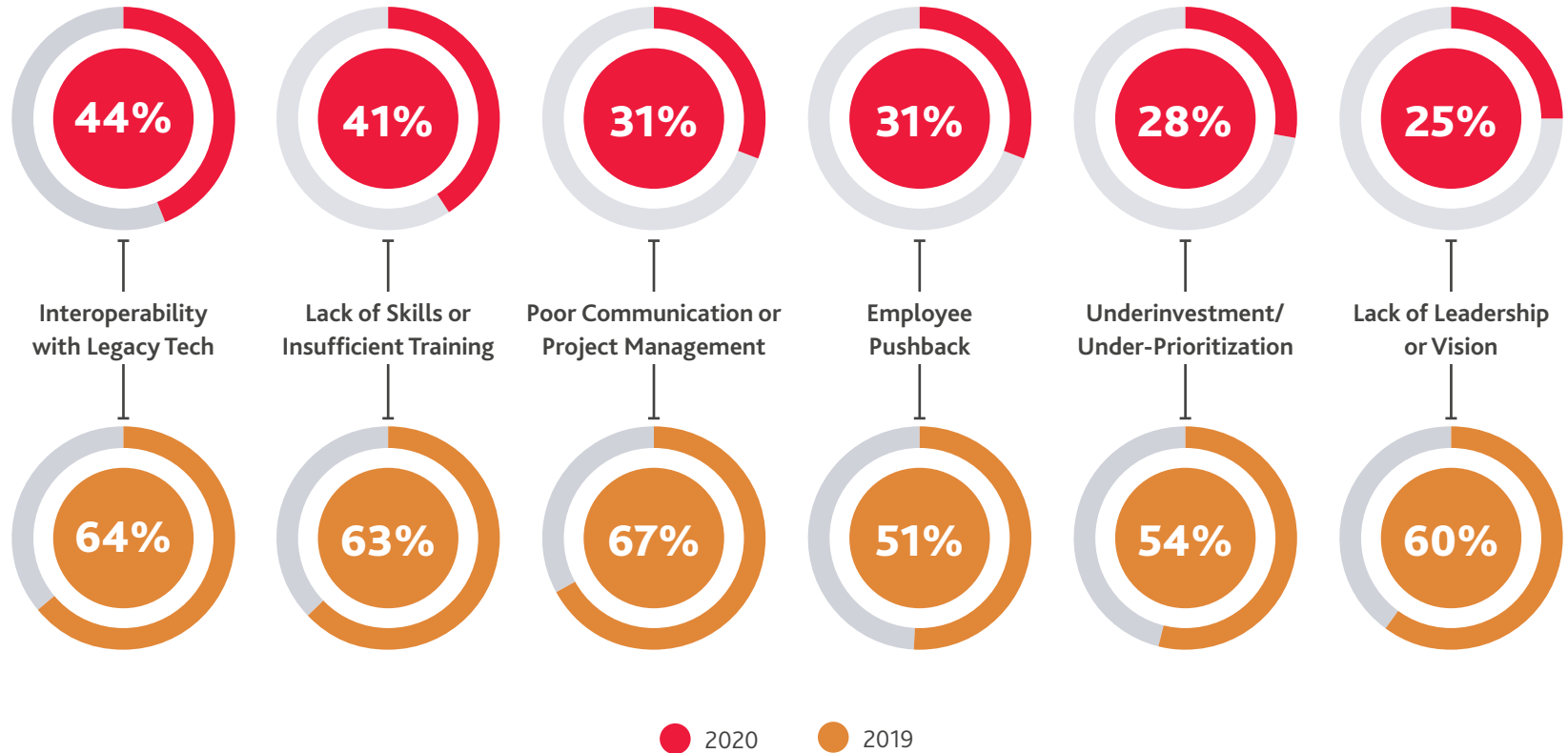


**In the current environment, budget/resource constraints are likely to pose an even greater challenge than is reflected here.*

Lessons Learned from Failure

Failures are a natural consequence of innovation. However, our survey shows that manufacturers are learning from their mistakes, as cited reasons for failure have gone down significantly across the board. Looking at top-cited reasons for failure year-over-year, it's clear manufacturers realize that prioritizing adequate workforce training and effective internal communication is critical to success. In the months ahead, the impact of the economic downturn is likely to be a significant hurdle for many manufacturers.

