

Expert Insights

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Building supply chain resiliency with AI-driven workflows

Leading companies share
how they innovate

IBM Institute for
Business Value



Experts on this topic



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In this report, we'll explore how supply chain stars are innovating more effectively than their peers.

Key takeaways

Intelligent workflows are the “center of gravity” for smarter supply chains

Intelligent workflows create value by *reimagining* the way work is done, adding AI and automation to everyday tasks, insights, responses, and actions. 85% of respondents in our executive supply chain survey plan to apply real-time intelligence to processes and value chain networks over the next three years.

Modern interconnected trends define the future

Supply chains can deliver differentiation through profound customer centricity and, in some cases, a radically personalized customer experience. Agile operating models are expected to provide near-instant insights supporting ecosystems and fluid work unit teams. One in six respondents to our survey plans to incorporate AI-enabled computing environments across their supply chain operations in the next three years.

The journey to smart starts with innovation

We identified a group of organizations, the Innovators, that significantly outperform their competitors in responsiveness, agility, and productivity. These Innovators have been early to harness self-learning workflows that provide insights and actions. Innovators anticipate leveraging automated processes and self-learning software 53% more often than other organizations.

Reviving stressed global supply chains with intelligent workflows

With global transportation restrictions, plant shutdowns, and workplace disruptions, COVID-19 has shattered the expectation that consumer goods, finished goods, and raw materials will be available when, where, and how companies and consumers need them. The pandemic has forever changed supply chains, and organizations need to step up their game. This means being more dynamic, responsive, and resilient, as well as interconnected to both their external ecosystems and internal processes—all in pursuit of the ideal business outcome.

A “smarter” supply chain that uses intelligent workflows is a new approach. These workflows use AI to make processes more efficient, responsive, and adaptive—and they're fueled by data-driven decisions. It's an effective, flexible proposition, but one that requires a strong organizational culture of innovation, discernment of priorities, and laser-sharp focus on beneficial initiatives. Fortunately, we've identified organizational mentors who can show us how it's done.

In a recent IBV survey, we asked 2,000 supply chain executives around the world to rank their organizations' innovation levels compared to those of competitors and peers.¹ About 10% of respondents, a group we call—appropriately—the Innovators, significantly outperforms the others. Over the past three years, Innovators report 34% more revenue growth and 326% more profitability than their peers. In this report, we'll explore what these supply chain stars do differently, where they are innovating more effectively than their peers, and what their examples reveal about adapting to challenging times.

Intelligent workflows can help narrow the gap between unimaginable and anticipated.

Intelligent workflows fuel the data-driven smart supply chain

Consider the challenges currently facing supply chain organizations. Extreme volatility in vital supplies. Inconsistent demand patterns as conditions quickly change. Inventory fluctuations, with key items out of stock. Lack of visibility into inventory count and location. Capacity-constrained warehouses. Lower fill rates and missed deliveries. Limited or no availability of raw, work-in-progress, or finished-goods inventory. And this list is far from comprehensive.

