



HOW GREATER  
INTELLIGENCE COULD

# supercharge supply chains

Augmented resilience, performance, and sustainability  
will allow organizations to take a customer-centric focus

#GetTheFutureYouWant

Capgemini   
RESEARCH INSTITUTE

# Introduction

The supply chain is no longer an afterthought in business meetings. Supply-chain leaders are now significant figures in their respective industries and are at the heart of ongoing transformation efforts.

Traditionally, supply-chain trade-offs have been driven by two recognized but nevertheless fast-evolving forces: a more connected, personalized, and real-time customer experience; and a global value chain that continuously optimizes the manufacturing and production costs of goods and services.

Resilience and sustainability are topics that must also be considered carefully in any modern business plan. Sustainability is a priority for all stakeholders, who are putting pressure on organizations to reduce CO<sub>2</sub> emissions and improve labor practices all along the supply chain. Resilience is essential for organizations to overcome the external, global black

swan events – such as the COVID-19 pandemic, the war in Ukraine, the recent blockage of the Suez Canal, and rising energy shortages – which are becoming more frequent and severe, impacting both top and bottom lines. Imperatives arising from consumer preferences and a societal push for localization are also exacerbating these issues.

Over half (54%) of organizations acknowledge that their supply chains have altered significantly in the past two years. However, while 51% of organizations have already deployed an omnichannel

**54%**

of companies acknowledge that their supply chain has changed significantly in the last two years.

# Introduction

strategy, only 27% are implementing end-to-end supply-chain transformation that will integrate front and back offices.

Our research found that 45% of companies absorb a significant portion of the cost increase due to resilience, sustainability, and customer-centricity efforts, while remaining unaware of their true end-to-end baseline. Also, 35% find it difficult to balance objectives that may be ideologically complementary but often compete for resource, particularly in a period of high inflation. In this context, while supply chains have changed a lot under the pressure of events, the foundations from which to move forward are not yet in place. Organizations have an opportunity to build intelligent supply chains that are more efficient, resilient, and sustainable, allowing for a focused customer-centricity.

In August 2022, we conducted an online survey of 1,000 organizations across the consumer products, retail, manufacturing, and life sciences sectors. We also conducted in-depth interviews with organizational leaders. In this research, we aim to answer the following key questions:

- What is the new supply-chain paradigm?
- Are organizations equipped to become part of an intelligent supply chain?
- Is the move to an intelligent supply chain a holistic and stepwise transformation?
- What can be learned from the best-in-class intelligent supply chains?
- How can organizations overcome key challenges on the road to transformation?



# Executive Summary

One of the cumulative effects of the crises of the past three years has been to redefine supply-chain priorities. Operational efficiency/cost reduction, resilience, and agility to support new business models are the top three priorities, followed (at some distance) by customer experience and sustainability.

While this seems like a significant burden on organizations, in practice and to put things in perspective, all these priorities interact with and complement each other; moreover, progress in this direction will see several benefits down the line:

- Getting supply chains in shape now will optimize resource consumption – particularly important in a period of high inflation – as well as enhance resilience, while significantly improving both sustainability and the customer experience.

- The smart and sustainable products to be launched in the next few years will progressively reshape the whole value chain, from sourcing through design, production, and recycling, transforming the customer experience in parallel.
- Greater resilience and sustainability will also drastically enhance brand reputation with all stakeholders, facilitating access to different sources of funding; improving working conditions; such qualities will give ethical credibility and a sense of purpose to organizations – significant weapons in the ongoing war for talent.

The main market trends to be addressed consistently are the following ones:

**Customer experience** : Online purchasing, faster order fulfilment, hyper-personalization

**Globalization and resilience** : Secured market access (suppliers and customers), relocation, product platforming (hardware and software)

**Sustainability** : CO<sub>2</sub> reduction, sustainable design /sourcing, supplier diversity

# Executive Summary

Fewer than 20% of organizations currently consider themselves to be equipped to handle those different challenges with consistent success.

Industrial organizations are fully aware that moving toward a digital intelligent supply-chain model will require an holistic and stepwise transformation from supply-chain design and systemic-risk management, through forecasting and planning to execution and control as well as governance.

Achieving this will entail constructing composable IS/IT architecture that combines a transactional backbone; best-of-breed solutions by industry; and data-sharing and collaborative platforms to break siloes and provide end-to-end visibility and traceability. In addition to technology, governance, capabilities, extended ecosystems, and collaboration will be key to progress, as well as a viable economic model.

Over the next three years, organizations plan to increase their supply-chain transformation investments by 17% on average, and expect to double their business outcomes in terms of growth, profitability, and sustainability.

A small group of companies – about 10% of the sample – have already laid the foundations, consolidated their investments, and begun to realize at least 20% higher benefits. Organizations could learn from the best practices of these front-runners.

## 20%

of organizations consider they are equipped in handling supply chain challenges consistently.



# 01

ORGANIZATIONS ARE  
STRUGGLING TO EMBRACE THE  
NEW SUPPLY-CHAIN PARADIGM



## The crises of the last three years have produced a new paradigm and set of priorities for the supply chain

Supply-chain trade-offs are no longer driven purely by the traditional forces of customer experience and the global value chain. Organizations must now consider two new forces: resilience and sustainability. In our survey, 45% of organizations state that their supply-chain cost base has increased over the past three years to accommodate the push to improve resilience, sustainability, and customer-centricity. However, these businesses do not feel in control of their end-to-end baselines.

**Fig.1**

Efficiency and continuous cost optimization, resilience, and agility are the highest supply-chain priorities among organizations



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022, and Supply Chain Survey, August–September 2020; N=1,000 organizations for each.

Note: Survey respondents were asked to rank the top five priorities of their organization's supply chain, from 11 options.



## CONSUMER PRODUCTS

- The top two supply chain priorities of the consumer products organizations are efficiency and cost optimization and agility to support new business models.
- Unilever's eCommerce sales in India saw double-digit growth in 2021. Through direct-to-consumer platforms, Unilever is expanding its digital footprint. In 2021, Lakme, the most-followed Indian beauty brand on Instagram, earned 30% of its revenue through digital channels.



## RETAIL

- The top two priorities of the retailers are localization/regionalization (which includes the agility to adapt to severe disruption resulting from events such as, geopolitical crises) and resilience (including diversification, contingency planning, etc.).
- Walmart has introduced automation to its existing facilities, improving the efficiency of transportation of products from distribution centers to outlets facilitating freight-handling at its regional distribution centers.



## MANUFACTURING

- The top two priorities of the manufacturing supply chain are localization/regionalization and resilience.
- Tesla has a dedicated responsible-sourcing program for three priority minerals in its battery supply chain, allowing it to engage directly with local suppliers, rather than relying on midstream companies. In addition, Tesla builds its own cells in its "gigafactories" and recently launched its 4680 battery in collaboration with Panasonic.



## LIFE SCIENCES

- The top two priorities of the life sciences supply chain are supporting new business models and localization/regionalization.
- Pfizer operates one of the most sophisticated supply chains in the industry, with over 40 owned sites and 200 suppliers globally, providing capacity as required. It successfully manufactured more than 3 billion doses of the Pfizer/BioNTech Covid-19 vaccine in 2021 and expects to manufacture 4 billion doses in 2022.

Source: Unilever Annual Report 2021; Walmart Group, "Chain Reaction: We're Partnering with Symbotic to Bring High-Tech Automation to Our Supply Chain," July 2021; Tesla Group, Impact report 2021; Pfizer Group, "Expanding COVID-19 Manufacturing Efforts to Increase Global Vaccine Access," 2021.



Thirty-five percent of organizations find balancing these (often conflicting) objectives difficult and only one in six considers itself well-equipped to handle this new paradigm in practice. Below, we unpack the trends making an impact on supply chains and make our own assessment of how well-equipped organizations are to manage them.

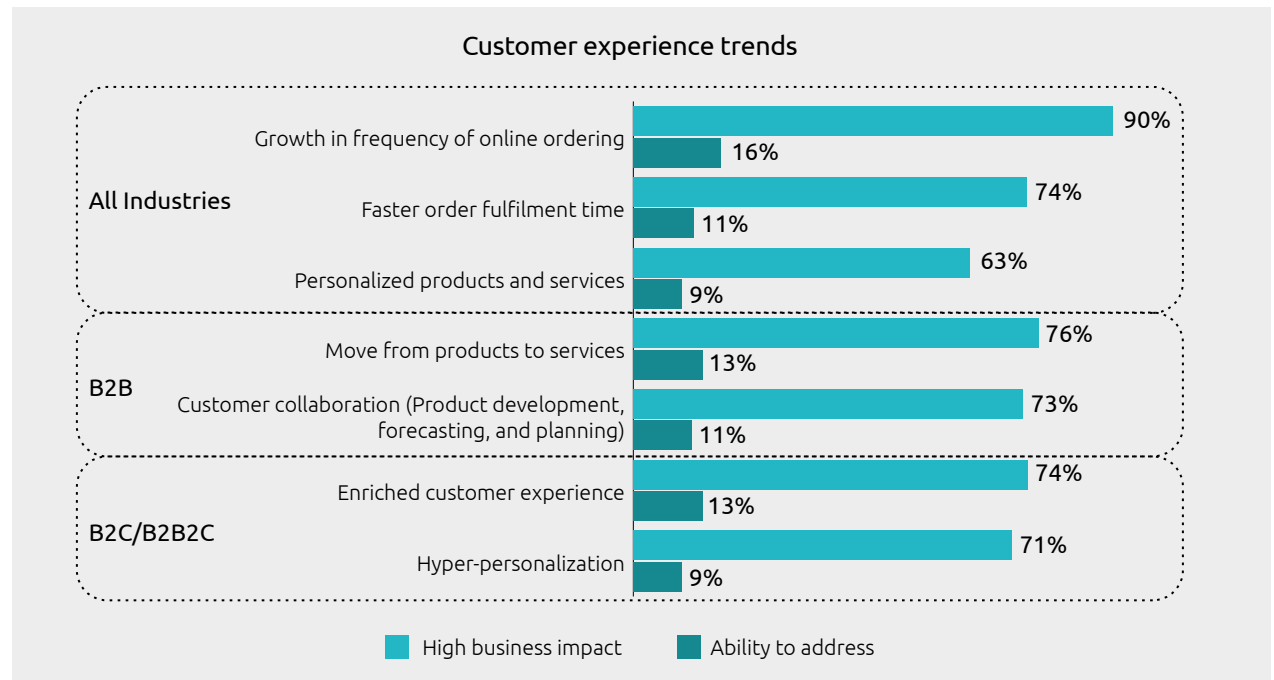
### Five in six organizations feel ill-equipped to accommodate the new supply-chain paradigm

Organizations are poorly prepared to offer a more connected, hyper-personalized real-time customer experience

Overall, 90 percent of organizations say growth in the volume of online purchases will impact them, but only 16 percent are well equipped to handle this (see Figure 2). Two related factors – shorter order-fulfillment times and more personalized products and services – are also impacting the supply chain. Seventy-four percent of organizations agree that shortening order fulfillment times will impact them but only

Fig.2

Customer experience trends across regions, and by industry.



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

11 percent are well equipped to do so. At the same time, 63 percent of organizations agree that personalized products and services will impact them but only 9 percent are well equipped to handle this.

Additional trends that business-to-business (B2B) organizations cited as likely to impact them but for which they are not prepared include:

- The pivot from products to services (76 percent versus 13 percent)
- Collaboration with customers to improve product development, forecasting, and planning (73 percent versus 11 percent)
- Supply chain for mass product personalization (73% versus 12%)

New digital services will drive servitization and value creation, while impacting the supply chain in the following areas: development of digital apps to monitor personal goals;

connected products and remote services; use of digital apps and handheld devices to collect usage data.

### Globalization and resilience: Distributed supply chain is the next frontier

Over the past three years, the COVID-19 crisis has drastically exacerbated supply-chain fragility: three-quarters of organizations globally have been impacted by the closing down of facilities, supply disruptions, employee absences, and the imperative for remote work, while less than 20 percent are well equipped to handle these changes. As many as 92 percent of organizations say the **ongoing relocation of the global supply chain** will impact them, but only 15 percent are well equipped to handle it (see Figure 3). Apart from under-capacity and mono-sourcing, de-risking is also an issue that 69 percent of organizations said will impact them but for which only 11 percent are prepared.

Fig.3

Organizations are not equipped to address globalization trends



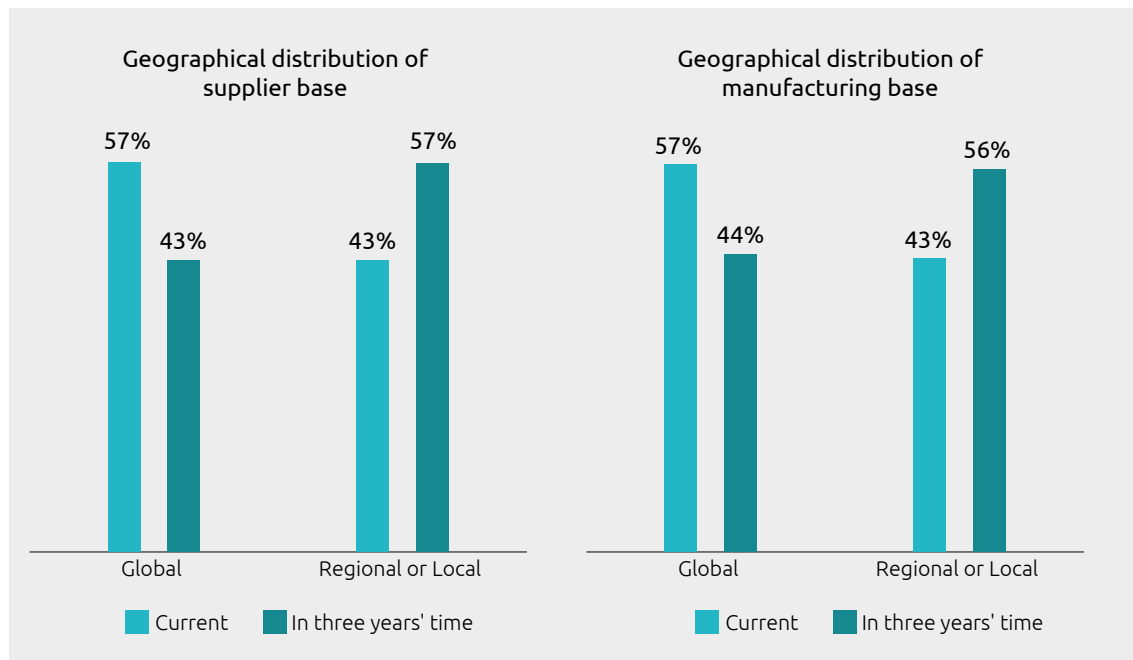
Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

**Organizations are shifting their supply chains to use more local suppliers and manufacturers.**



**Fig.4**

25% of global trade will relocate in the next three years



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

Organizations are pivoting their supply chains towards more local regional and suppliers and manufacturers: between 2022 and 2025 the share of regional or local suppliers is set to increase from 43 percent to 57 percent and manufacturers from 43 percent to 56 percent. Houssam Hage, Senior VP of Supply Chain, Stellantis, adds: *“Strategic sourcing may be considered as local, to ensure there is no dependence on any war-constrained countries or vulnerability to supply-chain disruptions, such as the recent blockage of the Suez Canal.”*





**90%**

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of organizations say growth in the volume of online purchase will impact them



## Resilience: A multi-dimensional and long-term investment

Resilience will impact operating models and improve proximity, reducing carbon footprints and non-cost competitiveness metrics such as quality levels and delays.