REASONS FOR FAILURE



Benchmarking Your Industry 4.0 Efforts

How do you stack up against your middle market peers? While every manufacturer is different, benchmarking against those in your revenue range can help you determine the priority areas of focus for your Industry 4.0 efforts.

HOW TO USE THIS BENCHMARKING DATA



Identify your
relative strengths &
weaknesses

Understand
competitive gaps &
threats to
your business

Gauge where you
can gain a
competitive advantage

Prioritize
investments

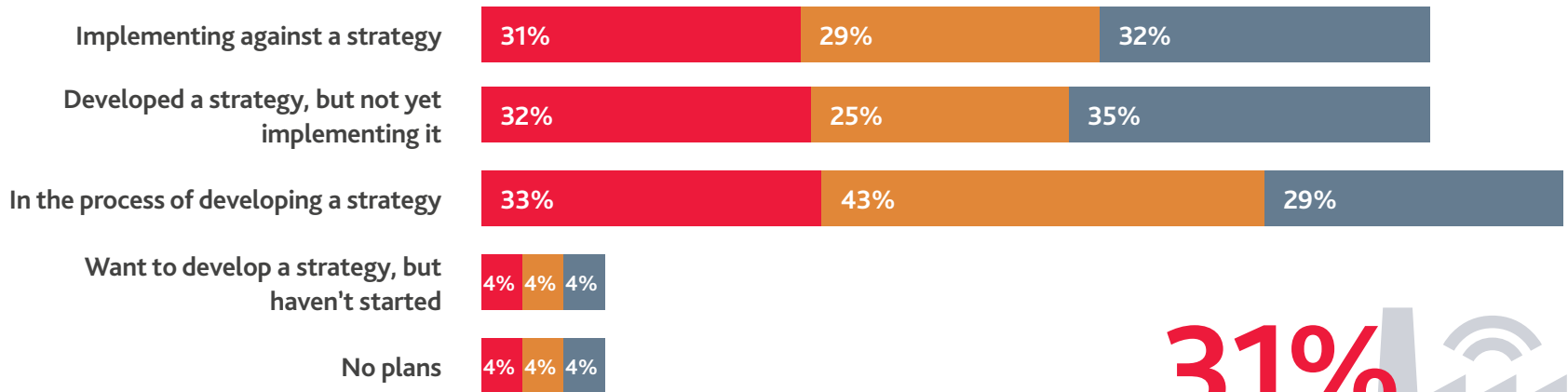
For the purposes of this section, organizations are categorized in two groups, according to their annual revenues:

- ▶ Lower Middle Market: \$250M-\$750M
- ▶ Upper Middle Market: \$751M-\$3B

WHAT IS THE CURRENT STATUS OF YOUR INDUSTRY 4.0 STRATEGY?