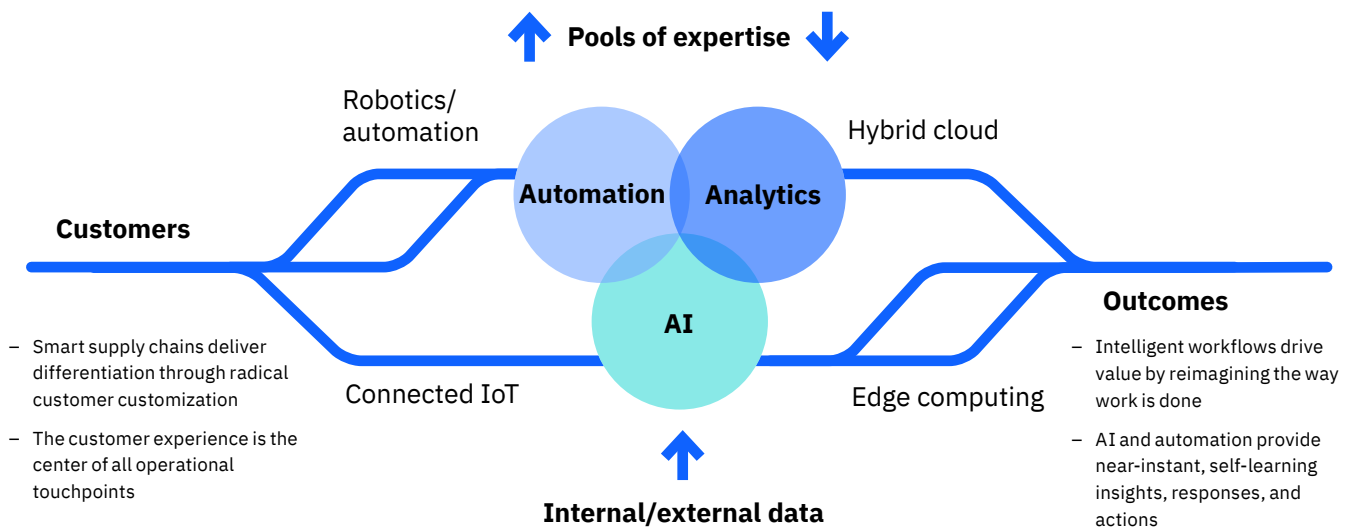
But there's hope. For these and other supply chain challenges, *knowledge is power*. Correspondingly, the ability to generate granular, real-time, security-rich data about your supply chain has gone from *nice-to-have* to *necessity*. That data, partnered with exponential technologies such as robotics, automation, hybrid cloud, IoT, edge computing, and blockchain can power *intelligent workflows* (see Figure 1). It's no coincidence that our leading supply chain organizations, the Innovators, use real-time intelligence 34% more often than their peers.

Intelligent workflows are AI-driven, embrace automation where possible, and facilitate horizontal integration and adjustments across functions, providing 360-degree visibility of the supply chain and potential disruptions. Intelligent workflows also support the critical digital platform of control tower visibility—essentially a personalized, connected command center of data, key business metrics, and events across the supply chain.² Control towers also fuel collaboration between supply chains and their customers, facilitating efficiency when tackling recurring challenges.

Would your organization benefit from end-to-end self-correcting supply chains? Do your operations, including throughout your extended ecosystem, need to better understand and prepare for the upstream and downstream impacts of potential vulnerabilities and disruptions? By improving reliability and reducing risks, intelligent workflows can help companies address dilemmas—workforce dislocation, supply chain challenges, and customer service disruptions—caused by the pandemic or other crises. As we move forward, it's tough to predict the parameters of a post-pandemic world. But intelligent workflows can help build a smarter, more resilient global supply chain and narrow the gap between unimaginable and anticipated.

Figure 1

Intelligent workflows for smarter supply chains



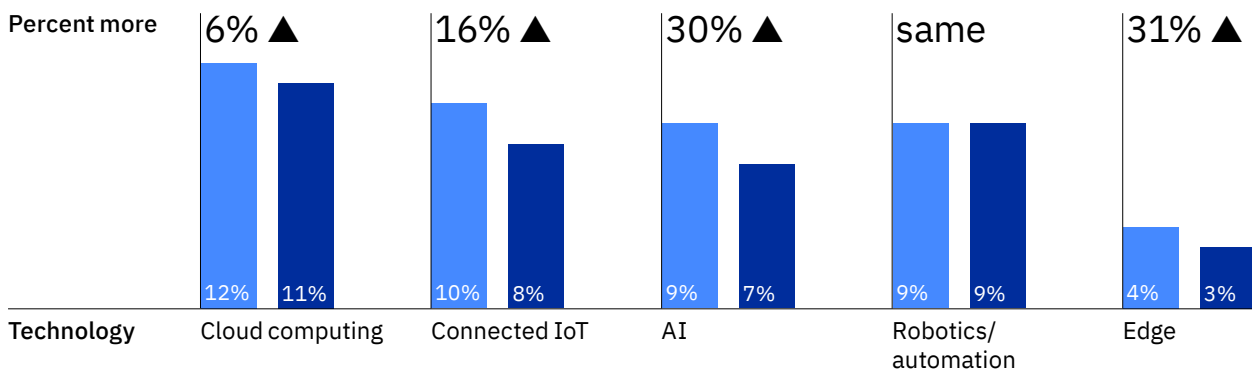
Source: IBM Institute for Business Value

