

Experts on this topic

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"We will never return to where we were before."

CSCO, IBM Think Circle

Key takeaways

Renewed resiliency

Keep one foot in the present and the other firmly planted to shape the future. The pandemic illuminated how flexibility and adaptability in supply chains need to support agility with digitization and automation on steroids powered by risk management models.

Workforce evolution

New technology-driven possibilities for collaborative work—anywhere and anytime—provide powerful virtualization opportunities and an imperative to re-examine workflows with the creation of new human-technology relationships.

Humanizing sustainability

Humanizing the sustainability emergency includes not just a tunnel-vison focus on carbon, but inclusion of the other critical risks that may be larger: biodiversity loss, water scarcity, air pollution, ocean health, and overconsumption.

Meeting the moment: Obstacles and opportunities

The buzz around supply chains has been intense. Pandemic disruption heightened awareness of the complexity of supply chains and how important they are to our communities and economies. Now rising factors, including inflationary pressures, have intensified the spotlight (see Figure 1). Supply chain leaders in 2022 find themselves cast as both heroes and villains, confidantes and advisors, with renewed authority and expanded responsibility. Chief supply chain officers (CSCOs) face fresh demands for sustainability, adaptability, and value creation—all of which can expose new risks as well as enhanced opportunities (see Figure 2).

In this catalytic environment, the IBM Institute for Business Value (IBV) brought together the top supply chain executives from dozens of leading organizations as part of the IBM Think Circle to explore the key lessons and action points for this moment. Drawn from a series of open-forum discussions (called Circles), as well as quantitative primary research from extensive C-suite data, the IBV has identified 5 top playbook essentials for supply chain leaders for 2022—and beyond.

These 5 imperatives encapsulate strategies being pursued to embrace and reimagine the supply chain of the future. Expectations include digital transformation, improved sustainability, and workforce evolution, as supply operations adapt to meet the immediate and evolving needs of customers, employees, shareholders, and society. "We will never return to where we were before," one CSCO observed.

CSCOs who rise to this moment and embrace higher-value strategic initiatives can distinguish themselves, their teams, and their organizations. The playbook for 2022 and beyond requires CEOs to straddle the present and the future. Keeping a focus on how supply chains can operate tomorrow is essential to succeeding today.

CSCOs who embrace higher-value strategic initiatives can distinguish themselves, their teams, and their organizations.

Figure 1

New supply chain obstacles

Supply chain executives have scrambled to rebalance and reimagine their supply chain operations

To correct this, they have been... Organizations Rebalancing Reallocating Instituting new Seeking alternate production modes/providers facing challenges existing policies and procedures to associated with workforces lines to other of transportation demand volatility products communicate and logistics with customers services 86% 93% 82% \Box

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

Figure 2

New supply chain opportunities

CSCOs leverage an expanding kit of tech-fueled tools for modernizing supply chain operations

Improving end-to-end visibility across
the organization

56%

Maintaining alternative sources of supply
and logistics providers

53%

Developing agile and resilient
workflows

50%

Using AI to leverage unstructured
real-time data

48%

Integrating technologies (automation,

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

46%

IoT, blockchain, edge)

Drivers of disruption

Supply chain executives agree that what was once "normal" supply chain operational complexity has been made worse by extreme disruption in multiple areas:

Demand: New demand patterns have spurred extreme volatility, with some items facing stock-outs and others stockpiled unexpectedly.

Supply networks: Shortages in materials, goods, and inventory have heightened the need for accelerated supplier onboarding and expanded ecosystem visibility into inventory volumes and locations.

Logistics: Lack of availability of ships, containers, pallets, and trucks have combined with last-mile night-mares as well as capacity-constrained warehouses.

Workforce: New ways of working are altering supply chain operations, as are skills gaps, talent shortages, wage discrepancies, and impacts from the "Great Resignation."

Sustainability: Regulatory pressure for more sustainable operations has been elevated by demands from consumers, employees, and investors.

The right workforce strategy can be a competitive differentiator, helping CSCOs meet their charge to drive growth and value.