Benchmarking / Strategy Status

STRATEGY STATUS



● All Respondents
 ● Lower Middle Market
 ● Upper Middle Market

31%

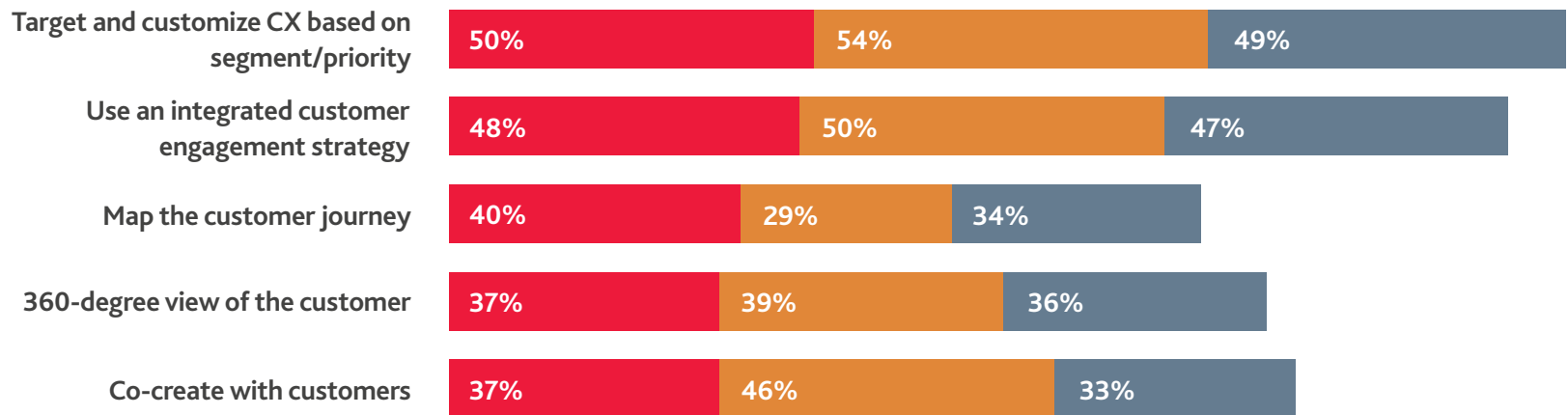
of manufacturers are **implementing against an Industry 4.0 strategy**, up from 5% in 2019



WHAT STRATEGIES DO YOU EMPLOY TO ENHANCE THE CUSTOMER EXPERIENCE?

Benchmarking / Customer Experience

STRATEGIES YOU EMPLOY TO ENHANCE THE CUSTOMER EXPERIENCE



● All Respondents
 ● Lower Middle Market
 ● Upper Middle Market

WHICH DIGITAL ENABLERS ARE YOU ADOPTING?

Benchmarking / Technology Adoption

Technologies	All Respondents		Lower Middle Market		Upper Middle Market	
	Currently Deploying	Considering Deploying	Currently Deploying	Considering Deploying	Currently Deploying	Considering Deploying
Cloud Computing	69%	27%	68%	29%	69%	26%
	96%		97%		95%	
Advanced Analytics	61%	28%	64%	25%	60%	29%
	89%		89%		89%	
Robotic Process Automation	42%	39%	43%	43%	42%	38%
	81%		86%		80%	
Artificial Intelligence & Machine Learning	44%	43%	43%	39%	44%	44%
	87%		82%		88%	
Internet of Things	54%	33%	64%	36%	50%	32%
	87%		100%		82%	
Blockchain/Digital Ledger Technology	38%	37%	36%	43%	39%	35%
	75%		79%		74%	
3D Printing	31%	27%	21%	39%	35%	22%
	58%		60%		57%	
Extended Reality	44%	30%	39%	21%	46%	33%
	74%		60%		79%	

Digital Enablers Defined



Cloud Computing

Cloud computing shifts the access, processing and storage of data and services to the Internet.



Advanced Analytics

Advanced analytics go beyond historical data analysis to provide real-time and predictive business intelligence.



Robotic Process Automation (RPA)

RPA is the use of software "bots" that automate repetitive manual tasks.



Artificial Intelligence (AI)

Artificial Intelligence is a broad concept to describe machines trained to think like humans.



Machine Learning

A subset of AI, machine learning aims to mirror human intelligence by equipping algorithms with the ability to "learn" on their own without human intervention based on experience and new inputs.



Internet of Things (IoT)

IoT connects "smart" devices to the Internet and to each other.



Distributed Ledger Technology (DLT)

A database of information that is simultaneously shared and updated in real time and in multiple locations across a network.