Intelligent workflows are the sum of their parts—specifically, components of exponential technology and automation. Both Innovators and their peers report similar investments and expectations related to robotics and automation, underscoring the across-the-board appeal of that capability. However, in all other exponential

technologies, Innovators lead the way. For example, Innovators anticipate investments in artificial intelligence (AI) to run 30% higher than other supply chain organizations, and 31% higher in edge computing (see Figure 2).

Figure 2

Innovators lead the way in exponential technology investments



Innovators % of technology budget invested in three years
All others % of technology budget invested in three years

Source: IBM Institute for Business Value Smarter Supply Chain Study, 2020.
 Q. What percentage of your organization's technology budget will be invested in each of the above technologies in the next three years?

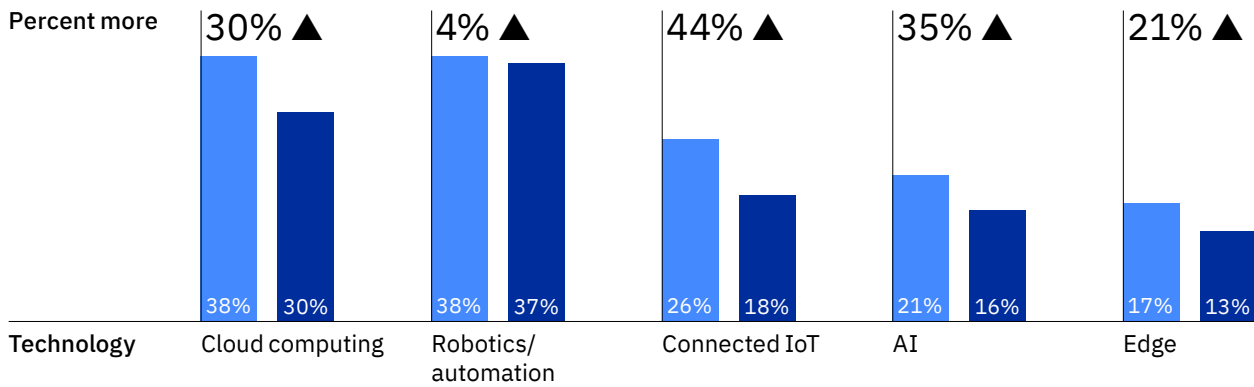
Innovators are constructing workflows that provide near-instant insights that enable dynamic workflows.

Given their position on the “bleeding edge” of applying technology to strategic workflows, Innovators are more optimistic than their peers that these investments will be profitable, especially related to IoT, AI, cloud, and edge computing (see Figure 3). Also, Innovators significantly outperform their competitors in responsiveness, agility, and productivity, all game-changing factors that build

resilience and influence their confidence in configuring and executing operations. In essence, Innovators are constructing workflows that provide near-instant insights that enable fluid, dynamic workflows, and workforce aptitude. They expect that the equity invested, both sweat and financial, will pay off.

Figure 3

Potential payoff: Innovators report greater ROI expectations than their peers



Innovators % of ROI expected in three years
All others % of ROI expected in three years.

Source: IBM Institute for Business Value Smarter Supply Chain Study. 2020.