Playbook essential #1: Secure the right supply chain talent

Great supply chains require great people, with skills and talent primed for the digital future. With around half of the world's population contributing in some way to the supply chain—and almost 40% of jobs in the United States supply chain related—identifying and using the right talent in the right ways is more critical, and more complicated, than ever.¹

The pandemic has changed ways of working for all business functions, including the supply chain. Flexibility is key, as organizations move toward a clear, reinvented, and "open" workforce strategy. Yet these new systems remain a work in progress for most organizations. In fact, one of the most significant leadership hurdles cited in a recent IBV survey—by more than 1 in 3 executives—is promoting collaboration through remote mechanisms in a post-pandemic workforce.²

Meanwhile, the competition for talent is heating up, and supply chain leaders need to reinvent the way work gets done in order to compete. In a recent IBV survey, 44% of CSCOs reported that workforce skills and responsiveness are expected to deliver an important competitive advantage by 2023.³

This fluid environment both reflects and flows from new choices by employees—many resigning from supply chain-related jobs, often in hourly wage positions in retail operations, transportation, logistics, and distribution, as part of the "Great Resignation."

The jobs market is becoming increasingly dynamic. Upward pressure on wages has to be built into planning. Some employees are even self-unionizing, representing themselves collectively. There is an impulse to protect against job losses due to automation and, at the same time, to demand skill enhancement initiatives to enable higher-value contributions in the future.

New technology-driven possibilities for collaborative work, including the ability to work anywhere and anytime, provide powerful opportunities—and an imperative to re-examine processes and create new ones. Virtualization has opened opportunities to tap new skills and capabilities through processes and workflows that are digital (automated and intelligent). This extended access to people across the organization—from wider labor pools throughout partner organizations and broader ecosystems—can unlock vast potential.

As CSCOs are increasingly charged with driving growth and delivering value, the right workforce strategy can be a competitive differentiator. By drawing on diverse global talent pools and disrupting old paradigms in talent management, organizations gain new perspectives that lead to innovative ideas and solutions and ultimately create new value.

Playbook essential #2: Insist on customer centricity

A focus on customers is not a surprising imperative. Corporate leaders routinely describe the source of their competitive value as: "We own the customer relationship." In fact, in a 2020 IBV study, 61% of CSCOs in outperforming organizations stated that brand value is the organizations' greatest competitive advantage.⁴

But for supply chain execs right now, customer centricity is like a magic bullet—one that can define their future success. In that same 2020 survey of CSCOs, the IBV found that they plan to reimagine how they work to better deliver customer value as their business models are shifting to a customized customer experience through 2023.⁵

How do we make supply chains a cool place to work?

"With today's technologies, we can reimagine the way work is done. By using AI to enable automation of everyday tasks, insights, responses, and actions, we can build intelligent, data-driven workflows. The efficiencies gained position us to focus on future opportunities.

"What's really important as we think about the way that humanity and technology engage is how we make supply chains a cool place to work? How do we make it easier for people to do their job, to allow them to focus on the strategic and on the important—not just the urgent, but on where they can add more value.

"It's really crucial that we think about removing redundancy in processes, things that are low value, and allow the machines to do those. How do we create touchless processes? We can eliminate the transactional asks and drive seamless end-to-end processes in a touchless way. Let's get to touchless planning. Let's get to touchless financial closing. Think about challenging the norms of the past so that we can drive real value through integrating technology and humanity."

Jonathan Wright, Managing Partner, Supply Chain & Finance Transformation, Sustainability, IBM In response to customer demand, leading supply chain organizations are turning to intelligent automation to help reduce costs and improve workflow efficiency. They are building automated, AI-powered workflows embedded with predictive intelligence, such as dynamic customer response, preventive product/service maintenance, and real-time inventory and delivery status. This automation enables data-supported decisions so organizations can rapidly identify, prioritize, and recommend next-best actions for response, action, and reaction.

Indeed, a cross-section of executives in a recent IBV survey cited an improved customer experience as the top reason for embracing intelligent automation—higher than even reduced costs and improved decision-making.⁶ Improved reliability and reduced risk of customer service disruptions were among the benefits named by CSCOs in a 2020 IBV study.⁷

Establishing customer centricity has to be authentic, CSCOs in our Think Circle have told us. Customers are going to recognize if an initiative is simply there to drive a corporate agenda. And every instance of feedback should be seen as an opportunity for improvement. Even if the organization is focused on internal transformation, building a product pipeline, or undergoing any number of operational improvements, top supply chain leaders note that losing sight of the customer is unacceptable. Mapping customer decision journeys, providing a consistent customer experience across channels, and designing workflows with attention to customer "moments that matter" can help.