Blockchain

A type of distributed ledger technology, governed by a consensus protocol, used for sharing and storing validated and unchangeable information.



3D Printing

Also known as additive manufacturing, 3D printing builds three-dimensional objects from a digital model.



Extended Reality (XR)

The extended reality realm encompasses virtual reality (VR), augmented reality (AR) and mixed reality (MR).



Virtual Reality

VR is a full immersion into a computer-generated environment.



Augmented Reality

AR overlays virtual elements, such as computer-generated graphics or simulations, on top of the real-world environment.



Mixed Reality

MR is an advanced form of augmented reality, integrating the virtual and physical worlds to create an immersive interface.

WHICH SOFTWARE APPLICATIONS AND TOOLS ARE YOU USING TO POWER THE DIGITAL THREAD?

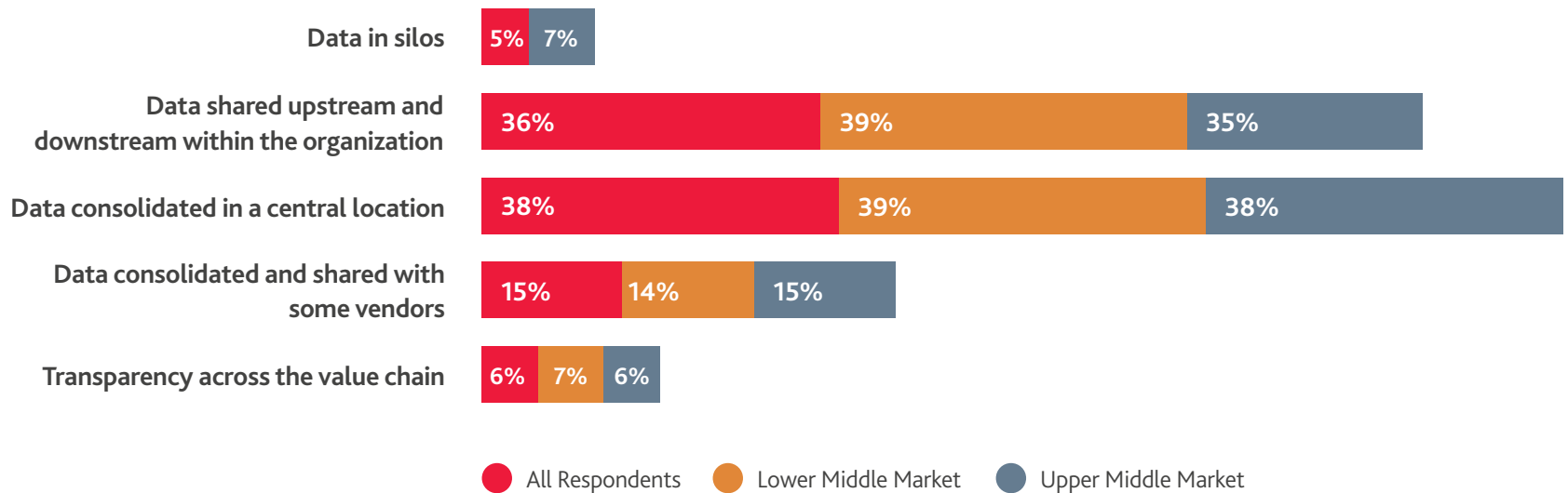
Benchmarking / Software

Software	All Respondents		Lower Middle Market		Upper Middle Market	
	Using Now	Plan to Use	Using Now	Plan to Use	Using Now	Plan to Use
Warehouse Management Systems	60%	31%	79%	18%	53%	36%
	91%		97%		89%	
Manufacturing Execution Systems	59%	31%	57%	29%	60%	32%
	90%		86%		92%	
Enterprise Resource Planning Software	53%	33%	50%	43%	54%	29%
	86%		93%		83%	
Product Lifecycle Management Software	51%	36%	46%	43%	53%	33%
	87%		89%		86%	
Geolocation Tracking Technology (e.g. RFID or Bluetooth low energy)	51%	37%	50%	32%	51%	39%
	88%		82%		90%	
Carrier Performance Management Software	40%	39%	39%	46%	40%	36%
	79%		85%		76%	
Digital Twin	27%	34%	21%	46%	29%	29%
	61%		67%		58%	

WHICH BEST DESCRIBES YOUR CURRENT LEVEL OF INFORMATION SHARING?