Q. What ROI do you expect to achieve for each of the above technologies in which your organization is investing?

The future starts now:

Five interconnected supply chain trends

Intelligent workflows ultimately generate value by reimagining the way work is done, adding AI and automation to everyday tasks, insights, responses, and actions. Intelligent workflows serve as the “center of gravity” to your supply chain, sitting at the nexus of five supply chain trends that can power responsiveness and flexibility (see Figure 4). As you’ll see, Innovators are at the vanguard of adopting these trends.

Customized customer experiences. Supply chains need to deliver differentiation through a radically personalized customer experience that is integral to virtually all operational touchpoints. And Innovators understand the centrality of the customer. They reimagine a cross-domain approach to a customized customer experience 40% more frequently than other respondents.

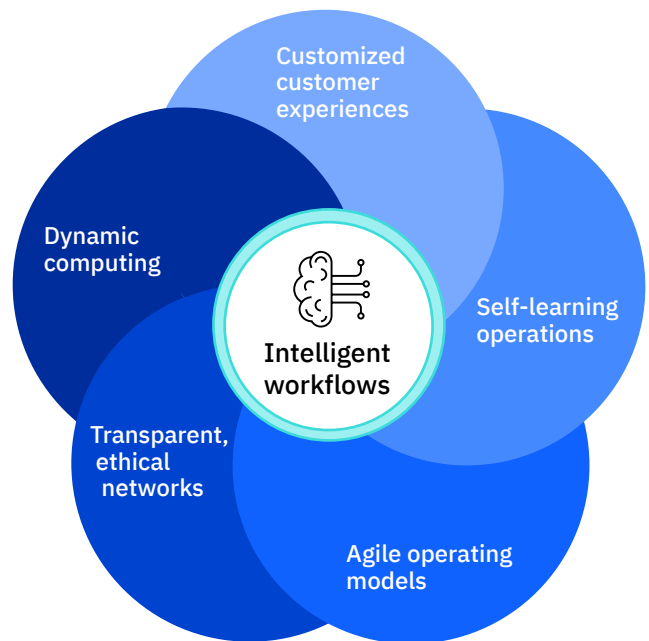
Self-correcting operations. Supply chains should strive for autonomy, with the top-performing companies incorporating self-learning, self-correcting, and self-directing capabilities. In this scenario, connected devices and assets understand the current state, learn, and take action accordingly. Where it makes sense to do so, Innovators anticipate leveraging automated processes and self-correcting software for supply chain operations 53% more often than other organizations.

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Figure 4

The supply chain of the future needs customized experiences, a self-learning environment, and critical data insights

Five interconnected supply chain trends



Source: IBM Institute for Business Value

Intelligent workflows sit at the nexus of five supply chain trends that can power responsiveness.

Agile operating models. An agile operating model empowers a network of teams through a culture of accountability, alignment to strategic objectives, constantly evolving expertise, relentless transparency, and ongoing collaboration and self-calibration. These models can provide near-instant insights in support of an organization's workforce, ecosystems, and fluid work unit teams. Innovators expect agile operating models to be a top competitive advantage over the next three years—and they report this expectation 20% more frequently than their peers.

Case in point: one leading telecommunications provider is transforming its supply chain to drive integrated operations, improve customer experiences, and reduce costs. Their AI-enabled control tower provides a 360-degree view for end-to-end visibility and collaborative decision support based on predictive insights of future disruption events and their potential impact. Improvements to date include 20% forecast accuracy and 12% reduction in costs.³

Transparent, ethical networks. Blockchains can enable cross-industry, multi-enterprise networks to provide shared visibility into trusted data that can drive insights and decisions. Blockchain networks can also remove transactional blind spots between partners, reduce order errors, and improve dispute resolution. In fact, 70% of all respondents say that blockchain capabilities will enable their organizations to increase transparency in sourcing. And when compared to other respondents, fully 25% more innovators expect blockchains to enable sharing of relevant data that can improve speed and quality of decisions.