Supply chains can deliver differentiation through profound customer centricity and, in some cases, a radically personalized customer experience. Agile operating models can provide near-instant insights that support ecosystems and fluid work unit teams operating across the extended value chain to deliver exceptional experiences at every customer touchpoint (see Figure 3).

Establishing customer centricity has to be authentic. Customers can recognize if an initiative is simply to drive a corporate agenda.

Figure 3

The essential customer experience

Leaders inspire innovation to deliver differentiating value to customers









75%

of executives whose organizations were implementing intelligent automation said their digital initiatives are delivering the greatest value to the customer experience*

70%

of CSCOs stated their organization delivers customer value by reimagining the way they work cross domain to customize the customer experience**

68%

of CSCOs reported their business models are shifting to a customized customer experience within 3 years**

50%

of global brands plan to create local content to service local markets***

*Butner, Karen, Tom Ivory, Marco Albertoni, and Katie Sotheran. "Automation and the future of work: Creating intelligent workflows across the enterprise." IBM Institute for Business Value. July 2020. **IBM Institute for Business Value Smarter Supply Chain Study. 2020. Previously unpublished data. ***IBM Institute for Business Value Virtual Enterprise Survey. 2021. Previously unpublished data.

Playbook essential #3: Embrace sustainability

Sustainability and stakeholder capitalism have become C-suite imperatives. In a recent IBV study of CSCOs and other C-suite executives, 32% of organizations cited increasing sustainable operations among their most important business priorities—and half of the organizations reported they expect to move toward carbon neutrality by 2024.8

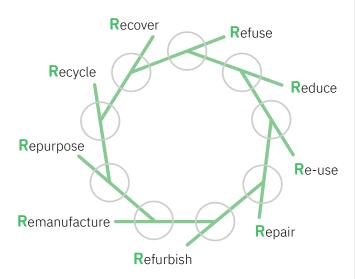
This focus has forced supply chain leaders to become serial innovators—to link social and environmental issues with business solutions, often using purpose as the great connector. Insightful CSCOs can partner with their organization's chief information officer (CIO) to help make this happen. 42% of CIOs in the 2021 IBV CIO study pointed to sustainability as the business area where digital technologies can have the greatest impact over the next 3 years.⁹

Many CSCOs are using a circular economy approach to mitigate near-term cost concerns and focus on long-term value to the customer. Transitioning to a circular economy requires supply chain leaders to embrace a new mindset and develop an appetite for business not-as-usual. Data from multiple sources (internal, public, scientific, marketplace, and so on) can be infused into business processes and decision-making to improve environmental outcomes. Virtualization can underpin the circular economy by applying the 9 Rs of circularity: Refuse, Reduce, Re-use, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recover (see Figure 4).¹⁰

Analytics applied to extended supply chain provenance and predictability can help reduce waste and align consumption to sourcing, as well as improve flexibility in the face of disruption. New engines for carbon reduction and renewable energy are expected as climate progress is embedded deeper in the measures of success for all entities. What's more, 78% of supply chain managers reported that they are adopting environmentally sustainable business practices into the demand and supply chain planning functional activities, and 72% have sustainability initiatives incorporated into the procurement and sourcing functional activities.¹¹

Figure 4 Rethink sustainability

CSCOs are finding value in the 9 Rs of circularity



Source: van Buren, Nicole, Marjolein Demmers, Rob Van der Heijden, and Frank Witlox. "Towards a circular economy: The role of Dutch logistics industries and governments." Sustainability. 2016.

We are building together the digital future of a more efficient, secure and patient-centric healthcare value chain

"We continue to build and strengthen a consortium across the pharmaceutical industry. 15 major global pharmaceutical companies are working towards a blockchain utility network that can be linked to each company's system, while appropriately safeguarding the confidentiality and security of each company's data. On top of that, we are building applications that allow for a trusted and compliant connectivity with the entire healthcare value chain, connectivity with regulators for product release, and connectivity to distributors all the way down to clinics and healthcare providers. This blockchainbased ecosystem will provide information at the point of dispensing—validating the quality and the provenance of the product through all aspects of transportation and distribution to the clinic and to the patient."