Overall, 94% of organizations say securing market access to withstand more frequent or severe disruptions will impact them but only 11% are well-equipped to handle this (Figure 5). While balancing 'just-in-time' and 'just-in-case' supply strategies was cited as a key area of impact, only 6% are well-equipped to do so.

## Transition to a sustainable supply chain is not obstacle-free

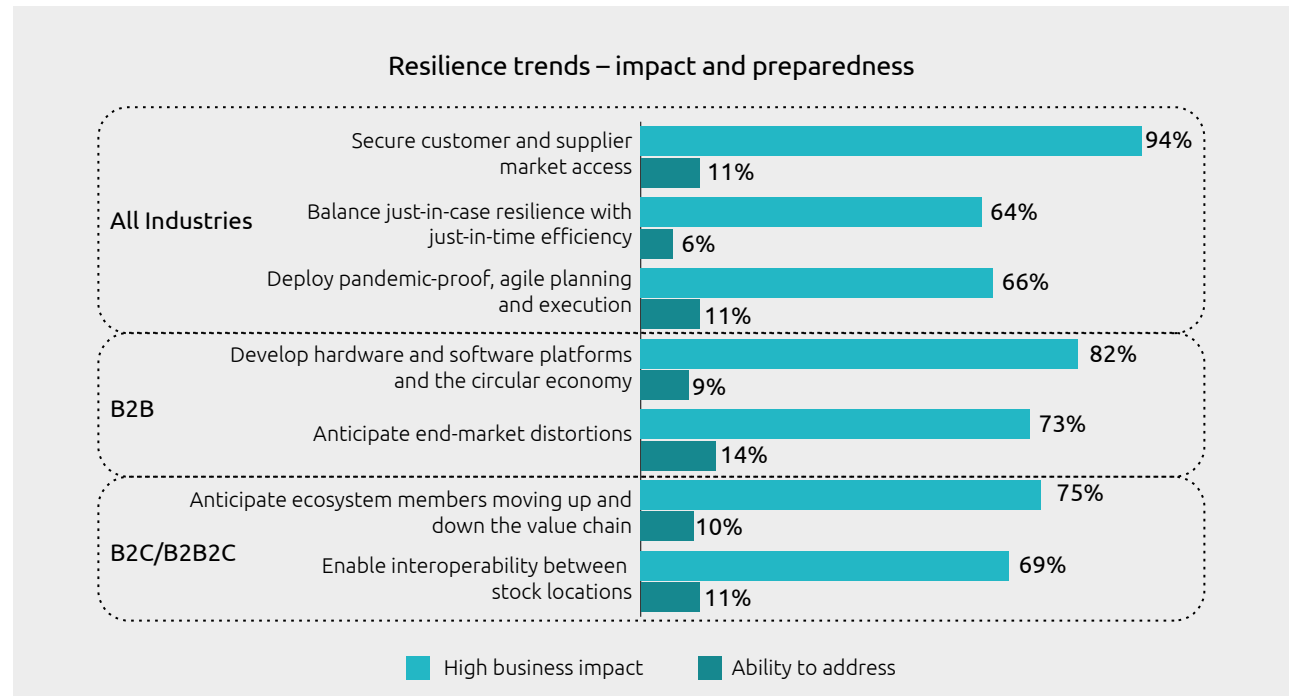
Organizations are implementing multiple sustainability initiatives, including carbon-footprint mapping and reduction, sustainable design, and sustainability metrics. Over

time, sustainability will reshape entire business models, from design through operations to product manufacturing and service delivery. This will require significant effort and investment.

Ninety-five percent of organizations say the **push to reduce CO<sub>2</sub> emissions across all tiers of the supply chain** will impact them, but only 13% are well equipped to accommodate this. The move from a linear to a circular supply chain is also a key area of impact for 68% of organizations, but only 10% are ready to implement it. Among B2B organizations, critical areas of impact include sustainable product development and end-to-end transparency and visibility; however, very few can manage this. Two other significantly affected areas are sustainable product development (77% affected versus 18% prepared) and end-of-life product management (72% versus 13%).

Fig.5

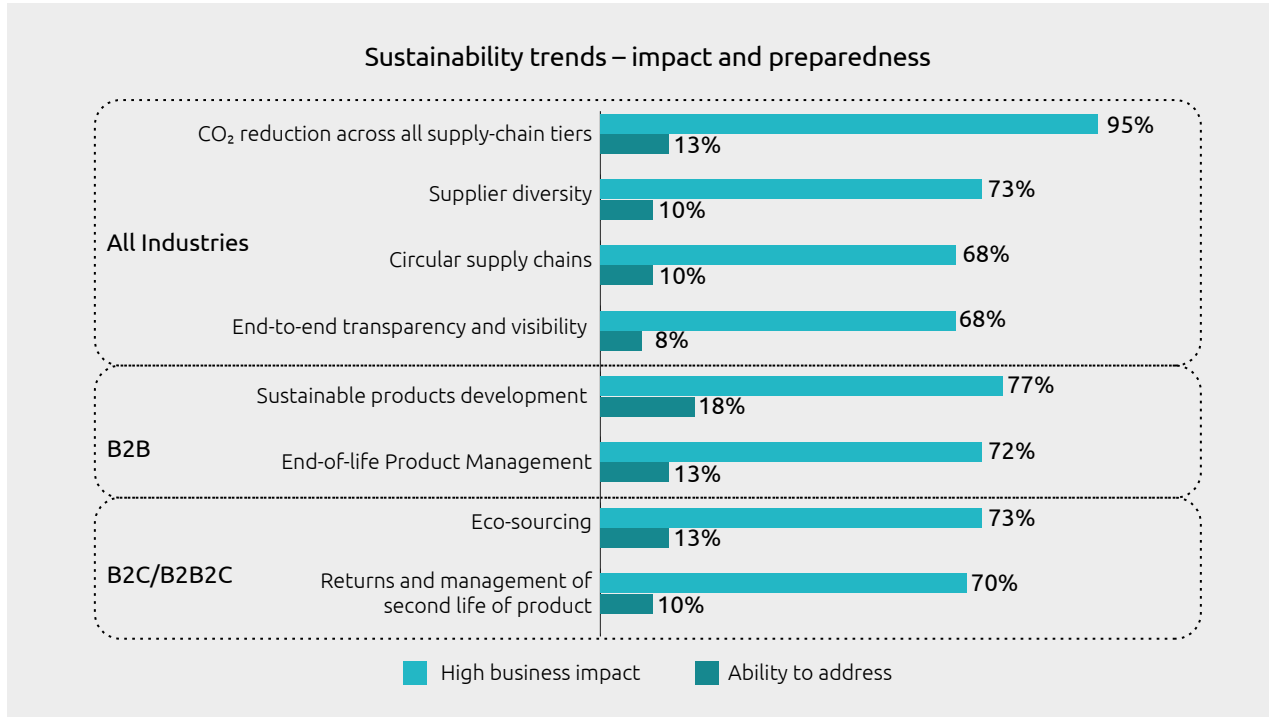
Organizations are poorly equipped to handle the impact of resilience on the global supply chain



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

Fig.6

The transition to sustainable supply chain will be a long journey



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

*“Strategic sourcing should be local to ensure there is no dependence on any war-constrained country or vulnerability to supply-chain disruptions, such as the recent blockage of the Suez Canal”*

**Houssam Hage**  
Senior VP of Supply Chain,  
Stellantis



## MAKING SUPPLY CHAINS THE FOCUS OF GREEN INITIATIVES

Organizations are committing to greater sustainability of products and services as a central strategic imperative. However, such ambitions cannot be achieved without a strong focus on supply-chain sustainability, as supply chains account for over 90 percent of organizations' GHG emissions.

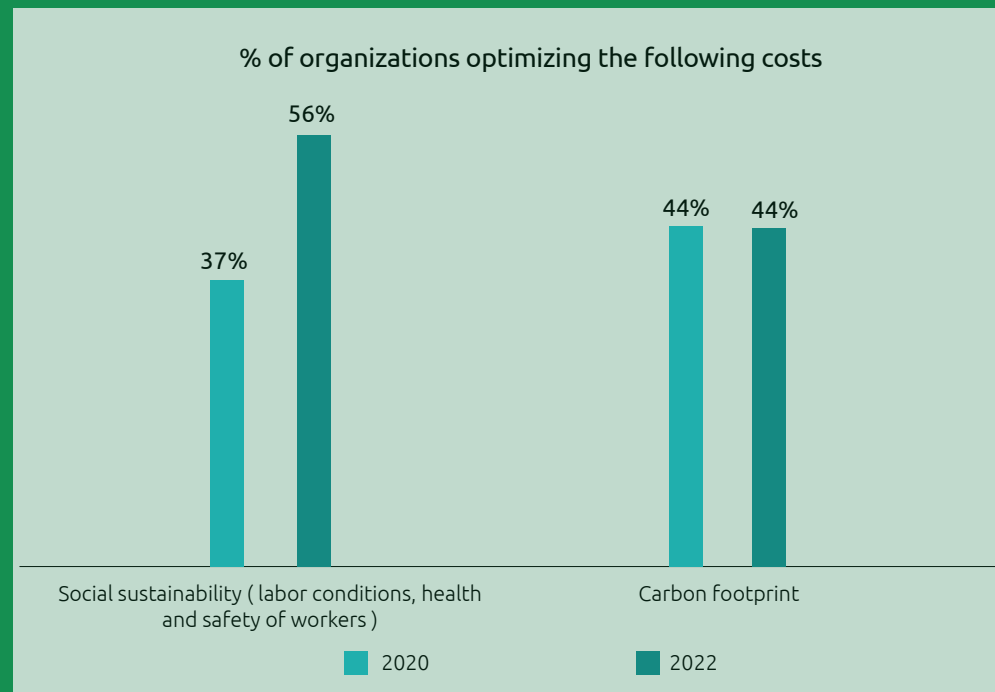
Historically, organizations have placed greatest emphasis (38 percent) on scope-1 emissions, which are from sources that the organization owns or controls directly. Less attention (22 percent) is given to scope-2 emissions (which are indirect, such as those created in generating electricity used by the organization) and scope-3 emissions (27 percent). Emphasis on scope-1 emissions

is driven by the organizational goal of carbon neutrality.<sup>2</sup> However, much of the supply chain's carbon footprint is generated under scopes 2 and 3, especially within manufacturing organizations. Moreover, most organizations lack reliable scope-3 emissions data.

Most scope-3 emissions arise from activities related to customers and the supply chain. Working with a wide range of suppliers and contractors makes it difficult to identify the discrete impact of the carbon footprint of each of these, but this task can be made easier through collaboration between supply-chain members.

**Fig.7**

More organizations are optimizing social sustainability costs in 2022 than in 2020



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022, and Supply Chain Survey, August–September 2020, N=1,000 organizations each.



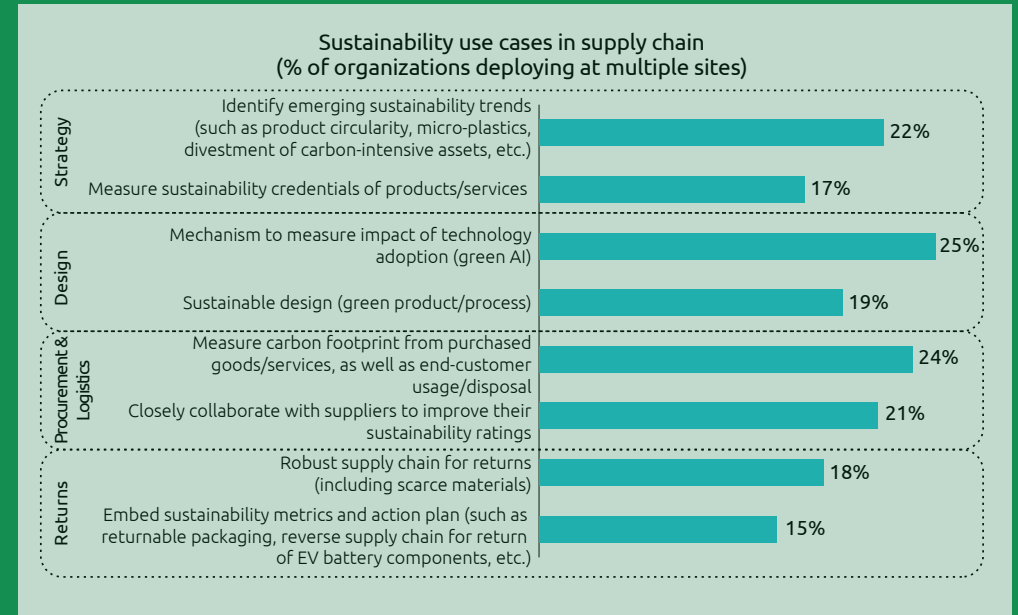
## Only one in four organizations is scaling sustainability supply-chain initiatives

In our research, we found that organizations are learning to optimize sustainability-related costs in their cost structure. While 56 percent of organizations were able to optimize costs on social sustainability in 2022 compared to 37% in 2020, this figure has remained the same, at 44 percent, for carbon footprints.

One in four organizations has started scaling sustainability initiatives in their supply chains, most commonly in procurement and logistics. However, the most implemented use case of measuring the carbon footprint of purchased goods/services as well as customer usage is at only 24 percent. Similarly, only 18 percent of organizations have implemented a robust supply chain for returns, and just 15 percent have embedded sustainability metrics and action plans for returnable packaging and reverse supply chains.

Fig.8

Fewer than one in four organizations is deploying sustainability use cases at scale



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022, and Supply Chain Survey, August–September 2020, N=1,000 organizations each.<sup>1</sup> CDP. Transparency to transformation: A chain reaction. 2020 Global Supply Chain Report, February 2021. 2. Capgemini Research Institute, Sustainability in Manufacturing Operations, Business executives survey, February–March 2021, N=480 businesses.

### In the past two years, organizations have focused on survival, neglecting cost reduction

Supply-chain complexity has increased in recent years. An end-to-end supply chain can involve thousands of suppliers, while customers demand more tailored, sustainable products and more efficient order fulfillment. Disruptions of the kind the business world has seen in recent times can affect the most robust systems.

# 45%

of organizations are absorbing a significant portion of increased supply-chain costs

In the past two days, owing to volatility in labor and commodity markets, cost-optimization has come under pressure. The number of organizations optimizing raw-material costs has declined drastically in this time, from 61 percent in 2020 to 38 percent in 2022. Transportation and labor costs have spiraled out of control. A new focus on social sustainability is evident, as more organizations (56 percent) are optimizing these costs compared with those in 2020 (37 percent).