Benchmarking / Information Access & Transparency

LEVEL OF INFORMATION SHARING



HOW ARE YOU RESPONDING TO NEW DATA PRIVACY REGULATIONS AND NORMS?

Benchmarking / Data Privacy Compliance

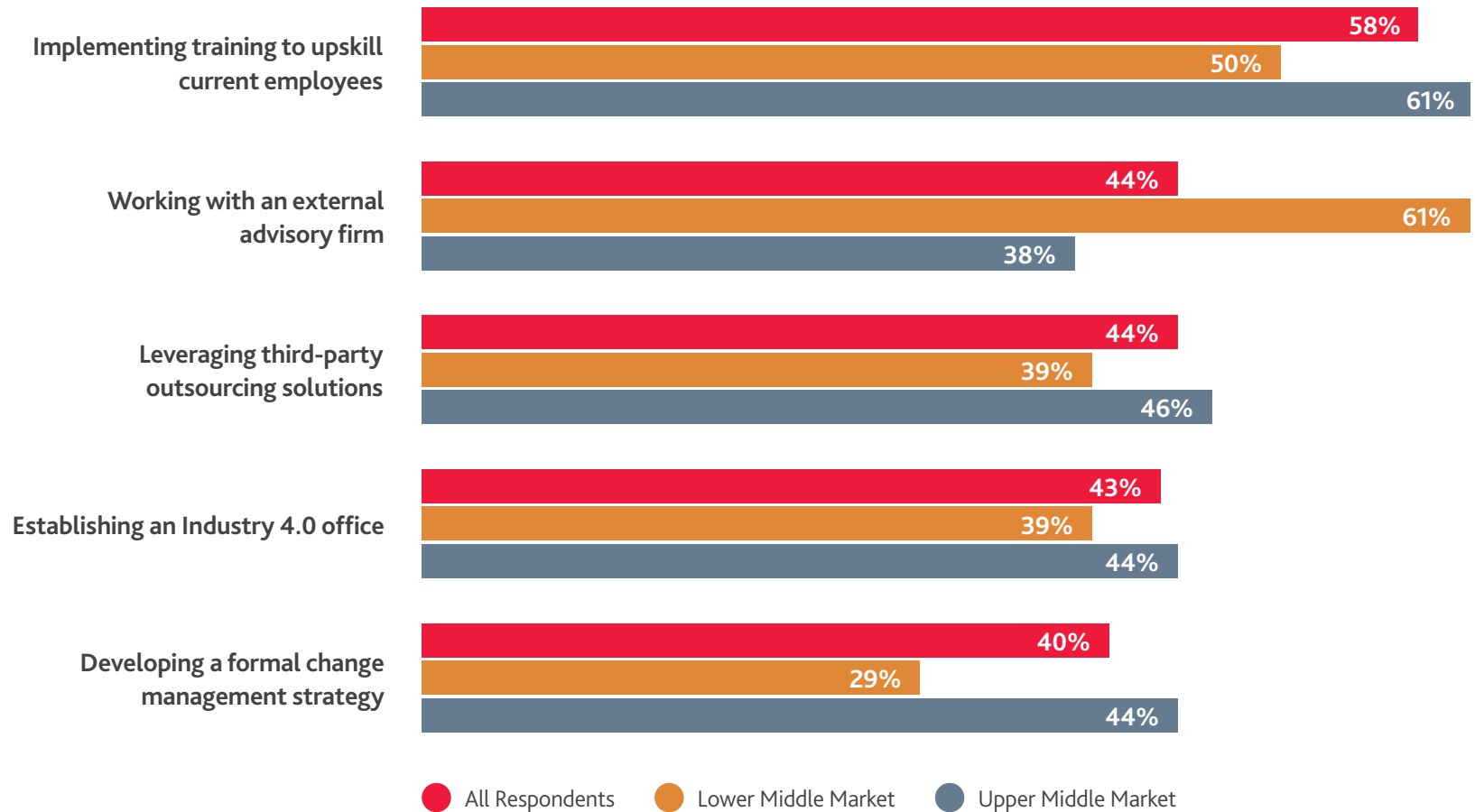
Compliance	All Respondents		Lower Middle Market		Upper Middle Market	
	Currently	Next 12 Months	Currently	Next 12 Months	Currently	Next 12 Months
Providing Training for Employees	70%	39%	57%	43%	75%	38%
Performing a Readiness Assessment	55%	32%	54%	32%	55%	32%
Reviewing Third-Party Agreements	53%	37%	46%	43%	55%	35%
Updating Privacy Disclosures	52%	41%	61%	43%	48%	41%
Automating Compliance Processes	51%	48%	64%	43%	45%	51%
Revising Privacy Policies and Processes	47%	45%	39%	54%	51%	42%
Performing a Data Mapping Exercise	44%	42%	46%	43%	44%	42%