One example: a government agency in Latin America wanted to establish safe, security-rich ways for its citizens to build business relationships with countries in another region. Over the next several years, they expect to improve these relationships through transparency, while lowering value chain costs and reducing the time needed to access supply chain assets. To achieve this, they've opted for a cross-entity blockchain platform technology that supports an agile digital certification chain.⁴

Dynamic computing configurations. These environments—hybrid cloud, platforms, and edge—can provide responsive data insights. And of course, security is of paramount concern (see “Insight: The importance of supply chain security” on page 7). Innovators report implementing AI and exponential technologies (such as robotics, automation, and edge computing) to automate supply chain operations 30% more than their peers.

Common themes across these five trends? Data, insights, and technology—specifically, emerging technologies that can empower supply chains to curate broad sets of data, which then provide valuable insights.

The ability to identify and relentlessly fixate on real-time opportunities can be a game-changer, especially given the volatility of the COVID-19-era supply chain. It's an opportunity for organizations to evolve from an “outside-in” digital transformation perspective. To compete at the highest level, now is the time to adopt an “inside-out” perspective—leveraging the unique strength of company-owned data partnered with emerging technologies.⁵ Incorporating wisdom from external sources that provide weather, demand fluctuation, and other logistical data is also essential.

Insight: The importance of supply chain security

Supply chain security is an expansive topic that can range from physical threats to cyber threats. It can encompass both transactions and the protection of systems, as well as mitigating risk from parties in both the immediate business network as well as broader ecosystem relationships.

It's an area of concern, with research revealing some sobering statistics: globally, the average cost of a data breach is \$3.86 million, and it takes an average of 280 days to identify and contain a breach.⁶

No one solution resolves supply chain security, so organizations are well-advised to use a combination of defenses. Here are some effective measures to help manage supply chain security risk:

- Security strategy assessments
- Vulnerability mitigation and penetration testing
- Digitization and modernization
- Data identification and encryption
- Permissioned controls for data exchange and visibility
- Trust, transparency, and provenance
- Third-party risk management
- Incident response planning and orchestration.⁷

For supply chain Innovators, strategizing for the future starts now

The pandemic caught the majority of supply chain organizations flat-footed. One survey conducted early in 2020 found 70% of respondents in react mode—to the point where they were *manually* determining which suppliers had operations in locked-down regions of China.⁸

Innovators are positioned to do better going forward, rating themselves significantly higher than their peers on responsiveness and agility (78% versus 20%) and productivity (94% versus 66%). It's no surprise this group is innately proactive. As you read this, most Innovators are actively developing strategies in support of the five interconnected supply chain trends they deem essential (see Figure 5 on page 8).

For example, they plan on *customizing customer experiences* with “local content” and specialized services unique to micro and local markets. And, they plan to use smart manufacturing to customize products for micro-segments. This could eventually drill down to “production-for-one” capabilities based on customer demand.

With AI, machines can learn from patterns and trends, detecting anomalies and recommending changes and reconfigurations to their own workflows, contributing to *self-correcting operations*. While all organizations report enthusiasm for this technology, Innovators are slightly ahead of the curve, expecting to embrace AI more frequently than their fellow respondents.