Furthermore, we found that, while failing to get to grips with their end-to-end baselines, 45 percent of organizations are absorbing a significant portion of increased supply-chain costs due to resilience and sustainability, with manufacturing (48 percent) suffering most in this respect, while life sciences (35 percent) organizations fare best.

### Supply-chain changes happen slowly

Organizations understand that emerging trends and drivers could have a long-lasting, transformative impact on supply chains, which, for 68 percent of them, are

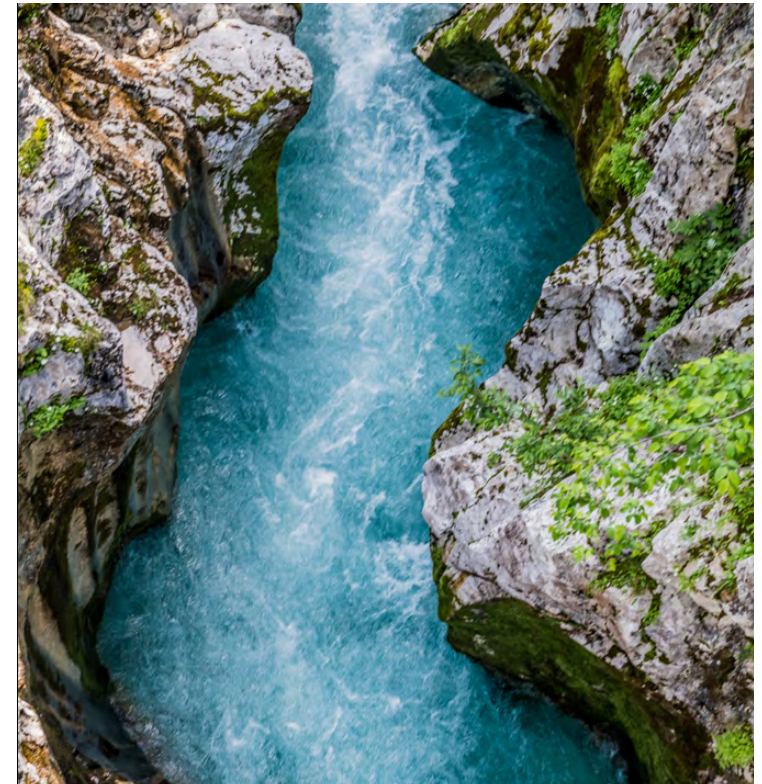
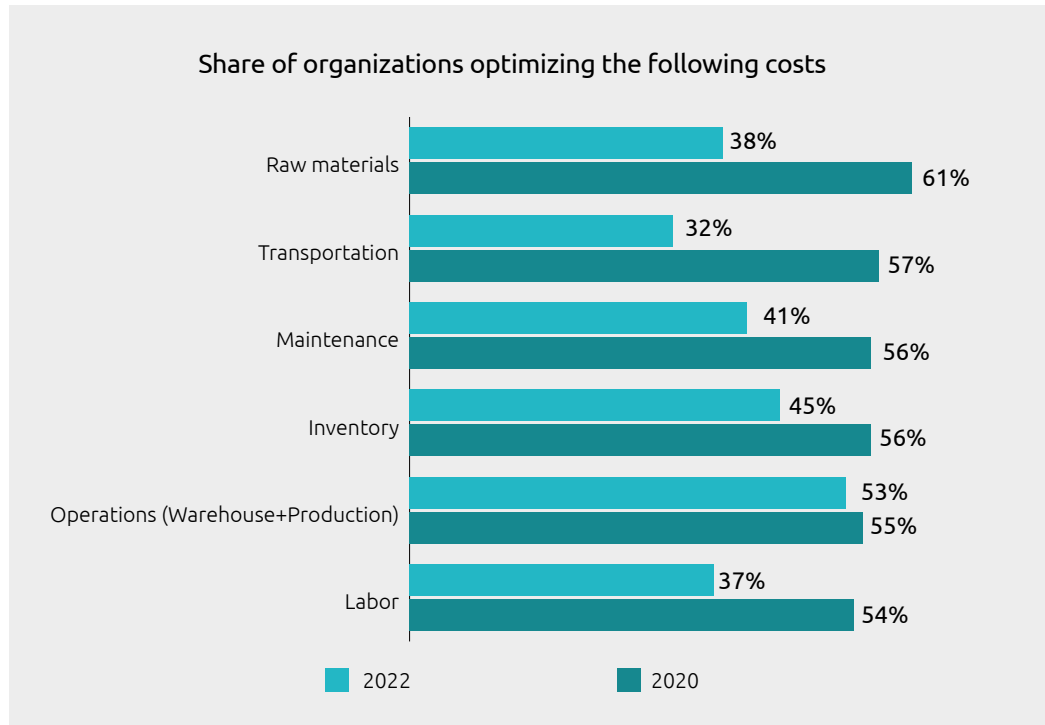




Fig.9

Cost-optimization has fallen away in recent times



Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022, and Supply Chain Survey, August–September 2020, N=1,000 organizations each.

*“We have to increase the amount of data that we provide to our suppliers, as well as the data our suppliers provide to us, including long-term forecasting, production data, scheduling, stocktaking, etc. Currently, we have some information from suppliers, but we are not aware of what is behind that supplier. We need to share the problem and find the solution together.”*

**Federico Baiocco**  
Head of Supply Chain, Iveco

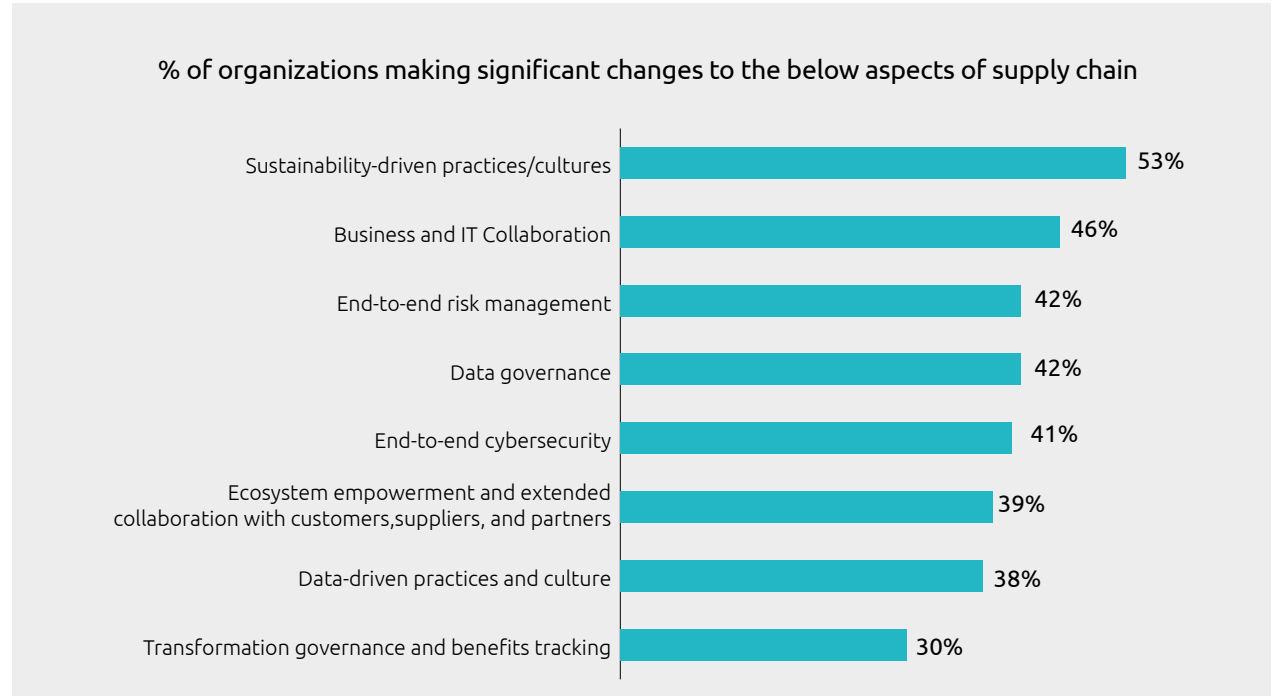


a key priority. Yet the pace of change is slow due to the multiple challenges faced by organizations. Only around half (54 percent) stated that their supply chains have changed significantly over the past few years. Even fewer (27 percent) are implementing comprehensive supply-chain transformation programs. Less than 40 percent of organizations have adapted their IT infrastructures, adopted a data-driven culture, and established collaboration systems for suppliers, customers, and other partners (Figure 10).

Organizations have reported lower maturity in several different aspects of their supply chains than in the previous survey, due to shifting priorities during COVID-19. In 2020, for example, 54 percent of organizations reported having a mature IT infrastructure to support digitalization, compared with 31 percent currently. Data-sharing-culture and data-governance maturity fell from 64 percent and 54 percent to 41 percent and 35 percent, respectively. Some underlying reasons for this are greater localization and fragmentation of supply chains; ad-hoc

**Fig.10**

Foundations of intelligent supply-chain transformation are not yet in place



Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.



arrangements put in place in response to unpredictable availability of inventories; or simply a more realistic self-assessment by organizations, recognizing vulnerabilities in their supply chains. All of this has increased pressure for upskilling and reskilling employees in supply-chain management. Only 43 percent of organizations claim to possess a skilled workforce to deal with the changes, compared with 55 percent previously.

### Intelligent supply chain: A holistic and stepwise transformation

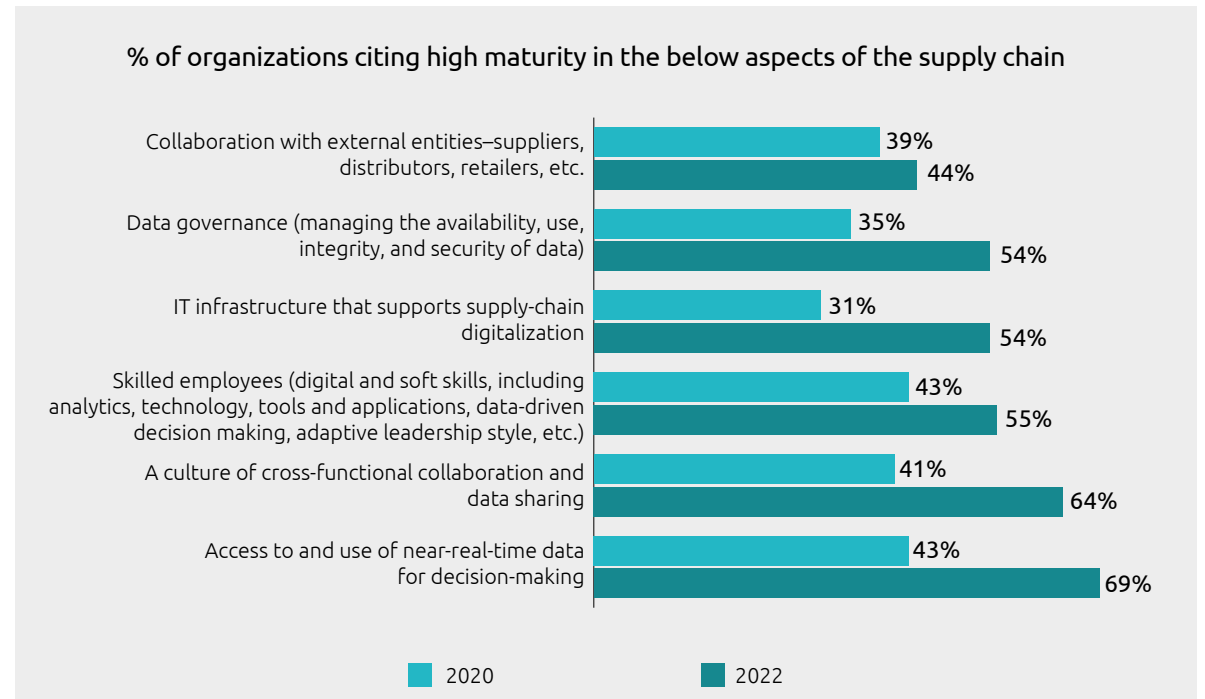
A successful intelligent supply-chain journey must consistently address new business and technological challenges, from supply-chain design and systemic-risk management, through forecasting and planning, to execution and control:

#### Intelligent network design and risk management:

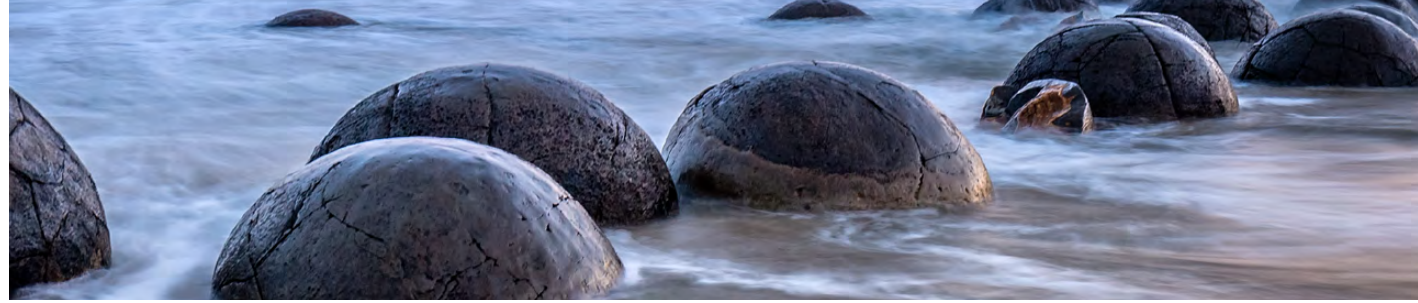
Segment end markets and channels, differentiate service offerings, and design and set up an intelligent supply chain network enabling the best “resilience-performance-sustainability” compromise, while monitoring systemic risks over time

**Fig.11**

Organizations are more realistic about their supply-chain maturity than previously



Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.