HOW ARE YOU PREPARING YOUR EMPLOYEES FOR INDUSTRY 4.0 IN THE WORKPLACE?

Benchmarking / Digital Adoption & Enablement

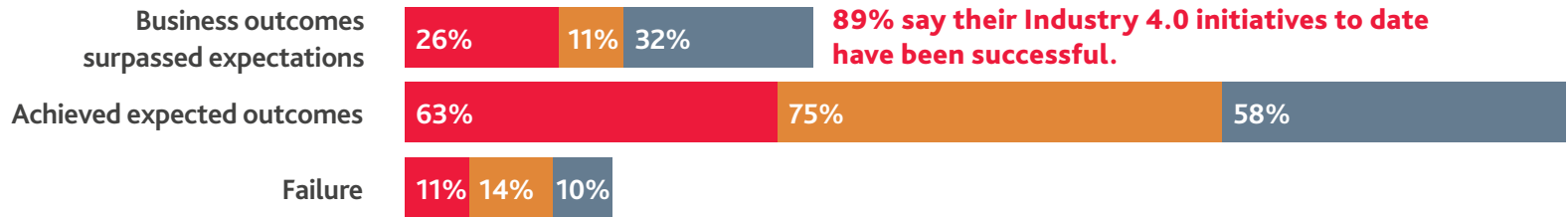
PLANS TO ENABLE EMPLOYEE ADOPTION



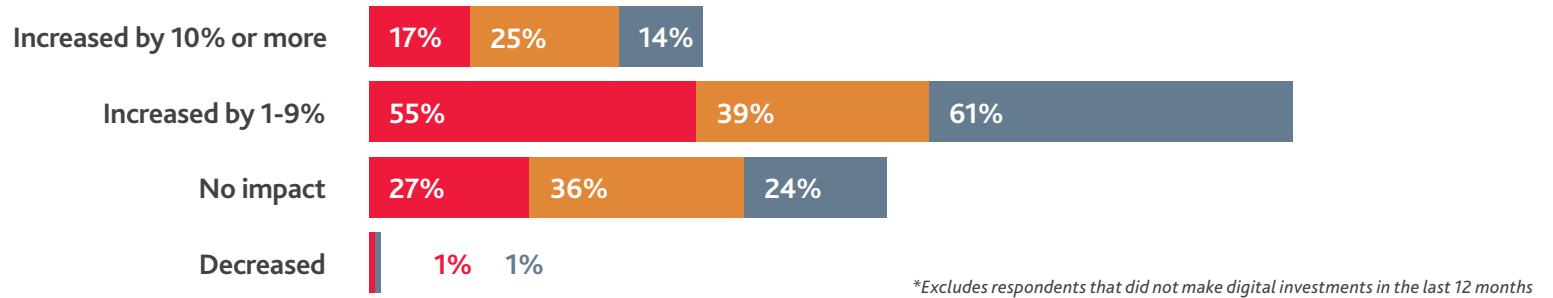
IS YOUR INVESTMENT IN DIGITAL PAYING OFF IN FULL?