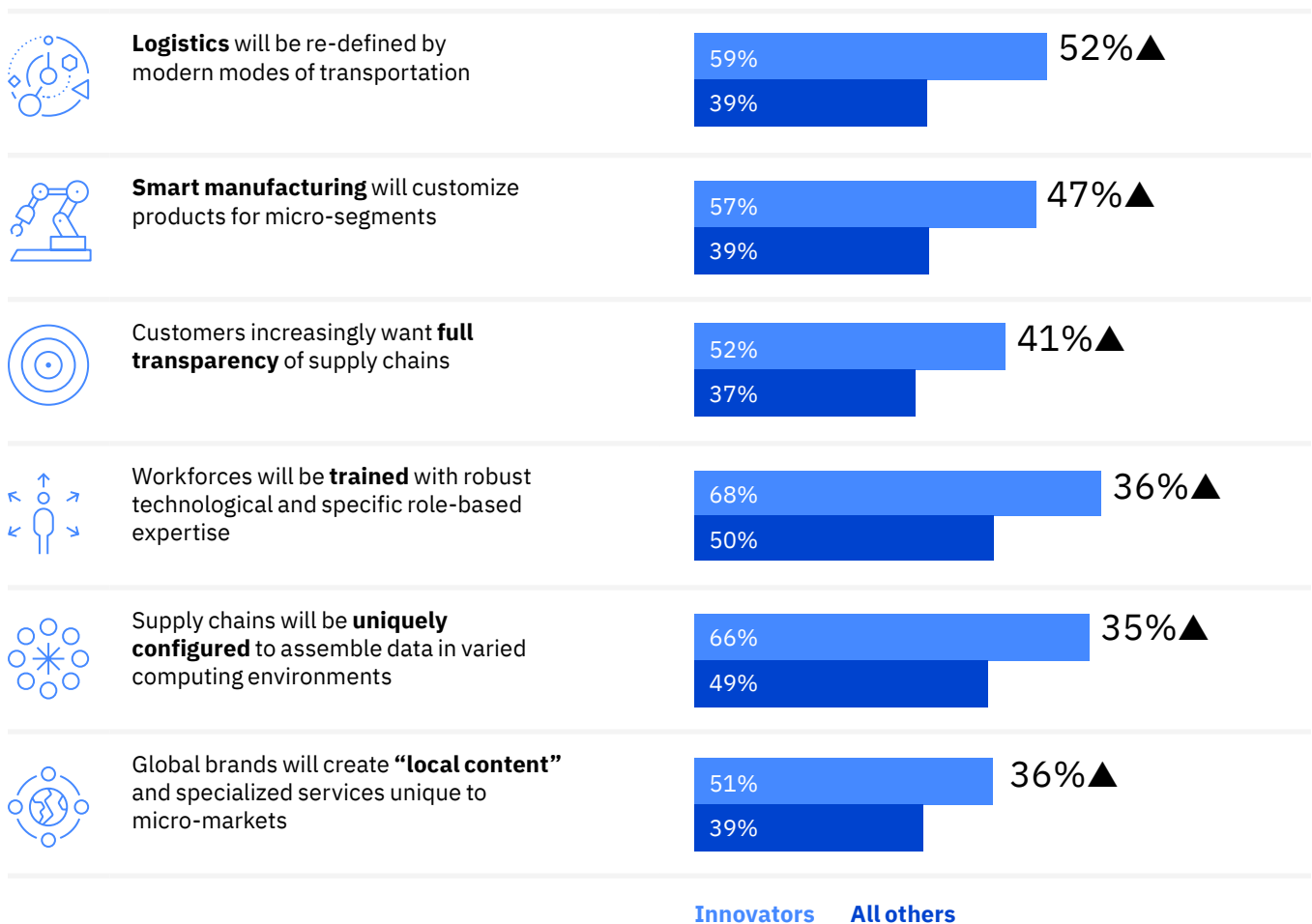
Innovators fully grasp the need for blockchain-enabled transparent, ethical networks.

The Innovator advantage extends to the realm of *agile operating models*. This leading group expects to redefine their logistics by using new modes and mixes of transportation roughly 50% more than their peers. As well, Innovators expect to train and re-skill their workforces with robust technological, operational, and specific role-based

expertise. Innovators also fully grasp the need for blockchain-enabled *transparent, ethical networks*, understanding that their customers increasingly want full visibility of supply chains from inventory to last-mile logistics. They report this understanding 41% more often than other respondents.

Figure 5

What does innovation look like?



Source: IBM Institute for Business Value Smarter Supply Chain Study. 2020.
 Q. To what extent do you agree with the statements above about supply chains of the future?
 Respondents who selected 4 or 5 on a scale of 1-5.