**Smart forecasting and integrated business planning:** Integrate end-customer data, sense the ecosystem, improve forecast accuracy and constantly ensure relevant and consistent planning across all tiers to better serve customers while improving company performance

**360° sourcing analysis and supplier collaboration:** Define and deploy “resilience-performance-sustainability” metrics to select suppliers and continuously fuel supplier collaboration and performance improvement

**Touchless and agile order to delivery:** Ensure a seamless, rewarding and efficient end-to-end omni-channel and personalized customer experience, including upcycling

**Supply chain as a service:** Leverage trusted partners to outsource while digitizing and automating supply chain processes and tasks to focus on higher levels of arbitration and innovation

**Supply chain control tower and end-to-end performance management:** Ensure end-to-end visibility, traceability, responsiveness and transparency for end-customers while deploying a consistent performance management system across all stakeholders

Composable IS/IT architecture combining a transactional backbone/enterprise resource planning (ERP), best-of-breed solutions by industry (notably in relation to execution),

54%

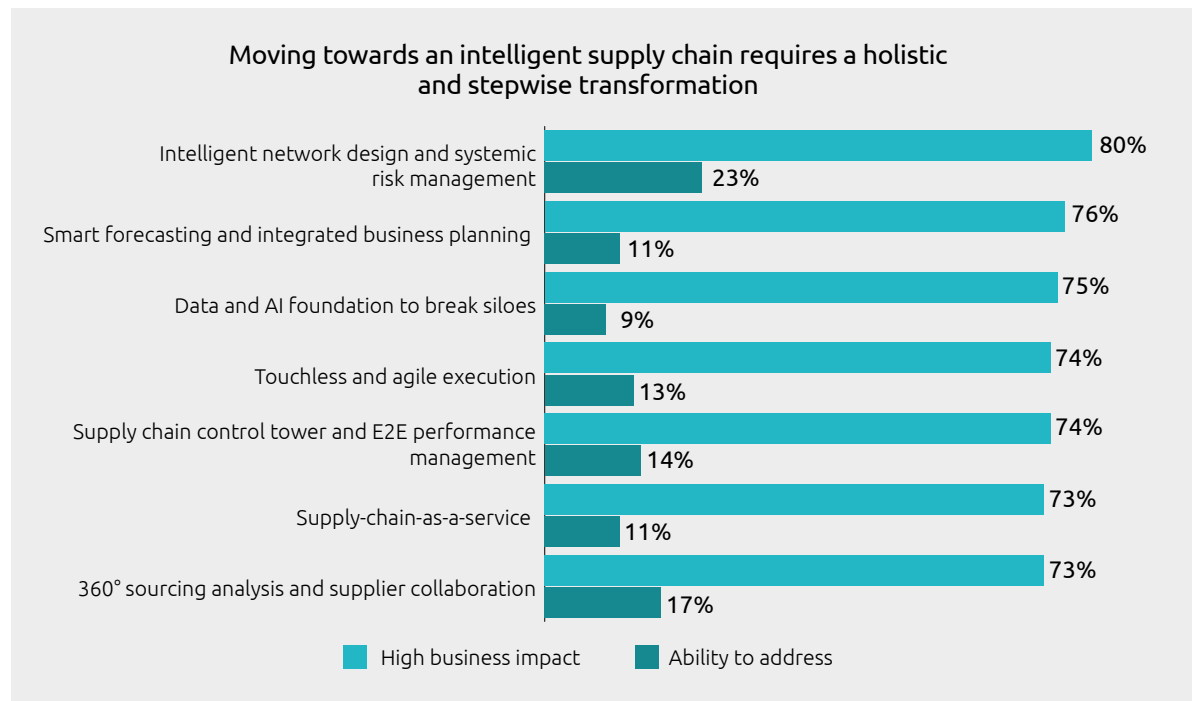
of organizations reported having a mature IT infrastructure to support digitalization

data-sharing and collaborative platforms to break siloes and provide end-to-end visibility and traceability will be required. Smart forecasting and integrated business planning are priorities for both original products (79%) and aftersales (73%).

The shift to an intelligent supply chain requires a holistic, stepwise transformation across multiple dimensions. Intelligent network design and systemic-risk management are essential to better balance the supplier network, considering the requirement for improved resilience and sustainability. Only 23% of organizations currently believe they have the ability to address this.

Fig.12

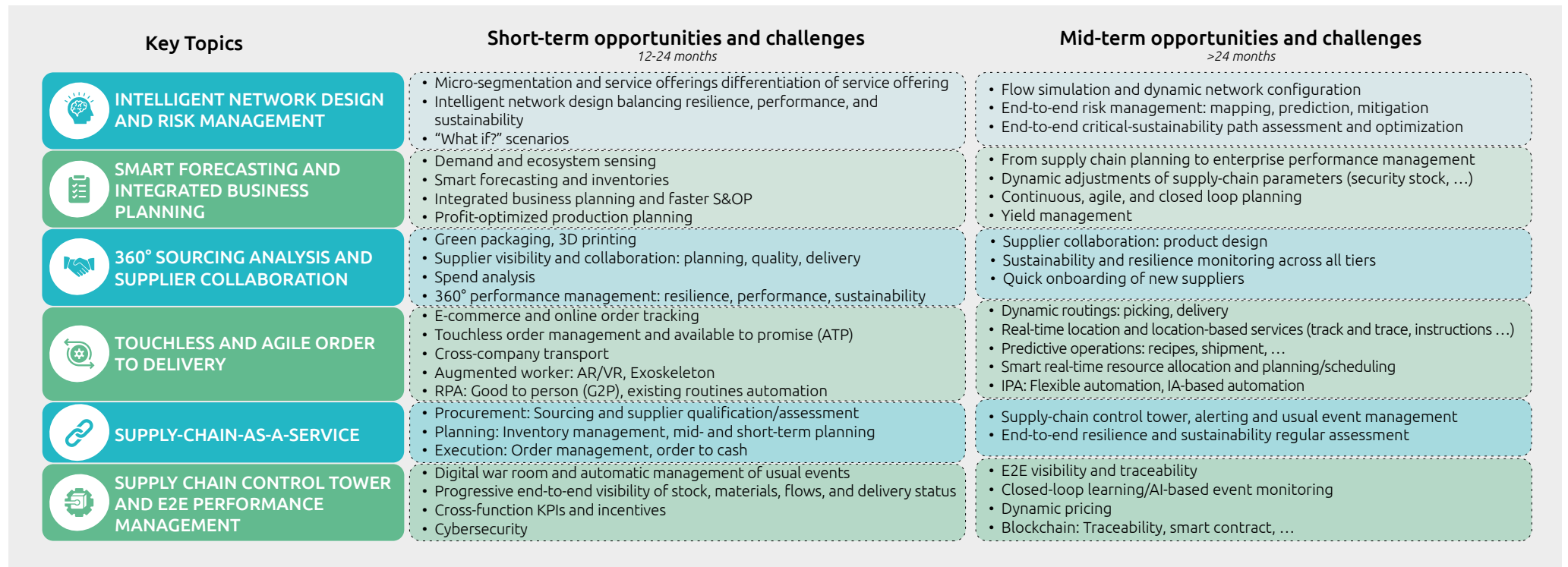
Moving towards an intelligent supply chain requires a holistic, stepwise transformation



Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

## Intelligent supply chain: A holistic and stepwise transformation

The path towards an intelligent supply chain entails addressing critical use-case-driven challenges while architecting the future:





## Only one-third of organizations have scaled intelligent supply-chain transformation initiatives

Two in three organizations are still in the initial stages of deployment or are yet to deploy supply-chain transformation initiatives. On average, organizations have scaled only 11 percent of relevant supply-chain initiatives across multiple sites. Supply-chain-as-a-service (39 percent), followed by 360-degree sourcing analysis and supplier collaboration (36 percent) and process automation (36 percent) are the most commonly deployed (single and multi-site deployment) use cases. Across sectors, the picture is consistent with this overall trend in terms of deployed use cases. When comparing across regions, we see EU and UK organizations having the greatest share of scaled deployments (38%), while the APAC region took the lowest share (30%). Some organizations are implementing multiple-process automation initiatives.

- The BMW Group's Mobile 3D laser scanners<sup>1</sup> create photorealistic

panoramic images, floor plans, and scatter plots for all vehicle plants. Production planning can integrate the virtual product into a virtual factory at an early stage, reducing planning effort and capital expenditure, and ensuring processes are more efficient and stable

- PepsiCo is working on workflow automation<sup>2</sup> for managing search-marketing strategies by creating a sales-intelligence platform. The platform combines retailer data with PepsiCo's supply-chain data to predict when items will go out of stock and prompt restocking to avert supply issues

## Around half of organizations must attain greater business and technical maturity

Among business capabilities, organizations rate sustainability monitoring and implementation (50 percent) and e-commerce and order-management systems (46 percent) as the areas in which they are most mature, while they see planning and ecosystem collaboration as

the least mature. Federico Baiocco, Head of Supply Chain at Iveco Group, emphasizes the importance of ecosystem collaboration: *"We have to further increase the amount of data that we provide to our suppliers, as well as the data our suppliers provide to us, including long-term forecasting, production data, scheduling, stocktaking, etc. Currently, we have some information from suppliers, but we are not aware of what is behind that supplier. We need to share the problem and find the solution together."*

- Unilever improved its partner experience through a new integrated supplier helpdesk,<sup>3</sup> with a single point of contact and faster query-resolution times
- BMW and Brilliance Auto Group's joint venture<sup>4</sup> has established a closed loop for the reuse of raw materials from the batteries used in electric vehicles (EVs); a battery-tracing system enables traceability of batteries throughout their life-cycles

17%

of organizations plan to increase their investments in the supply chain over the next three years

Looking at technical capabilities, organizations are most mature in data and artificial intelligence (AI) as well as execution systems (43+ percent). Organizations consider the metaverse, digital twins, and collaborative platforms to be the least mature areas. Unilever has set up a Virtual Ocean Control Tower,<sup>5</sup> which provides real-time data related to cargo location, estimated arrival, etc., helping the organization to minimize delays and increase cross-border efficiency

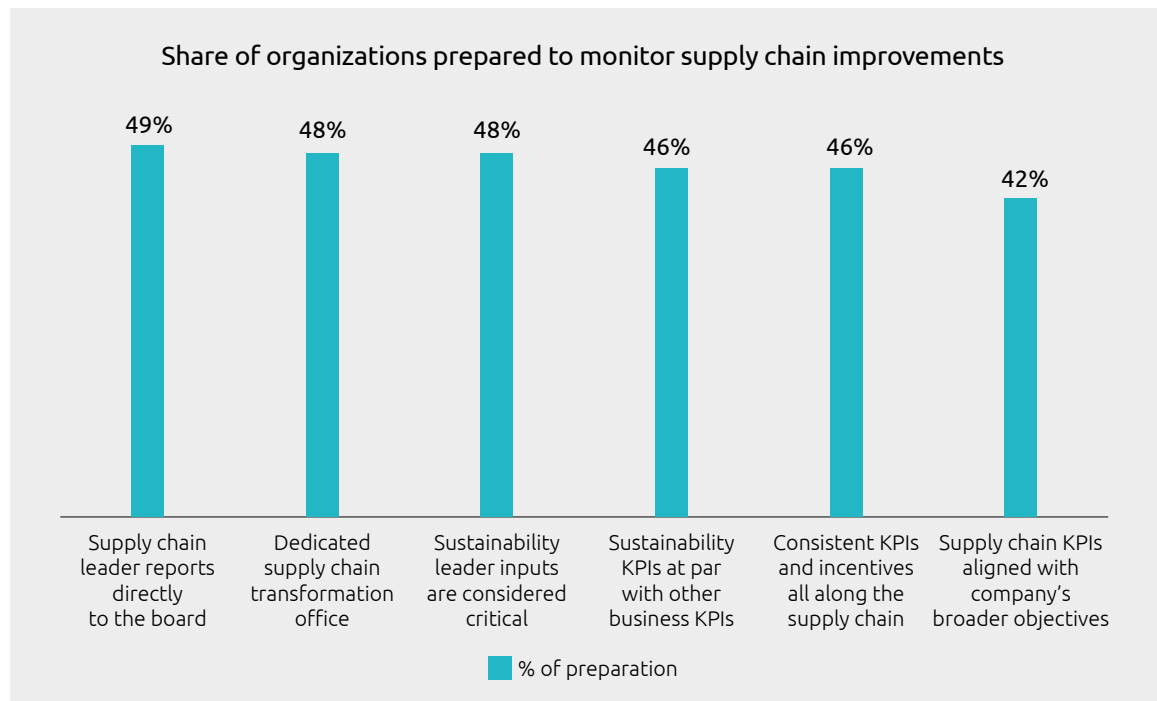
- Johnson & Johnson has harnessed machine learning (ML)<sup>6</sup> and the technologies that underlie it to create an engine that can accurately predict demand in real time

### Reinforcing governance and performance is mandatory to succeed

Organizations are not well prepared to monitor supply-chain improvements over time. Only 49% of organizations say their supply-chain leader reports directly to the board. Just 42% of the organizations claim that supply-chain key performance indicators (KPIs) are aligned with the company's broader objectives.

**Fig.13**

Less than half of companies are well prepared to monitor supply-chain improvements over time



Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.



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**Only one-third of organizations  
have scaled intelligent supply-  
chain transformation initiatives.**

### Empowering an extended ecosystem is a key success factor moving forward

Supply-chain excellence will also require an empowered, extended ecosystem if it is to translate into operational excellence. According to organizations, hyperscalers for harnessing the full power of data and cloud, contract manufacturers and insurance firms are the top contributors who help transform/improve the performance of their organization's supply chain.

Insurance and finance companies could mitigate supply chain losses and implement innovative financing solutions, while energy and utilities companies can secure business continuity.

**Fig.14**

Empower an extended ecosystem: top partners for operational excellence



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

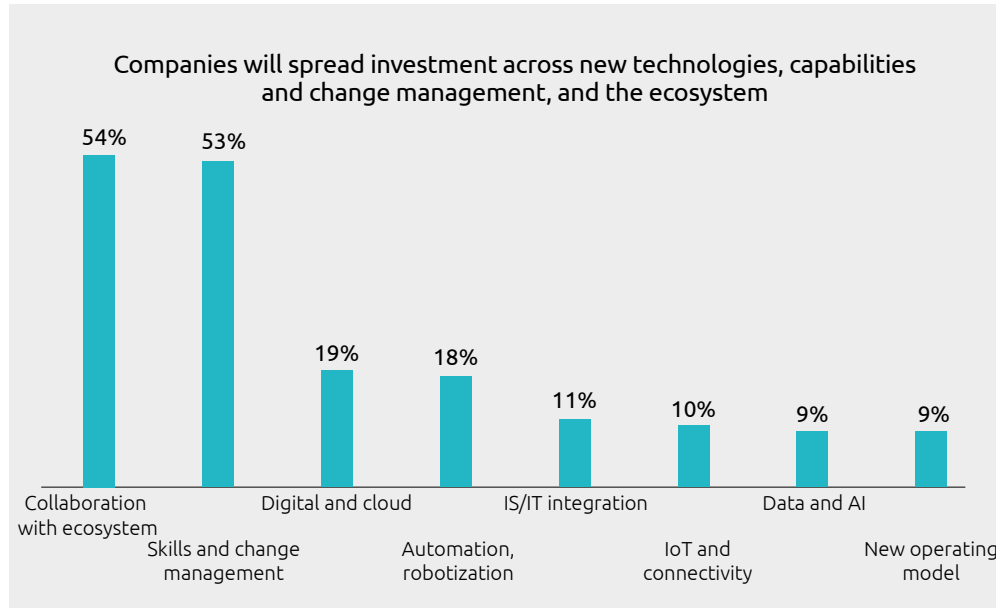
### Challenges around economic models and trajectory are sizing

The drive for sustainability can reshape the entire business model of an organization, while resilience will mainly impact its operating model. In both cases, the degree of effort and size of financial investments will be very important over time and should be proportionate to the scope and intended business impacts.