Benchmarking / Industry 4.0 ROI

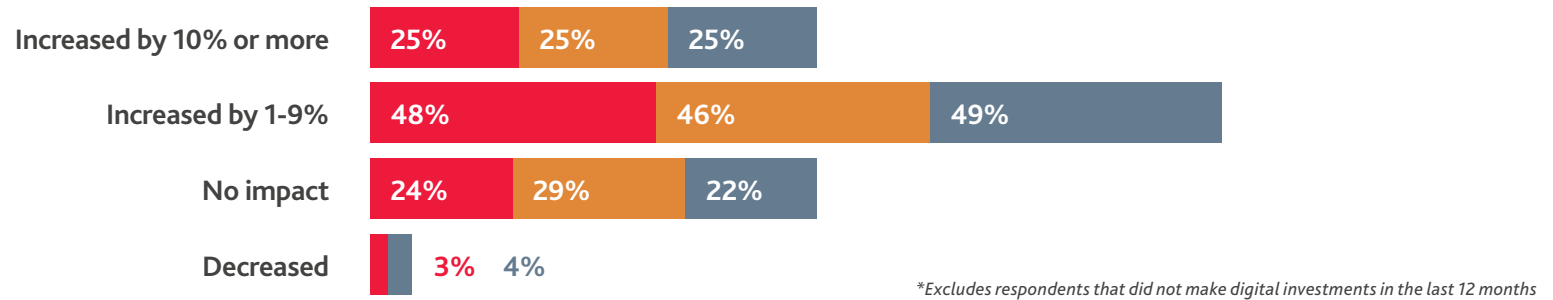
RATE OF SUCCESS



12-MONTH REVENUE GROWTH FROM DIGITAL INITIATIVES



12-MONTH PROFITABILITY IMPROVEMENT FROM DIGITAL INITIATIVES



● All Respondents ● Lower Middle Market ● Upper Middle Market

Conclusion

Everything is connected—customers, supply chains, economies, opportunities and risks. The information-sharing and collaboration required for Industry 4.0 maturity requires a daunting level of vulnerability, but as the global economy evolves, manufacturers must evolve with it.

The short-term horizon may be bumpy, but the manufacturing industry's future is bright. The next iteration of our nascent digital economy is one where the physical and digital worlds are tightly integrated. Goods will still be manufactured and sold—they'll just be paired with services. Production processes may be increasingly reliant on digital information, but that digital information is still driving toward real-world output. And when it comes to physical production, manufacturers have a leg up on the competition. In this new economic paradigm, manufacturing is far from doomed.

It's easy to watch the tides of change coming, but it's seeing clear to the other side of the crisis that determines whether you sink or swim. Manufacturers need to place smart bets and invest now to maximize productivity, accelerate recovery and ultimately, fill the gaps desired by customers and left open by competitors.

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BDO has been a valued business advisor to privately held, private equity-owned and publicly-held manufacturing and distribution companies for more than 100 years. We work with a variety of companies from all industrial sectors, ranging from global distributors to startup and niche manufacturing corporations, on a myriad of accounting, consulting, tax and other financial issues.

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EXPLORE HOW BDO HELPS CLIENTS ALONG THEIR INDUSTRY 4.0 JOURNEYS ►

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