Brian Thornley, Associate Vice President, Supply Excellence, MSD Pharmaceuticals Analytics applied to supply chain provenance and predictability can help reduce waste and align consumption to sourcing.

Sustainability is not just environmental or climate related, of course. Too many supply chain leaders have failed to operationalize a full set of environmental, social, and governance (ESG) initiatives and measurements (see Figure 5). A sustainable supply chain encompasses environmental, social, and economic management—in

ways that have dramatically expanded since the pandemic. COVID-19 taught us that existential health risks threats are real; that industries can come together across the global economy to address a problem; and that the well-being of employees and customers is as important to organizations as the condition of the planet.

Figure 5

Building a sustainable supply chain

Integrated technologies help support ESG objectives



The virtual community: Customers, employees, ecosystem partners

Environment: Open innovation can help solve some of the planet's most daunting challenges

Social: The extended virtual community supports agility, diversity, and inclusion

Governance: Many environmental and social challenges cut across industry sectors requiring new forms of governance



New business platforms and ecosystems

Environment: Platform visibility and transparency enhance ecosystem collaboration

Social: New insights to working conditions and sourcing behaviors support cooperation on resolutions

Governance: Platforms provide opportunities to promote ethical standards



Human-technology partnerships

Environment: Circularity requires partnerships and technology-enabled platforms

Social: New team models and technology create purpose-driven relationships from the home to the community

Governance: Ethics and governance issues arise as technology weaves into our lives

Source: IBM Institute for Business Value analysis.



Virtualization and new ways of working

Environment: Remote working can support decarbonization by reducing office space and commuting

Social: AI-powered workflows leverage continuous learning and new skill enhancements

Governance: Agile and virtual operating models can uncover new opportunities for stakeholder engagement



Hybrid cloud and exponential technologies

Environment: Analytics for operational predictability can reduce waste and reinforce the circular economy agenda

Social: Digital twins model the physical to simulate sustainable practices in infrastructure and impact decisions

Governance: Stakeholder entrepreneurship can provide a holistic lens of people, planet, purpose, and profit impact



Intelligent Workflows and transparency

Environment: Intelligent Workflows can monitor and provide insights into energy, water, and waste management

Social: Customers and employees make purchase and work choices based on trust in the organization's values

Governance: Increased visibility and transparency can transform the way economies operate and govern

In this way, sustainability efforts must address environmental challenges—promoting greenhouse gas reduction/carbon neutrality, water management, air pollution, ocean health, biodiversity, energy management, and the like—but they also need to encompass employee wellness, diverse and equitable workplaces, and ethical supplier relationships. From a business perspective, these types of efforts enable organizations to differentiate themselves by turning environmental and social challenges into marketplace opportunities that can benefit both society and the individual enterprise. Such integrated enterprise sustainability practices can build lasting brand value and competitive advantage.

Playbook essential #4: Invest in automation

CSCOs in our Think Circle say they look to bring automation and humans together to improve human work (see Figure 6). Sensor technology, computing power, and edge processing can provide digital workers and robots with robust AI capabilities. In recent IBV research, CSCOs reported that they anticipate value beyond efficiency gains when they apply intelligent automation—from improved customer experiences to faster response times.¹²

When the physical operations are automated and digitized with robotics (drones, robots), robotic process automation, and intelligent workflows, the value employees deliver can be greatly amplified. The combination of physical workers with digital workers drives operational velocity with low- or no-touch operations in manufacturing, distribution, transportation, and field service asset maintenance.

Implementing automation is not without its challenges, say CSCOs. Among the obstacles they cited in a recent IBV study: refinement of internal strategies with clear objectives and outcomes (noted by 43% of respondents); the need to re-engineer the misalignment of workflows to support automated decision-making (42%); and the increased complexity of the IT architecture needed to implement and scale (42%).¹³

This is a true call to action

"We must humanize the sustainability emergency. This is a call to action—the relationship surrounding equity for all. We are experiencing 'carbon tunnel vision.' So many executives are only talking about net-zero transitions. There are other critical risks that are larger, including: biodiversity loss, water scarcity, air pollution, ocean health, and overconsumption. Sustainability is the next systemic impact on the entire system—and supply chains are front and center to build a better planet for us all."