- Particularly in periods of high inflation, optimizing the cost of operations is mandatory to support sustainability and resilience transformations. Data-driven operations are the main lever for boosting performance, deploying a virtual model before undertaking physical development; remote work before in-situ; in-situ but augmented; and finally closed-feedback loop. It will significantly contribute to sustainability objectives by doing right the first time every time while optimizing key resources consumption.
- In addition, specific sustainable projects will optimize energy mix and consumption all along the supply chain as well as supplier sustainability

Fig.15

Top transformation investments areas



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

- At the same time, resilience improvement will usually increase proximity, reduce transport distance and CO<sub>2</sub> emissions.

Greater resilience and sustainability will also drastically enhance brand reputation with all stakeholders, facilitating access to different sources of funding and improving working conditions. Such qualities will give ethical credibility and a sense of purpose to organizations – significant weapons in the ongoing war for talent.

Cost and non-cost competitiveness, sustainability, and resilience will impact each other more profoundly as operational complexity deepens as well as the customer experience. Each individual benefit case must assess the impacts within those different specific dimensions. Designing the most effective economic model and trajectory for an industry or a company will be the key to future success. Such a comprehensive approach and model will require multi-disciplinary collaboration and extensive investment.

## Organizations will increase supply-chain investment to boost business outcomes

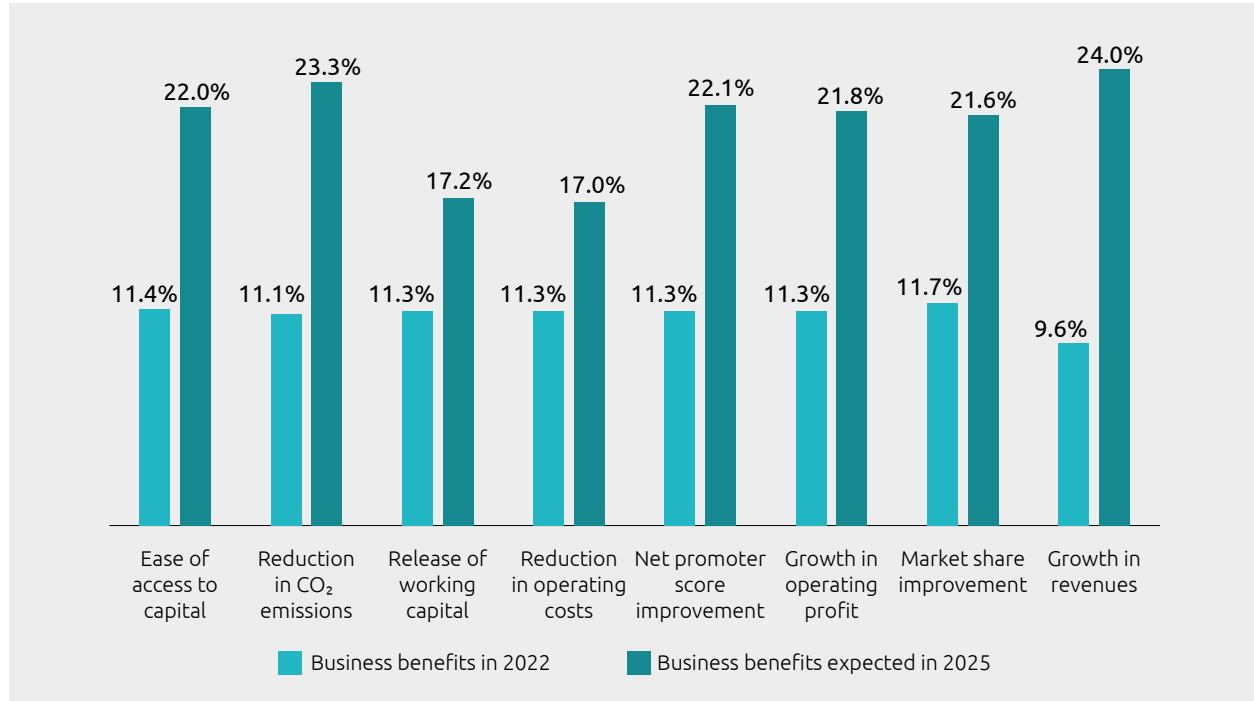
On average, organizations are planning to increase their investments in the supply chain by 17 percent over the next three years. Currently, organizations on average invest 2 percent of their revenue in supply-chain transformation programs. The top areas of investment include collaboration with the ecosystem (54%) and skills and change management (53%).

The top three broad areas of investment are planning, sales and marketing, and quality. In terms of specific investment areas, organizations plan to focus on change management and skills, collaboration with ecosystem players (customers, suppliers, and peers), automation and robotization.



**Fig.16**

Business outcomes are projected to double over the next three years



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

Houssam Hage at Stellantis confirms the importance of collaboration to skills development: *“Today, in terms of supply chain, we are training ‘à la demande.’ So, when I have an issue, I train up, I fix the issue, and I move on. We would need a global plan. An intelligent supply chain is about collaboration with the company, with the consultant company, or with the internal team, to define the training plan and implement it in real time.”* Other organizations are implementing multiple automation initiatives:

- J&J has added capabilities<sup>7</sup> such as track-and-trace devices with GPS signals and temperature monitoring to address issues such as theft and counterfeiting
- BMW has installed an AI application<sup>8</sup> that prevents unnecessary movement of empty containers on conveyor belts. It also uses image data to recognize whether a container needs to be lashed onto a pallet or if additional securing is required for large and unstable boxes

As a consequence, expected business outcomes are projected to double over the next three years according to the organizations we surveyed.

# 02

## THE MANY BENEFITS OF REVISITING SUPPLY-CHAIN ARCHITECTURE



Fig.17

Key attributes of Supply-chain Masters

## What can organizations learn from Supply-chain Masters?

In this section, we will discover how certain organizations are mastering the new supply-chain paradigm in practice and gaining higher benefits across dimensions as a result.

'Supply-chain Masters' are organizations that demonstrate the ability to meet multiple demands on their supply chains. We rated our respondents on the steps they had taken to strengthen the six key aspects of supply chains.

Organizations with high cumulative implementation scores across all of the above emerged as Supply-chain Masters. Overall, 9.5 percent (95 of 1,000 organizations) satisfied the criteria.

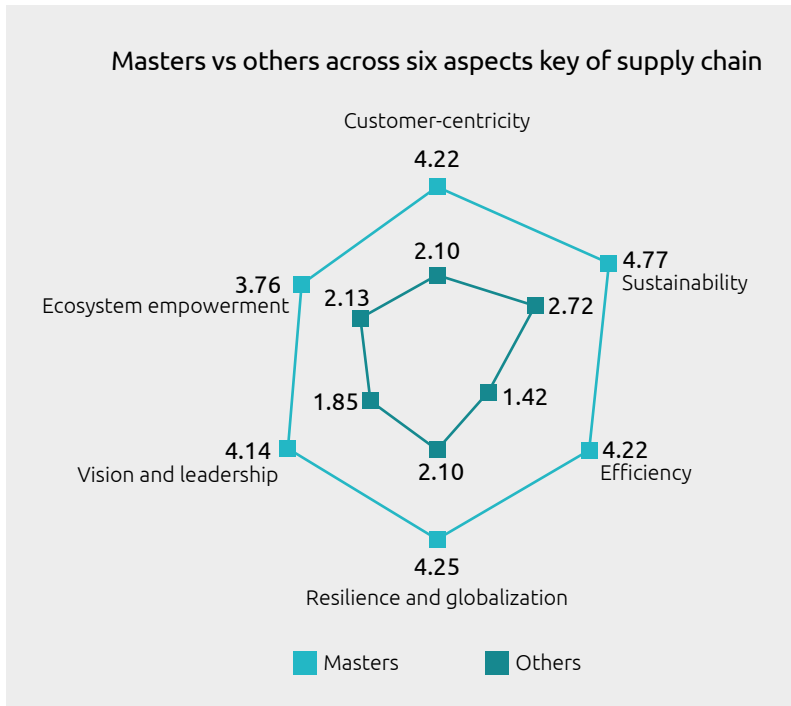
In Figure 18, we compare the scores of Masters with those of other organizations. Masters, on average, heavily outperformed the other organizations in vision and leadership, efficiency, resilience, customer-centricity, sustainability, and ecosystem empowerment.

Aspect	Characteristics for scoring
<b>Vision and leadership</b>	Steer and deliver a holistic and stepwise transformation, leadership commitment, investing in capabilities, and communicating the vision across internal and external ecosystems
<b>Efficiency and continuous cost optimization</b>	Optimize costs and working capital all along the supply chain and balancing with priorities such as service offerings differentiation and service levels improvement
<b>Customer-centricity</b>	Deploy a powerful omnichannel strategy and seamlessly integrate front and back office while managing the end-to-end value chain, due to a customer-centric composable IS/IT architecture
<b>Sustainability</b>	Consider sustainability KPIs alongside other business KPIs and collaborate closely with supply-chain partners to improve sustainability all along the product life cycle
<b>Resilience and globalization</b>	Rebalanced geographical footprint to secure market access, customers and suppliers, and deploy a just-in-time supply chain within the past three years, and reoriented their supplier base to ensure continuity of supply
<b>Ecosystem empowerment</b>	Empower an end-to-end and extended ecosystem to securely enrich and personalize products and services at speed. Setup close collaborative platforms with customers, suppliers, and other partners in the value chain

Source: Capgemini Research Institute analysis.

**Fig.18**

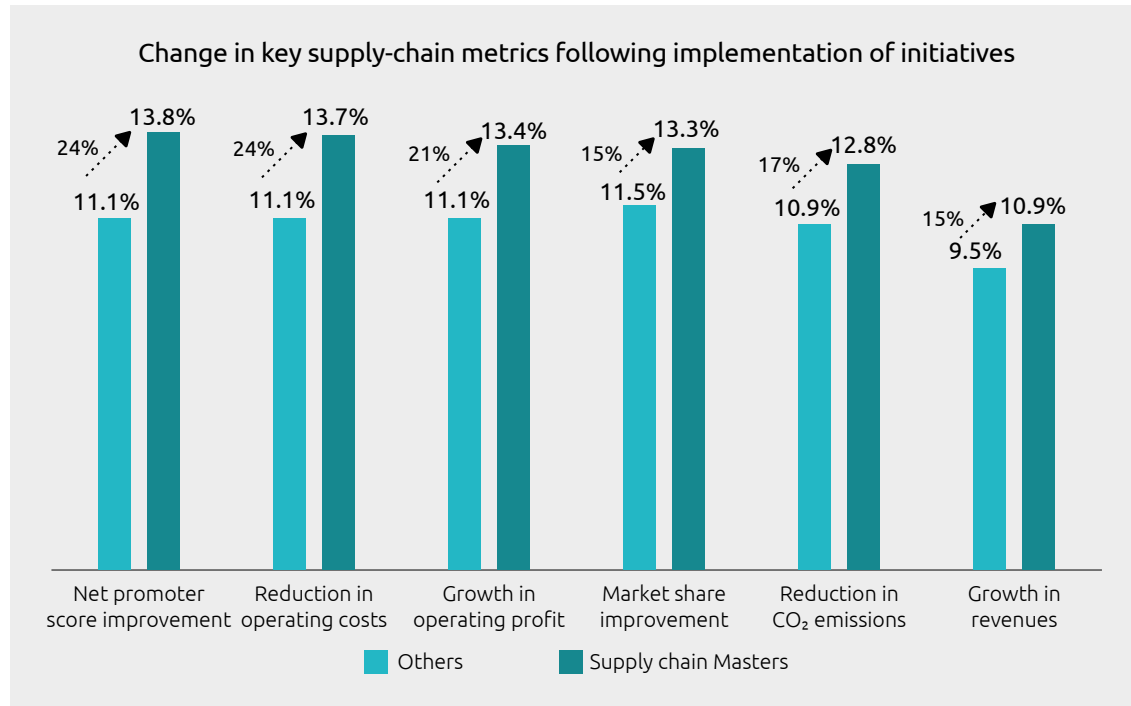
Supply-chain Masters maturity matrix



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.

**Fig.19**

Supply-chain Masters derive 20% greater benefits compared to others



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.



# 50%

share of organizations that say that their business teams are either not at all equipped or only slightly equipped to use emissions data to drive business decisions



## Supply-chain Masters on average garner 20 percent greater benefits across key business metrics

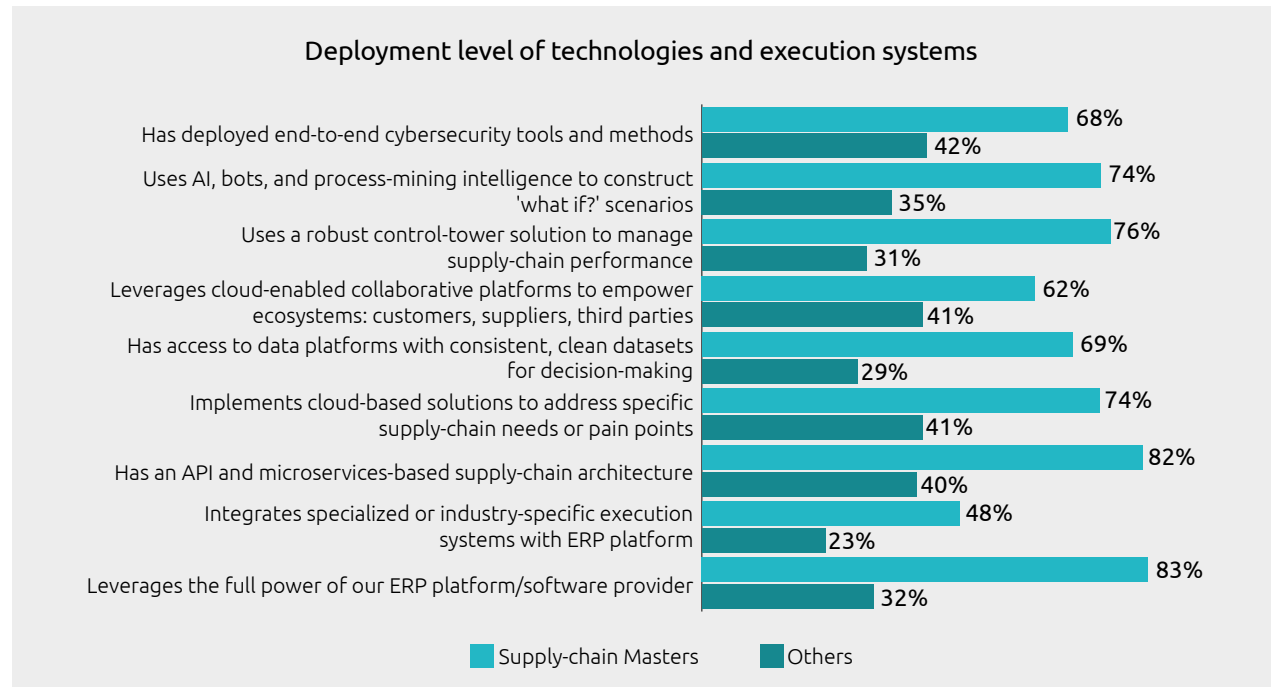
High scores are translating into strong performance by Masters versus the rest, as depicted in Figure 19. For example, Masters reported incremental revenue growth nearly 15 percent greater than that of other organizations. Similarly, they derive a 15 percent higher market share, on average.