Dynamic computing environments encompass hybrid cloud, platforms, and edge, and can provide security-rich, responsive delivery of data insights. When it comes to dynamic computing, Innovators plan to integrate hybrid cloud into their technology strategies and extend existing supply chain investments to support AI-enabled workflows—and they report these plans 18% more frequently than other organizations. A full 66% of Innovators also plan to uniquely configure their supply chains, assembling data in varied computing environments such as platforms and edge computing, as well as hybrid cloud.

If the pandemic has taught us one thing, it's that we're all interconnected. Supply chains are a prime example. By developing data-driven intelligent workflows and aligning strategies with the five supply chain trends identified by our research, supply chain organizations can better nurture, understand, and react to those connections. After all, COVID-19 has emphatically underscored the importance of supply chains to their organizations, broader communities, and entire economies (see case study, "JOANN and IBM").

Indications are that supply chain organizations are ready to more fully embrace that critical responsibility. 85% of *all* respondents in our survey plan to apply real-time intelligence to processes and networks for near-instantaneous actions and outcomes over the next three years. They would do well to emulate the Innovators. This outperforming group's proactive adoption of intelligent workflows, exponential technologies, and corresponding trends and strategies can be a "North Star" to other organizations as they navigate the substantial challenges ahead.

JOANN and IBM: Rising to the COVID-19 challenge⁹

When the pandemic broke and medical personal protective equipment (PPE) grew scarce, the demand for materials to sew cloth face masks skyrocketed. To help during the crisis, JOANN, the largest fabric retailer in the US, launched its "Make to Give" campaign to encourage home mask-making.

At the same time, shelter-in-place orders had been issued across the country, and in-store traffic plummeted—yet online orders skyrocketed. For example, in March 2020, online inquiries exploded to four times the previous holiday season's peak demand. JOANN's challenge: How to handle this unprecedented demand when in-store shopping had slowed to a trickle?

JOANN had long engaged with IBM to handle its order management and fulfillment platform. In the thick of the crisis, IBM used a cloud-based, AI-driven solution to help quickly ramp up JOANN's order management capacity. The solution provided control tower visibility and insight-driven recommendations to help JOANN:

- Rapidly determine if it had inventory on hand to fulfill customer orders
- Strengthen its mail delivery channel
- Implement curbside delivery across its more than 850 stores nationwide.

JOANN was able to re-envision its stores as fulfillment centers, with curbside pickup becoming its primary fulfillment channel. The result was a quick pivot to supply much-needed raw material to make cloth face masks at a time when these products were in short supply—and provide essential support to healthcare workers and communities.

Action guide

Building supply chain resiliency with AI-driven workflows

A smarter supply chain—one that uses intelligent workflows fueled by data-driven decisions—is an effective strategy that can adapt to rapidly shifting requirements. As this paper has shown, Innovators are leading the way. If these leading performers inspire you, here are three critical steps to get started.

1. Drive innovation-to-value with intelligent workflows.

Understand that the ability to generate granular, real-time, secure data about your supply chain has gone from nice-to-have to necessity. Adopt an “inside-out” approach to digital transformation by partnering that data with exponential technologies such as robotics, automation, hybrid cloud, connected IoT, and edge computing. Incorporate wisdom from external sources that provide weather, demand fluctuation, and other essential logistical data.

2. Strive for autonomy through automation.

Leverage automated process and self-learning software. Emulate the top-performing supply chain organizations with workflows that are self-learning, self-correcting, and self-directing. Free up resources to focus on higher value work. Empower your connected devices and assets to understand the current state, learn, and take action accordingly.

3. Impart agility with instant and transparent insights.

Embrace agile operating models, which can provide near-instant insights in support of an organization’s workforce, ecosystems, and fluid work unit teams. Get inspired by the highest-performing respondents in our study—the Innovators. They expect these operating models to be a top competitive advantage over the next three years.

Notes and sources

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