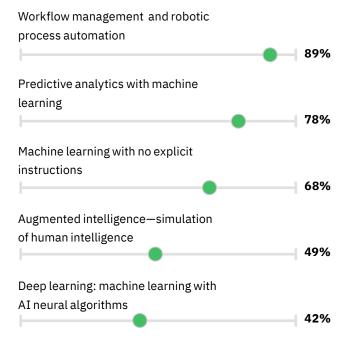
Sheri Hinish, Sustainability Services Leader, IBM

When humans and machines are working in tandem, the goal is to elevate the value created by all.

Figure 6

From emerging to essential

Intelligent automation offers new tools to fuel supply chain sophistication



Source: Butner, Karen, Tom Ivory, Marco Albertoni, and Katie Sotheran. "Automation and the future of work: Creating intelligent workflows across the enterprise." IBM Institute for Business Value. July 2020. Q. To what extent has your organization implemented the following technologies? 3, 4, 5. pilot, full production, scaled across the enterprise.

Nonetheless, the business case for addressing these challenges is embraced across the organization. In fact, 80% of executives across functions whose organizations were scaling intelligent automation expected their organization to outperform the competition in revenue growth by 2023.¹⁴

By overcoming misalignments, CSCOs can extend the end-to-end connectivity among contributing supply chain players. The use of digital twins can virtualize models to simulate and analyze digital automation as applied to the concrete world. (A digital twin is the virtual representation of a physical object or system across its lifecycle, using real-time data and other sources to enable learning and reasoning, while dynamically recalibrating for improved decision-making.) Data-led innovation can also support segmentation and localization strategies. Many CSCOs are integrating segmentation principles into their supply chain modeling parameters so that they can automate the decision-making used in designing their supply chains. They are building the rules into algorithms.

With extreme automation, the human workforce may be put under new pressure—with algorithms taking on repetitive tasks at the same time that employees are fragmented into remote work environments. To optimize the human-machine partnership across supply chain activities, leading CSCOs are prioritizing the reskilling of workforce talent to perform higher-value tasks, such as analytics and workflow monitoring. The goal, when humans and machines are working in tandem, is to elevate the value created by all.

Digital acceleration is the new mantra

"Digital acceleration is the new mantra. Continuous balancing. We need to maintain a laser focus on data-based decision-making. Improving the digital view of the supply chain—digital twins of everything. Improving algorithms. Improving the organization fluidity as well."

Dr. Dirk Holbach, Corporate Senior Vice President and Chief Supply Chain Officer, Henkel

Playbook essential #5: Model risk in new ways

"CSCOs need to have one foot in the present and the other firmly planted in the future to manage the present and shape the future," one CSCO told us. That applies perhaps most dramatically to supply chain risk analysis and mitigation. The pandemic illuminated how flexibility and adaptability in supply chains need to support resiliency and risk management, facilitating the development and expansion of real-time demand data and supply signals. A recent IBV benchmarking study revealed that 71% of organizations shared supply and demand data in real time to a significant extent.¹⁵

These more acute risk realities are pushing CSCOs and supply chain operations beyond traditional planning methodologies. Operating models are becoming both predictive and proactive to anticipate issues and prepare for unpredictable ones.

Some organizations are bifurcating their supply chains into 2 modes running on 2 different philosophies. The first follows a predictive approach, exploiting efficiencies by using advanced analytics, data modeling, and automation to drive reliability and deliver a frictionless experience. The other mode is more proactive, addressing high variability and unexpected disruption while embracing exponential technologies (AI, edge computing, intelligent workflows, and even quantum) to use immediate data across the entire supply chain, including tier 2, 3, and 4 suppliers. These dual capabilities help an enterprise to be "always-on," providing continuity in dynamic markets, CSCOs say, while also allowing them to maintain focus on the future.

Another strategic modality CSCOs are deploying is moving from cost competitiveness to risk competitiveness. The emphasis here is on diversified sourcing models, including localization and near-shoring of production to build risk resilience.

Other CSCOs are leaning into segmentation models to control risk. Parsing the supply chain by segment allows an emphasis on tighter collaboration with suppliers boasting differentiated skills and capabilities. These modeling systems can offer segmentation based on volatility, value, frequencies of supply, and lot size horizons.