Supply-chain Masters have invested significantly in overhauling their technology infrastructure. They are already mature in various technologies, affording them a better understanding of market dynamics, risks, and vulnerabilities, and providing the flexibility to adjust quickly.

In terms of specific technologies, Supply-chain Masters focus on the following five areas:

**Fig.20**

Supply-chain Masters are mature in leveraging the full power of a composable architecture



Source: Capgemini Research Institute, Intelligent Supply Chain Research, August–September 2022.



- Execution systems (warehouse-management, transport management, order management, etc.)
- Cloud
- Cybersecurity
- Data and AI
- Blockchain

Supply-chain Masters identify change management and skills development as top investment areas. While technology upgradation is an ongoing process, Masters pinpoint areas where they see maximum potential incremental value, aligned with overall business objectives.

### Making the data work harder

Corporate supply chains generate huge amounts of internal and external data. What differentiates Masters from the rest is how fast and accurately they aggregate, analyze, and act upon that data. US-based industrial-products manufacturer Honeywell has digitized over 200,000 customer and supplier contracts, allowing it to apply

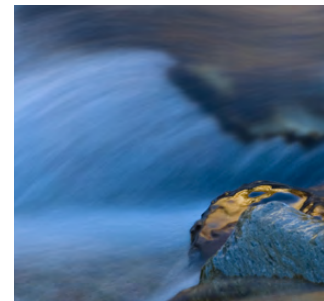
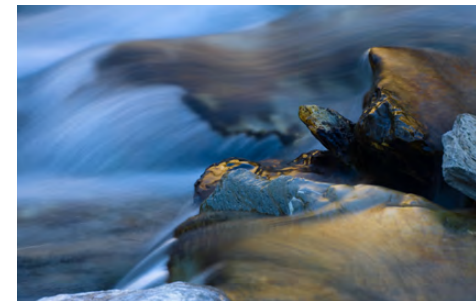
a granular pricing system across its 38 business units, providing some insulation against rising inflation and ensuring that demand is not affected by generic price rises.

*“We have tools that automatically update our ERP systems. We identified 600,000 SKUs on which we needed to take price action. And we were able to do that across 38 businesses globally in about two days [...] Previously, that would have taken us eight weeks,”* states Sheila Jordan, Chief Digital Technology Officer, Honeywell International.<sup>9</sup>

Conagra Brands is in the process of digitally connecting its manufacturing operations. The first pillar is connecting all equipment on production lines to the internet, providing a constant cross-functional flow of data. The second pillar is the connected worker, who is able to collect data on a mobile device.

The third pillar is yield management (understanding and influencing customer

behavior to yield maximum revenue), which allows teams to improve material efficiency (minimizing the amount of materials used) and supplier quality, and ensure adherence to the standards required to produce consistent, repeatable products and minimize waste. Lastly, it is creating dashboards and alerts for its frontline teams and site leadership, to allow them to take timely action on high-priority events. The initiative is expected to deliver \$300 million in manufacturing savings over the next three years.<sup>10</sup>



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**Supply-chain Masters  
reported incremental revenue growth  
nearly 15 percent greater than that of  
other organizations**



# AN INTELLIGENT SUPPLY CHAIN WILL DELIVER A SUSTAINABLE AND PROFITABLE GROWTH

An intelligent supply chain consists of key factors including an optimized customer experience, sustainability, global connectivity, and resilience, which enable smart forecasts, strong network design, integrated business planning, predictive ability, and timely insights.

Successful organizations will balance adjustments to their geographical footprint with securing and nurturing an ecosystem of partners that will increase network resilience; deploy just-in-time efficiency; set up end-to-end risk management; and centralize planning and decentralize execution in a coordinated manner.

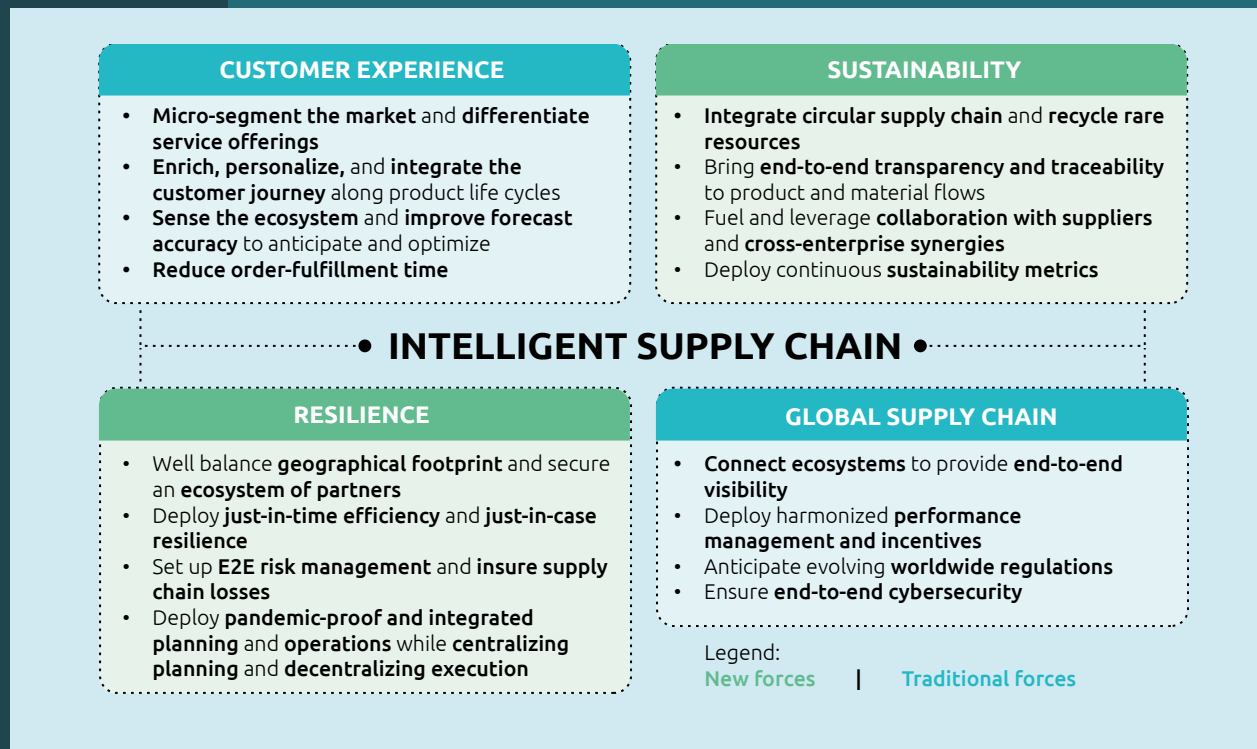
Organizations will be able to access ecosystems to provide end-to-end visibility and deploy harmonized performance-management and incentives. Fast-food restaurant organization, Yum China Holdings, rolled out an application of the Internet of Things (IoT) to its entire value chain, from suppliers to food preparation, allowing it to track over 90 percent of inventory accurately, in real time. This helps it to monitor in-store and warehouse stock levels, reducing wastage.<sup>22</sup>

Organizations will be able to enrich, personalize, and integrate customer journeys through the entire product life cycle, improving demand-forecast accuracy and reducing order-fulfillment times. Carrefour, a French retailer, is working on an automated system that will determine 80 percent of the stock assortment in a store without human intervention, as well as comparing customer buying behaviors across stores.<sup>24</sup>

Organizations will be able to make efficiencies and monitor performance while deploying a circular supply chain and recycling rare resources, bringing end-to-end transparency and traceability to product and material flows, and implementing ongoing sustainability metrics. J&J's MedTech business is partnering with customers on a program that allows hospitals to recycle metal and plastic components from its single-use surgical instruments, while also digitally capturing and communicating the environmental impact of salvaging materials. The pilot program is now expanding to hospitals across Germany and other European countries.<sup>25</sup>

Fig.21

From traditional to intelligent supply chain: complementary challenges



Source: Capgemini Research Institute Analysis.



# 03

## HOW TO OVERCOME OBSTACLES ON THE ROAD TO SUPPLY-CHAIN TRANSFORMATION





## Organizations will need to achieve transformation to create future-ready supply chains.

In the survey, we segregated the organizations into two segments: Supply-chain Masters and the rest. We analyzed the practices of Masters and found they differentiated themselves across multiple dimensions, overcoming challenges in planning and execution through targeted investments and maintaining long-term strategic focus. Based on our analysis and insights from industry leaders, we recommend that organizations follow the guidelines below to enable them to overcome challenges in implementing an intelligent supply-chain network (Please refer to Fig.21: From traditional to intelligent supply chain: complementary challenges):



**Fig.22**

Guidelines to move towards an intelligent supply chain

Source: Capgemini Research Institute analysis.



## Reassess your organizational future-readiness to allow adoption of the new supply-chain paradigm

Supply chains of large global organizations have undergone numerous changes over the past 2–3 years. Large retailers, for example, are re-evaluating their distribution and manufacturing footprints to personalize the customer experience and drive e-commerce profitability through omni-fulfillment (selecting, picking, packing, and delivering products across various channels, involving data-driven synchronization) and automated warehouses.

To position themselves to cope with future demand, organizations must start by assessing how ready they are to capitalize on the emerging trends that have a bearing on their supply chains. The Supply-chain Masters in our survey have done exactly that: 71 percent have stress-tested their supply chains (using “what if?” scenarios) compared with only 35 percent of the rest. As they reassess their supply chains’ resilience to future shocks and design new customer experiences, they have made significant adjustments: 87 percent of Supply-chain Masters stated that their supply chain had changed significantly in the past two years.

Almost 89 percent of Masters have mature supply-chain network-design practices, versus 39 percent of the rest. This reflects the Masters’ understanding that it is necessary to balance the traditional demands of efficiency and high levels of customer service with efforts to meet sustainability requirements, ensure business continuity, and nurture resilience to geopolitical shocks. María Fernanda Fornells, Senior Director Supply Chain, Haleon states: *“Integrating design, and then understanding what changes are expected and how those changes could improve the business, is important. We need a 360-degree approach for consumers, our internal stakeholders, and the people that will do the job.”*

Organizations can take the following steps to refashion their supply chains to meet these new demands.

### Start by analyzing the impact of emerging trends on your supply chain and assessing your readiness to capture any benefits

Sixty-four percent of Masters have aligned their supply-chain objectives with broader business goals, compared with only 40 percent of the rest. María Fernanda Fornells comments: *“First, determine what you would like to achieve as a business, and the critical success factors. Next, take small steps, trying to collect all the required pieces and build up an organization-wide scope. Third, ensure the solution is appropriate to the company. There are a lot of ostensibly attractive solutions, but you need to understand what is going to create a competitive advantage, and focus on that.”*

US food company Mondelez is a case in point. The organization revisited its supply-chain network with a view to making it more customer-centric (as opposed to manufacturer-centric). It analyzed the implications for the consumer of its

processes at each stage of the supply chain. In 2021, the organization introduced a 'design-to-consumer' value approach to realize cost efficiencies, while providing the elements that matter most to the consumer. The organization over-delivered by 50 percent on its goals for the year and has plans to improve on that going forward.<sup>11</sup>

### Recognize missed opportunities over the past few years and test areas of vulnerability to measure progress

#### Masters focus their efforts on improving quality, planning, and sourcing to generate maximum incremental value.

Amid global uncertainties, organizations face restrictions on the movement of goods across borders. In response to this threat, many have taken steps to strengthen relationships with top suppliers to secure an uninterrupted supply of critical parts. Rolls-Royce, a UK-based aerospace and defense organization, reduced its reliance on titanium supply from Russia by securing a long-term agreement with a US-based titanium supplier. It also achieved a 10-percent cost reduction on

parts by consolidating spend with four high-performing suppliers.<sup>12</sup> Organizations should revisit core and non-core activities in their supply chains to increase resiliency. For example, should transportation be considered as a core competency, given rising freight costs, freight disruptions, and labor shortages? It should also be noted that greater localization of products requires organizations to build relationships with regional transport providers.

Similarly, organizations need to adapt their operating models in response to new trends. Consumer products (42 percent), retail (39 percent), manufacturing (42 percent), and life sciences (41 percent) organizations have cited the emergence of new operating models (such as omnichannel fulfillment and remote working) as a key challenge. María Fernanda Fornells at Haleon confirms: *“What we've seen is the incredible impact of the e-commerce platforms, where our consumers buy directly. I think Amazon and Netflix have created this mindset of instantaneous service and gratification. So, customers want products to be delivered right now. Customers are also moving towards*

“What we've seen is the incredible impact of the e-commerce platforms, where our consumers buy directly. Customers want products to be delivered right now. Customers are also moving towards self-service patterns. They don't want to call anyone and want quick answers. So, omnichannel communication is key.”



**María Fernanda Fornells**

Senior Director Supply Chain, Haleon



*self-service patterns. They don't want to call anyone and want quick answers. So, omnichannel communication is key."*

### Embrace technology and automation as part of your organization's operational culture

Organizations should automate processes to generate efficiencies and redeploy resources to value-adding aspects such as customer interactions, analysis, and decision-making. Organizations in retail (52 percent), manufacturing (45 percent), life sciences (44 percent), and consumer products (40 percent) have cited federated and siloed data lakes as a current challenge.

Organizations that lead in terms of technology uptake report less downtime, even during severe disruptions. Automotive supplier Aptiv built a digital twin of its supply chain, allowing it to plan scenarios and respond to change quickly. In 2021, flooding in Belgium and Germany impacted the organization's connector business and movement of some of its raw-materials supplies. Using real-time information the organization was able to work with

suppliers in the area, gauging potential impact, and sourcing alternatives. Within days, the organization had secured orders for components with suppliers outside the impacted region.<sup>26</sup>

### Build capabilities and scale technologies as part of a composable and integrated architecture

Build and deploy a composable, integrated, and customer-centric architecture, combining a transactional backbone, ERP, best-of-breed industry solutions (notably for execution), as well as data-sharing and collaborative platforms to break down siloes and enable end-to-end management, from simulation to AI-based event monitoring.

### Build and deploy a composable customer-centric architecture, control tower, and digital twins

Although control towers have been around for more than a decade, implementation has been patchy. Often, organizations have different control towers for different parts

(outbound logistics, for example) of their supply chain. There is a need to upgrade the control-tower model into an integrated and connected solution that provides improved visibility for the entire supply chain.

Yum China Holdings has developed a supply-chain control tower to link data from its otherwise siloed system to allow integrated management reporting and intelligent decision support. It created various dashboards, including: 1) details of supplier performance and food-safety sampling test

## 77 percent of Supply-chain Masters collaborate with external entities versus 35 percent of others.

results; 2) supply and demand planning, with details of demand and inventory forecast accuracy by segment and by brand; 3) for logistics centers, with details of inventory level by product category. The organization is customizing this report for mobile devices

to increase accessibility and connectivity, as well as faster decision-making.<sup>22</sup>

At Kraft Heinz, a control-tower solution provides real-time visibility of plant operations and automation of supply-chain distribution across its 85 product categories. Kraft Heinz will also create digital twins for its 34 manufacturing facilities in North America, to help test and refine solutions and processes before implementing them on the plant floor. For example, the technology will help predict optimal product capacity and reduce mechanical interruptions by proactively addressing issues before they occur, ensuring only the highest-quality products reach the consumer.<sup>13</sup>

A digital twin is a virtual replica of a physical system that can model, simulate, monitor, analyze, and constantly optimize its counterpart in the physical world. Through its ability to answer questions such as “what is best?”, “what if...?”, and “what next?”, a digital twin can not only provide visibility on how dynamic, real-world systems are currently performing and propose how to

improve them, but also predict how they will perform in different scenarios.

For instance, home-improvement retailer Lowe’s created a digital twin of one of its stores to help its associates improve efficiency of operations and better serve customers through accessing and interacting with the store’s digital data. In the future, the digital twin will enable new ways of viewing sales performance and customer traffic; for example, it can simulate the act of customers or associates picking up items often bought together to enable time-saving proximate positioning of those products in stores.<sup>14</sup>

### Invest in skills and capability building

Supply-chain Masters plug capability gaps by developing in-house talent (82 percent); adding new talent through mergers and acquisitions (76 percent); and partnering with business or IT service providers (74 percent). The future-fit supply chain needs future-fit people. Eighty-one percent of Masters have skilled employees (with digital and soft skills, including analytics, technology, tools, applications, data-driven

decision-making, adaptive leadership skills, etc.) who can respond to a dynamic environment, compared with only 39 percent of others.

Attaining consistently game-changing levels of execution in the supply chain requires masterful use of digital technologies at the grassroots level, backed up by organization-wide understanding and commitment. For example, organizations treating demand-planning as a strategic priority can prioritize investment in continued upskilling of demand planners and foster a knowledge-sharing community across different

# 81%

of Masters have skilled employees who can respond to a dynamic environment, compared with only 39% of the others.



geographies or products. The objective is to equip employees to compile their own datasets, which they can then analyze for purpose.

### Clearly define roles and responsibilities to balance multiple demands

Organizations in the consumer products (46 percent), life sciences (51 percent), and retail (43 percent) sectors state that lack of clarity on roles and responsibilities is the most common hindrance to successful transformation of the supply chain.

Dr. Dirk Holbach, Chief Supply Chain Officer, Henkel Global Laundry & Home Care, adds:

*“What we have learned is the main challenge is not the technology – which is out there, and you can buy it – it is much more the soft factors, such as change management. You have to get both right, and involve your teams in the transformation journey.”*<sup>16</sup>

In the manufacturing sector, 43 percent of organizations have cited inability to balance multiple demands as a major challenge.

We found that Supply-chain Masters are significantly ahead in monitoring supply-chain improvements over time:

- Around 78 percent of Supply-chain Masters have a dedicated supply-chain transformation office versus only 45 percent of the rest
- At 66 percent of Supply-chain Masters, the supply-chain head reports directly to the board on the progress of supply-chain transformation initiatives, compared with 48 percent of other organizations
- At 77 percent of Supply-chain Masters, the sustainability leader’s inputs are considered critical compared with only 48 percent of the rest of the organizations

### Build a data-driven and collaborative culture across both internal and external ecosystems

Consumer products (38 percent), retail (40 percent), manufacturing (36 percent), and life sciences (38 percent) organizations have stated that cultural pushback to change is the most common tactical hindrance.

According to Lidia Fonseca, Executive Vice-President and Chief Digital and Technology Officer at Pfizer: *"Pfizer's move toward supply-chain analytics has helped it transform into a leaner, more science-driven, more patient-focused organization. To succeed, we have had to communicate the company's digital strategy clearly, in order to inspire employees' support and participation. Our culture was instrumental in encouraging our employees to be courageous and think differently in order to accomplish what we previously would not have imagined possible."*<sup>17</sup>

Seventy-three percent of Masters have set up a cross-functional risk-management team for supply-chain operations, compared with 41 percent of the rest. At Schneider Electric, strong collaboration between sustainability, global supply chain, lines of business, and customer satisfaction and quality teams has given rise to new processes, enabling the organization to revalorize customer returns. Through the reuse of components or remanufacturing of new products in the organization's local adaptation centers, it is able to accelerate progress towards its sustainability ambitions. For instance, it was

able to comply with the upcoming anti-waste law and reduce the carbon footprint of its supply chain. This also translated into higher customer satisfaction, even during component shortages, serving new customers and reducing the cost of quality failure due to lower volumes of product scrap.<sup>17</sup>

Similarly, retailer Kroger set up cross-functional and collaborative in-stock teams dedicated to solving supply-chain issues, working with its supplier partners to produce detailed plans to free up constrained product lines.<sup>18</sup>

### Create data-driven supplier and customer relationships

Supply chains are increasingly driven by geopolitical events impacting the flow of materials. Moreover, growing demand for sustainable products and more frequent weather-related disruptions require organizations to predict and prepare, rather than simply react.

New demands on supply chains to connect to external ecosystems are driven by:

- Vendor accountability for sustainable sourcing and procurement
- The imperative to secure supply and enhance visibility of critical-parts supply chains, with organizations requiring visibility of supplier operations at tier-2, tier-3, and other levels
- The requirement to establish traceability of parts to guarantee authenticity and track the movement of products
- Improving resilience to external shocks
- Nurturing agility in responding to trends
- Increase diversity and inclusion criteria for supply-chain vendors (such as sourcing agri-commodities from small farmers)

Organizations that integrate their systems externally see the benefits. Our research revealed that 77 percent of Supply-chain Masters collaborate with external entities (suppliers, distributors, retailers, etc.), versus 35 percent of others. Eighty-two percent of Masters have scaled deployment of integrated and collaborative planning via the cloud, compared with only 32 percent of the rest.

Supply chains are increasingly driven by geopolitical events impacting the flow of materials.



Often, organizations have deployed various off-the-shelf solutions, such as procurement, demand-supply matching, and supplier collaboration, leading to siloed data systems. They need to reset their data architectures to connect to these platforms and tap into external ecosystems.

Alcoholic beverages organization  
Diageo has kicked off several initiatives to encourage close collaboration with suppliers and customers. With real-time shipment tracking, the organization could determine the status of all global customer shipments during the Suez Canal blockage, for instance. It determined that the ship blocking the canal did not contain Diageo products, but that the organization would be impacted by the resulting backlog of vessels. This insight allowed the organization to communicate proactively with shipping lines and customers. Diageo created a virtual incident room, prioritizing its own shipments and putting contingency plans into action. The organization is in the process of integrating its system with those of its customers to unify trade terms and

cost-to-serve initiatives, as well as real-time transport-performance visibility.

The organization facilitated customer connectivity through the Diageo One platform, which provides a single digital point of engagement. It enables customers (including bars and restaurants) to view Diageo's portfolio of SKUs, place new orders, review historical orders, and view invoices and billing information. Customers have access to tools and data that help them generate value and accelerate decision-making. As a result, Diageo was ranked top for supply chain and customer service in the UK and 4th globally, up nine places from 2019 and seven places above its nearest spirits competitor, in the Advantage Group International UK Beer, Wines and Spirits report.<sup>19</sup>

**Reassess relationships across the supply chain through both resilience and sustainability lenses:** As supply-chain emissions are the greatest contributor to organizational emissions, organizations can ill afford to ignore sustainability considerations across supplier relationships. More than 50 percent of clients at DHL, a

leading logistics services provider, request information on responsible business practices as part of their tender processes.<sup>21</sup>

Organizations can better harness technology and knowhow to reduce emissions at the supplier's end through the following steps:

- Invest in supplier training and education: Suppliers in most sectors lack the training and conditioning to tackle emissions-reduction. Furthermore, expectations



# 68%

of organizations recognized the importance of developing end-to-end transparency and traceability of products.

are rising to include other social commitments, such as sourcing from minority groups, women entrepreneurs, etc. Large organizations can extend their support to identify the correct starting points for their suppliers' sustainability journeys.

- Set clear metrics for measurement: Sustainability could mean different things to different supplier and customer groups. For each supplier group, set up transparent indicators by which their sustainability ratings will be assessed. Ideally, sustainability will be implemented across suppliers' value chains. Focal metrics will help suppliers prioritize initiatives such as sourcing sustainable raw materials, packaging, route optimization, green power, green warehousing, waste management, labor policy, etc.
- Implement real-time tracking systems for sustainability: Collaboration not only enhances sustainability but also helps organizations obtain real-time data on supplier operations to ensure quality, speed, and accountability. Yum China has built end-to-end connectivity from the supplier's plant to its systems. The system helps it obtain instant deviation

notifications, trend analysis, and risk warnings, allowing it to take immediate action to mitigate risk.<sup>22</sup>

Sustainability is as much about diversity of supplier base, traceability of source materials, and workforce wellbeing and safety, as it is about emissions. Many organizations feel they are impacted by these trends but are not ready to deliver on them in the near term. Sixty-eight percent of organizations recognized the importance of developing end-to-end transparency and traceability of products but less than 10 percent are able to deliver on these.

A similar number of organizations were able to ensure supplier diversity (sourcing from small businesses or ones which are owned/operated by minorities, members of the LGBTQ+ community, etc.), while almost 73 percent of them cited it as an important emerging trend. Pivoting towards more equitable sourcing opportunities requires educating procurement teams about how they can positively impact business performance by improving innovation, quality of sourcing, and cost-effectiveness.

It also entails challenging leaders to think differently about how to include a more diverse set of suppliers. Recognizing this, companies are committing more spend to diverse sourcing. For example, Mondelez set a goal to spend \$1 billion with minority and women-owned businesses globally by 2024.<sup>23</sup>

As uncertainty in supply networks increases, more organizations are prioritizing resilient operations that show the following characteristics:

- **Network resilience:** Well balance the end-to-end geographical footprint; secure an ecosystem of third-party logistics and contract manufacturers; ensure end-to-end cybersecurity; Integrate agility cost in cost to serve model. Nike, for example, has a fully outsourced and diversified supply chain with manufacturing contracted out across over 500 factories.<sup>27</sup>
- **Just-in-case resilience:** Increase flexibility and interoperability within the supply chain; build up stocks of critical parts/products; Enable omni-channel model to balance stock availability across

markets and geographies ; develop multi-sourcing strategies by engaging multiple procurement partners

- Elevator engineering organization Kone is adopting multi-sourcing, meaning it will have an alternative supplier in place not just at elevator-module level but also at components and parts level, a policy it will enforce across its supply chain. It is also harmonizing supply-chain processes and IT systems among suppliers to ensure products and components can be manufactured identically in different locations.<sup>2</sup>
- Stanley Black & Decker, a US industrial tools and household hardware manufacturer, is standardizing components across its product range to create economies of scale with its key suppliers. It is simplifying product design and consolidating its supplier base, and reducing time to market on innovation by sharing design initiatives. The organization aims to reduce the number of stock keeping units (SKUs) in its system by over 40 percent and

deliver cost savings of approximately \$300 million over the next three years.<sup>1</sup>

- **End-to-end risk management:** Set up a cross-functional end-to-end risk-management team enabled by methods and tools; develop real-time visibility of stocks/flows with suppliers and partners through a shared-data approach.
- **Pandemic-proof planning and operations:** Tap into customer/supplier and delivery data to improve logistical and post-sale efficiency. Use an integrated collaborative platform for planning. Implement automated operations and goods-to-person technologies to improve the efficiency of operations and mitigate unexpected labor shortages.

### Empower an extended ecosystem

As supply chain complexity grows, an extended ecosystem (third-party logistics firms, business consultancies, software vendors, hyperscalers, etc.) becomes important to realize overall business objectives. It helps not only in efficient and integrated operations, but in managing risks and access to capital (insurance providers,

investment bankers) and improving sustainable operations (suppliers across all tiers, energy and utility providers). Close collaboration through real-time data sharing and setting up integrated systems will add value to the entire industry value chain.

Organizations can start with identifying their role in the value chain, finding common corporate objectives and opportunities to achieve them jointly. For instance, to achieve its sustainability goals, J&J, together with nine other pharmaceutical organizations, launched Energize, a platform to educate industry suppliers on renewable-electricity procurement opportunities and to help them transition to renewable energy.<sup>22</sup>



## + CONCLUSION

Businesses have scrambled to navigate disruption to supply chains, often caused by factors out of their control. This has resulted in several ad-hoc implementations to maintain service levels.

In parallel, new dimensions of supply-chain performance have emerged. A new supply chain paradigm is already in action; Supply chain trade-offs are now driven by four complementary forces: customer experience , global value chain , resilience and sustainability.

Moving toward an intelligent supply chain is an holistic and stepwise transformation that will require significant and consistent investments and efforts over time.

New smart and sustainable products to be launched on the market in the next few years will progressively reshape the whole

value chain, from design and procurement, through to product manufacture and service provision and recycling, as well as having a profound effect on the customer experience.

Resilience and sustainability will also drastically increase brand value to all stakeholders while facilitating access to different sources of funding, improving working conditions and giving employees a greater sense of purpose, with knock-on positive effects on recruitment and retention.

Cost and non-cost competitiveness, sustainability, and resilience will impact each other as well as the customer experience. Each individual benefit case must assess the impacts in those different dimensions. Globally, defining the right economic model and trajectory for an

industry or a company will be key to moving forward successfully. Such a comprehensive approach and model will require multi-disciplinary collaboration and investments in technology and automation, change management, skills, collaboration, and data governance. Changes are happening; now things need to accelerate, and a faster-moving, smarter supply chain will be integral to this.



# + RESEARCH METHODOLOGY

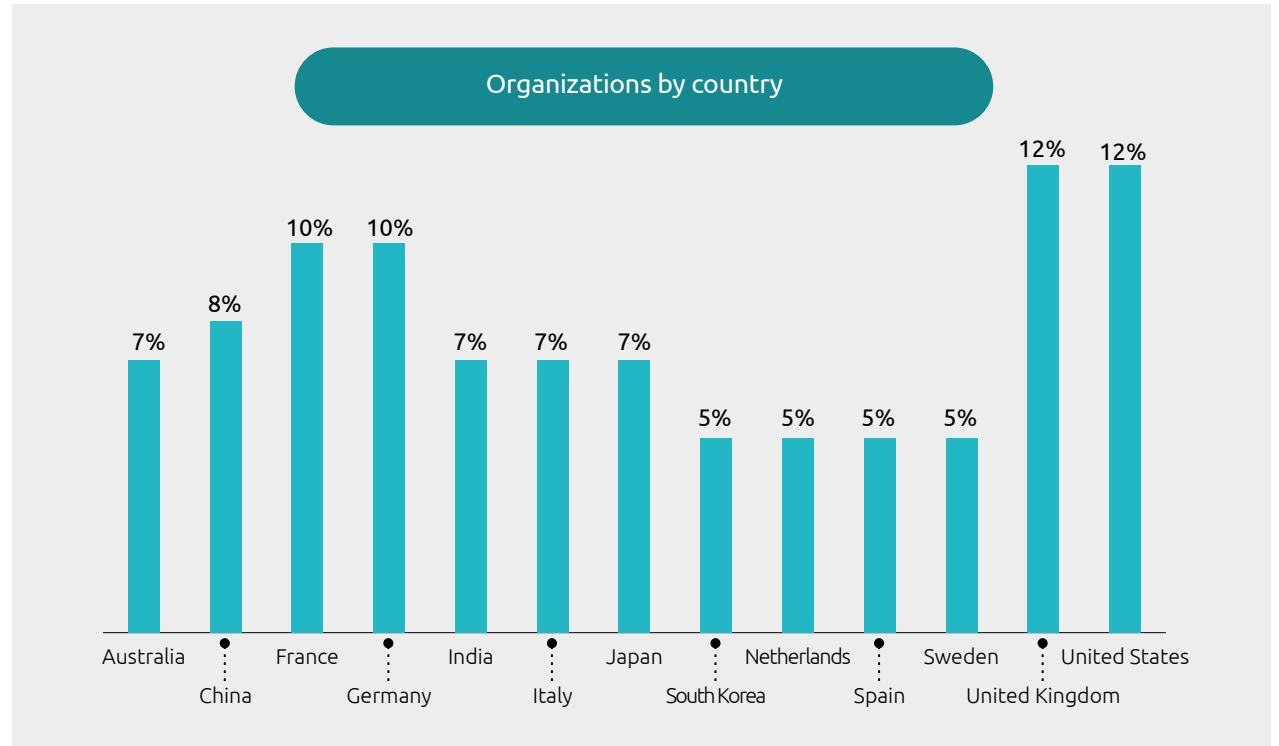
To understand the maturity of intelligent supply chains across sectors, we carried out extensive research using both qualitative and quantitative methods. The study findings reflect the views of the respondents to our online questionnaire and are intended to provide directional guidance. Please refer to the methodology for details of respondents and get in touch with a Capgemini expert to understand specific implications.