An additional risk model to note: one built around country-specific policies. The pandemic halted production in some locales that, until then, were fueling global supplies. In response, almost every country now is seeking to source some portion of supplies within their own borders. Some government vendors explicitly require a certain amount of locally produced product. Industries, especially those that are very much government connected, need to evaluate the risk and cost equation of various government policies on their supply networks.

Given these new risk requirements and tools, it's no surprise that 50% of organizational leaders cite "technology-infused workflows" as one of the most important areas of competitive advantage for the next 3 years, according to a 2021 IBV survey. 16 These tech and data advances can provide real-time insights and automated decision-making while helping to lower risk profiles. They also allow the human workforce to focus on high-value, high-volatility situations and conditions that deserve special attention.

We have learned a great new lesson

"The complexities of digitization, supply chain requirements, supply chain disruptions, ecosystems, recycling technologies, and the like... It is literally impossible to have somebody to connect all the dots. That's where talent and diversity come in. If you don't have a diverse workforce, it's impossible to manage that level of complexity. We have learned a great new lesson. We must rethink and redesign the organization and its supply chains of the future."

Jeroen Diderich, Vice President and General Manager, Label and Graphic Materials, Avery Dennison Corp.

Action guide Forging the future of supply chains

"What's the next generation of supply chain?" posed one global CSCO in our Think Circle. "We need to have tight collaboration, tighter technology partnerships with strategic partners sharing data—trusted and secure data—and we need to drive the integration that historically only came from ownership. Digital transformation in all areas of the business is a must—data analytics, decision-making based upon data."

Supply chains used to be measured by perfection. The IBV anticipates that going forward, great ones will be measured by their resilience and agility as they adapt and overcome. They should be defined by world-class, available-everywhere talent that is focused on an exceptional customer experience. They can be powered by new technologies and data that capture market share through end-to-end visibility, which can be accessed from the factory floor, a delivery truck, or an AI-enabled control tower. They should operate with sustainability, driving down costs and uncovering new opportunities. And all these elements can come together to create more adaptable and effective risk structures.

The massive explosion of data sources and micro-insights born from extreme digitization provides the opportunity to solve complex problems in all these areas. But with data and information being the raw materials of new, automated workflows, the value of that data is very dependent upon the transparency, trust, and security of the sources (enterprise internal, supply chain partner ecosystem, customer insights). These factors should be considered by the many CSCOs who are building AI-enabled platforms for shared visibility across their ecosystems.

Every CSCO should ask the following questions as they look to develop and operate a more optimized supply chain operation in 2022 and beyond:

Are we doing all we can to identify, empower, reskill, and upskill the best supply chain talent?

- Are we continually exploring new ways of working and virtualized collaboration?
- Are we updating our recruitment, compensation, and career-tracking approaches to match the shifting talent marketplace?
- Are we empowering wider labor pools through ecosystems and focusing our people assets on higher-value tasks?

Are we focusing on and anticipating evolving customer needs?

- Are we looking at every instance of feedback as an opportunity for improvement?
- Are we exploring radically personalized customer experiences and providing near-instant insights at every customer touchpoint?
- Are we mapping customer decision journeys, providing a consistent customer experience across channels, and designing workflows with attention to customer "moments that matter"?

Action guide continued

Have we made sustainability one of our most important business priorities?

- Are we operationalizing a full set of environmental, social, and economic initiatives and measurements?
- Are we approaching sustainability as serial innovators, linking environmental and social issues with business solutions?
- Are we partnering with CIOs to apply digital technologies to the challenges and opportunities of sustainability?

Are we consistently investing in the near-term and long-term potential of automation?

- Are we providing robust AI and automation capabilities to speed insights and decision-making and empower our human talent?
- Are we extending end-to-end connectivity among contributing supply chain players?
- Are we integrating segmentation principles into supply chain modeling parameters, building the rules into algorithms?

Are we exploring new risk models to amplify resiliency?

- Are we experimenting beyond traditional modeling methodologies?
- Are we focusing on both predictive and proactive approaches to better anticipate the likely scenarios and prepare for unpredictable ones?
- Are we implementing technology-infused workflows to better provide real-time insights, automated decisionmaking, and reduced risk profiles?

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The Magic of Extended Intelligent Workflows

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