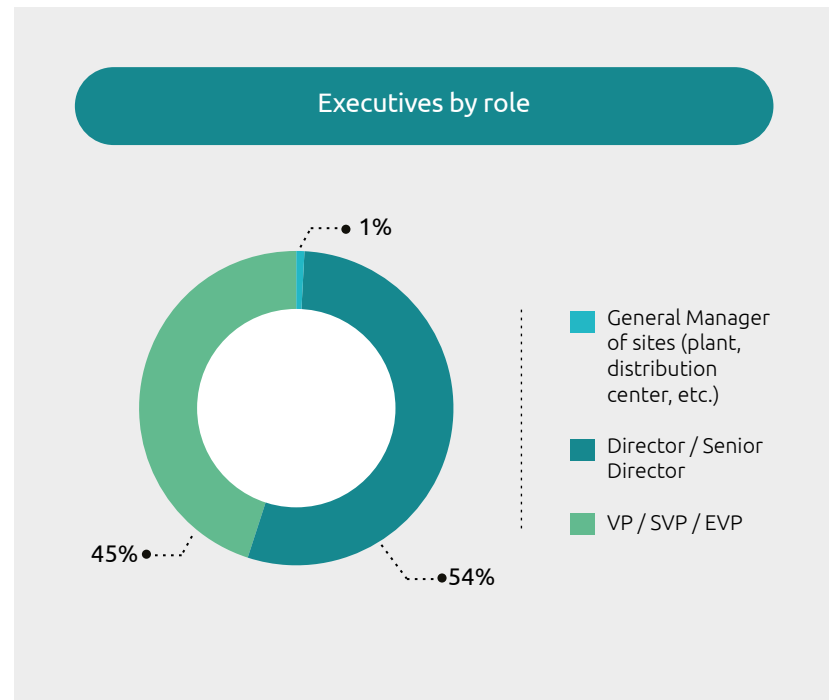
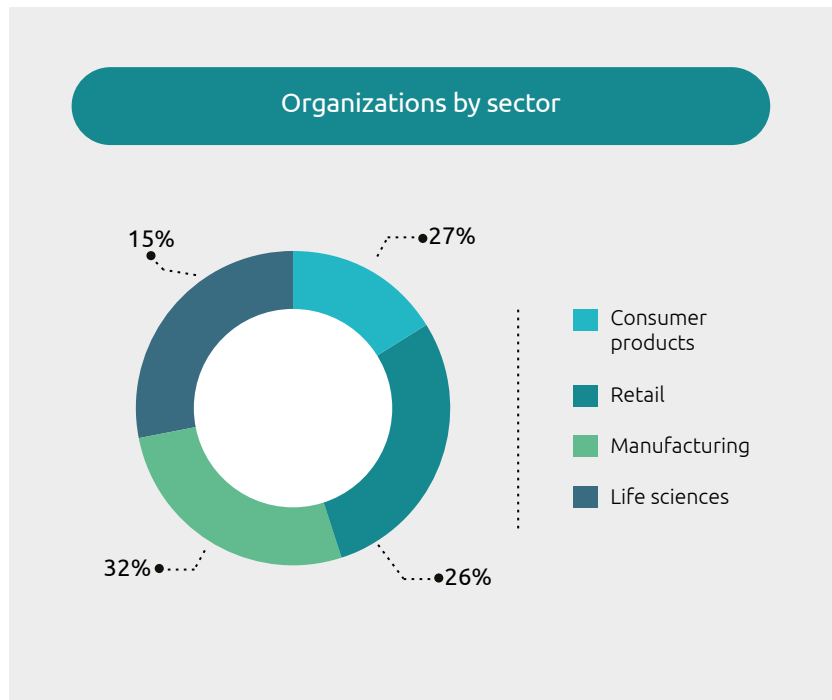
## In-depth interviews

We conducted 10 in-depth interviews with experts from large organizations who are involved in the supply-chain domain.

## Executive survey

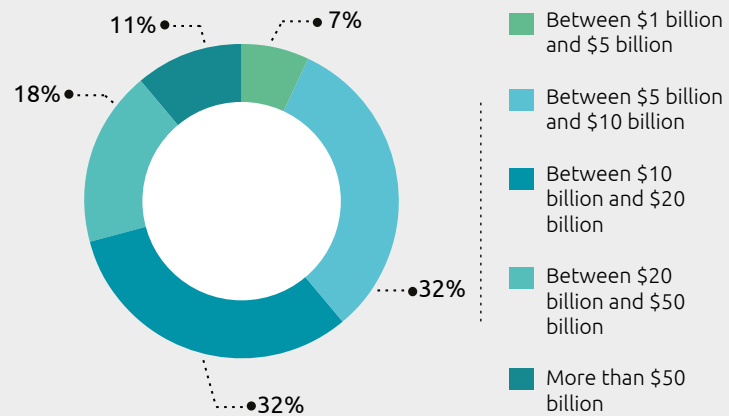
We surveyed 1,000 supply-chain executives from large organizations across sectors. The global survey took place in August and September 2022. The distribution of selected respondents and their organizations is provided below.



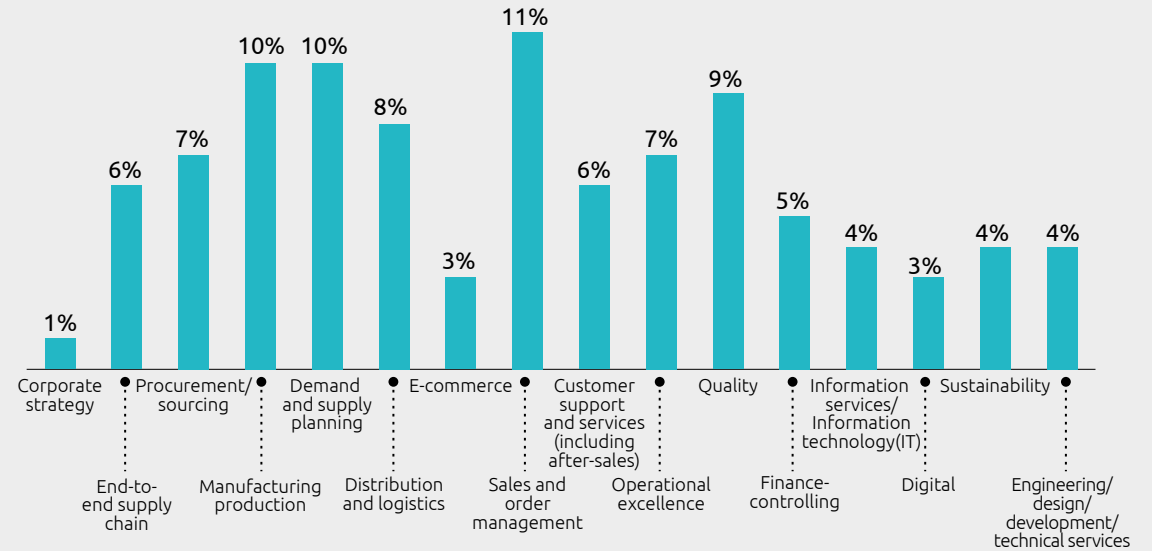


## Research Methodology

### Organizations by annual revenue



### Executives by function



### Research Methodology

# + APPENDIX

The following are the questions used to identify the Supply-chain Masters for our research. (Figure x)

Axis	Score	Statement
Customer centricity	5 – Strongly agree 4 – Agree 3 – Neutral 2 – Disagree 1 – Strongly disagree	We've already deployed a powerful omnichannel strategy
		Is leveraging IoT and connectivity for location-based services, real-time tracking and tracing
		Integrates specialized e-commerce platforms with planning and execution systems
		We can implement quick and cost-effective means to adjust to short-term disruptions/fluctuations in our supply chain
		We have an automated order-entry process for all our customers
		We have an API and microservices-based supply chain architecture
Sustainability	5 – Very high level of preparation 4 – High level of preparation 3 – Medium level of preparation 2 – Low level of preparation 1 – Very low level of preparation	Maturity of initiatives
		Sustainability KPIs are considered alongside other business KPIs
Efficiency	5 – Strongly agree 4 – Agree 3 – Neutral 2 – Disagree 1 – Strongly disagree	Our inventory levels (or inventory turnover) are comparable to the best in the industry
		Cost optimization
		Automated or robotized processes in the supply chain, where possible
		We can run continuous improvements of service levels for each node of the supply chain
Resilience	5 – Strongly agree 4 – Agree 3 – Neutral 2 – Disagree 1 – Strongly disagree	Rebalanced our geographical footprint to secure market access, customers, and suppliers, in the past 2–3 three years
		Evaluated partners'/suppliers' capacity to fulfill our requirements to ensure business continuity
		Systematically deployed multi- as opposed to mono-sourcing strategies
		Set up an ecosystem of contract manufacturers and global third-party logistics organizations
		Continuously integrated external data (political risks, market surveys, social-media crawling, etc.) to aid decision making



Axis	Score	Statement
Vision and leadership	5 – Very high level of preparation 4 – High level of preparation 3 – Medium level of preparation 2 – Low level of preparation 1 – Very low level of preparation	We have mastered agile methodologies for working cross-functionally function working within business and IT teams
		Ability to digitally integrate the plan, make, source and deliver functions of your organization
		A culture of cross-functional collaboration and data sharing
		Skilled employees (with digital and soft skills, including analytics, technology, tools, and applications, data-driven decision-making, adaptive leadership style, etc.)
		Data governance (managing the availability, use, integrity, and security of data)
Ecosystem empowerment	5 – Very high level of preparation 4 – High level of preparation 3 – Medium level of preparation 2 – Low level of preparation 1 – Very low level of preparation	Change management, it's communication and implementation
		Deployed at scale integrated and collaborative planning, leveraging cloud platforms
		Maturity in ecosystem collaboration
		Strong collaboration with ecosystem players (customers, suppliers, peers, etc.) – one of the top investment areas

### Score level of preparedness to be a Supply-chain Master

<b>Greater than 100:</b>	Very high level of preparation
<b>75-100:</b>	High level of preparation
<b>50-75:</b>	Medium level of preparation
<b>25-50:</b>	Low level of preparation
<b>&lt;25:</b>	Very low levels of preparation

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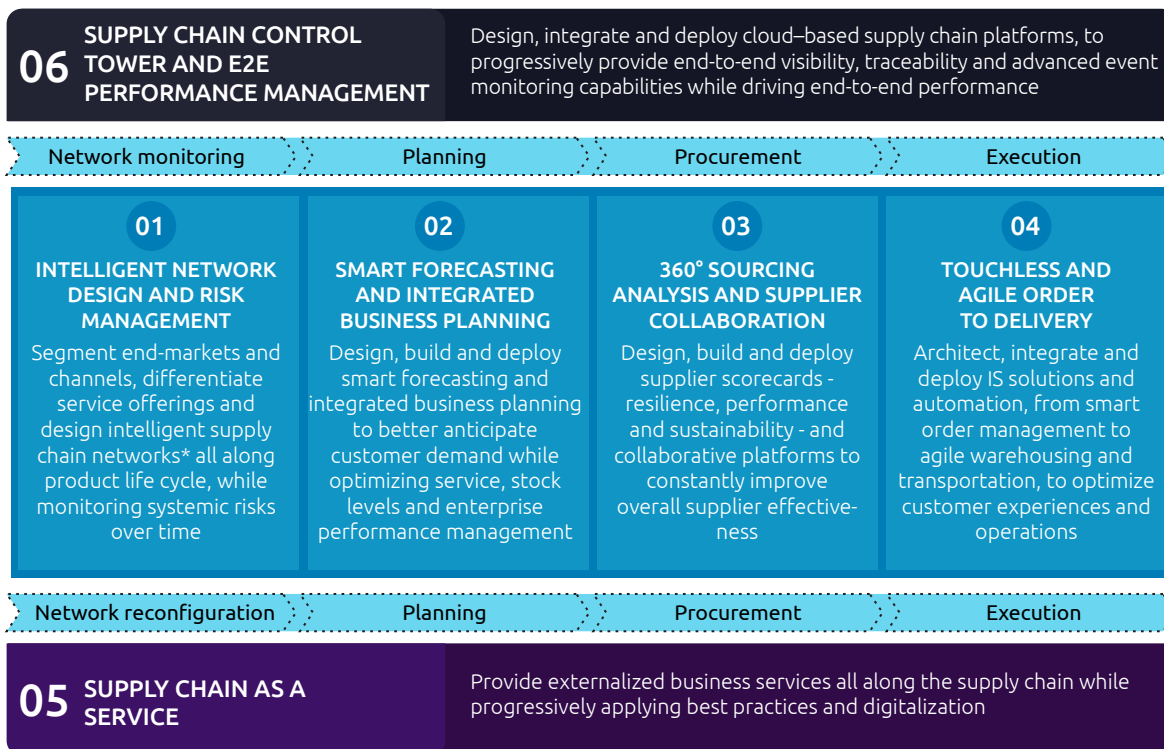
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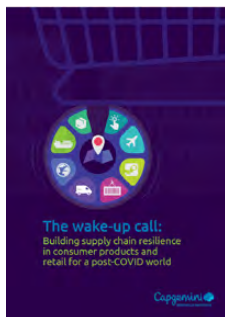
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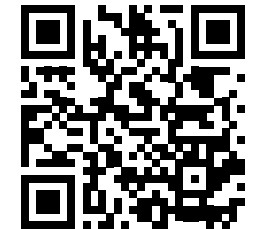
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