



Confederation of Indian Industry



CII Institute
of Logistics

Resilience – Moving from life insurance to competitive advantage in supply chains

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Preface

We at CII Institute of logistics, a renowned center of excellence in logistics and supply chain management are delighted to share this report on “Resilience – Moving from life insurance to competitive advantage in supply chains”, which provides a thorough examination of the pivotal strategies necessary for building resilient supply chains.

Supply chains today are more fragile than ever, repeatedly assessed by an unpredictable mix of disruptions and challenges ranging from financial crises and global pandemics to cyberattacks and geopolitical instability. Supply chain shocks are no longer isolated incidents—they have become a persistent reality. Businesses that fail to prepare for these disruptions are prone to operational setbacks, financial instability, and reputational challenges.

With several tools and technologies increasingly at disposal for companies to leverage in the risk mitigation areas, as it involves varying levels of investment in capital and resources, it is very important that companies adopt a structured approach to identify core areas and channelize the efforts in the right areas. Leading organizations should today can data-driven approach to managing risk by implementing the Supply Chain Resilience.

Drawing on real-world examples and the latest advancements in supply chain resilience, the report outlines actionable insights for organizations striving to protect their operations and ensure continuity in times of crisis. We invite you to read this report to equip yourself with the knowledge needed to foster supply chains that not only endure but excel in an unpredictable world.

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Recent disruptions like the COVID-19 crisis, post-pandemic economic effects, and the ongoing conflict in Ukraine have exposed the vulnerabilities of today's global supply chains, highlighting the challenges of moving products in a complex, uncertain, and fast-changing environments.

Supply chains have always been exposed to major disruptions like natural disasters, geopolitical disturbances, and macro-economic events. Pre-pandemic research by the McKinsey Global Institute found that, on average, companies experience **a disruption lasting one to two months (in duration) every 3.7 years**. The financial fallout of these disruptions over a decade, averaged across industries, is likely **equal to 45 percent of one year's EBITDA**.

Even if we discount widespread disruptions like the COVID-19 pandemic, supply chains keep facing **localized day-to-day operational disturbances**. In interviews with leading supply chain executives¹, we found that 82% organizations had experienced **business-related incidents** like vendor de-commits, shipment delays, non-availability of transport etc. in the recent past (~6 months), while 58% firms also saw **unpredictable external incidents** like regional protests/ rallies, adverse weather conditions etc.

Forward-thinking chief supply chain officers (CSCOs) can future-proof their supply chains by recognizing the **7 key archetypes of supply chain risks** and redesigning operations to build resilience across **3 strategic pillars**.

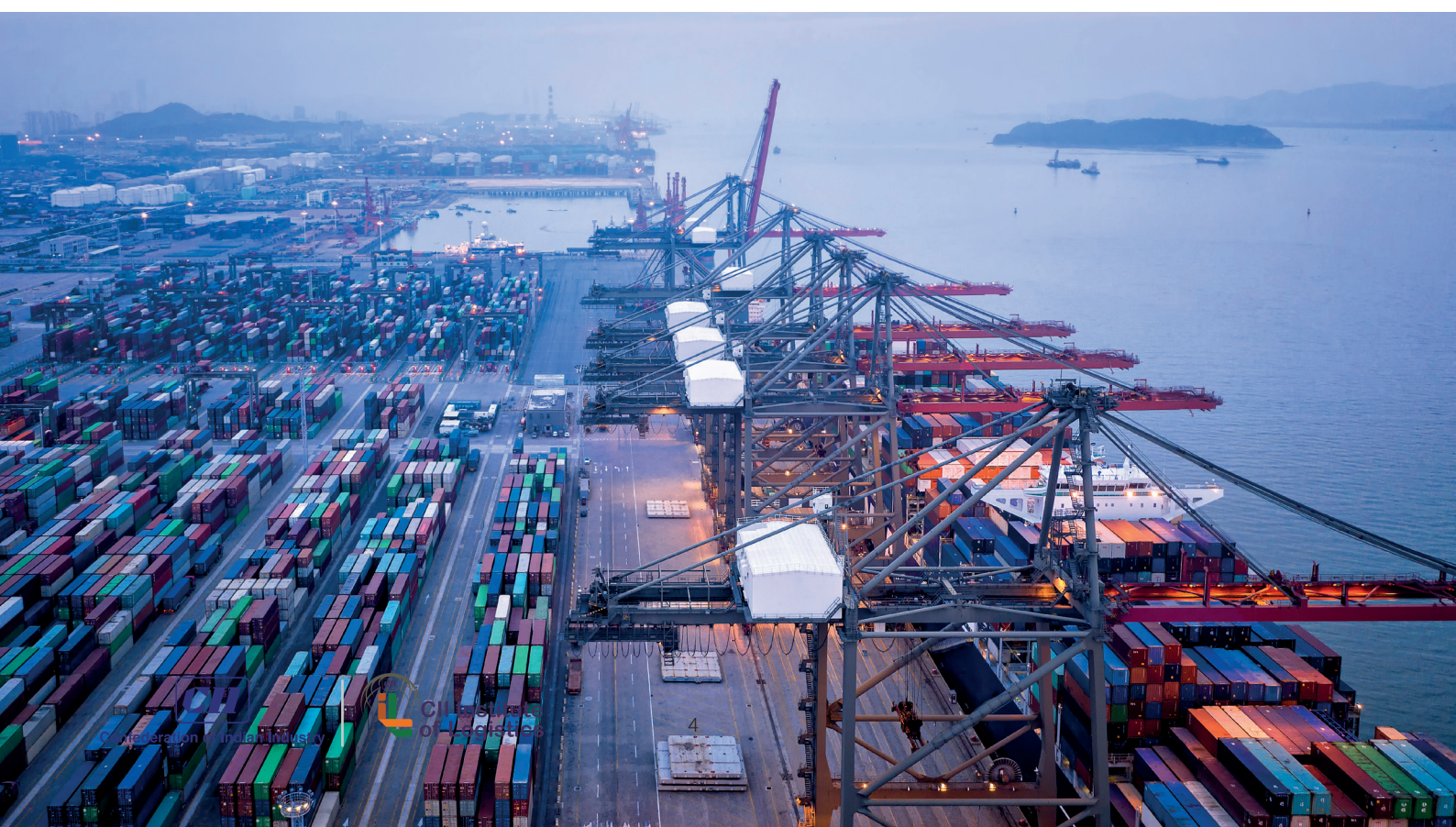
The first of these pillars, **structural resilience**, addresses risks associated with the immutable aspects of supply chain (e.g., geographical footprint). The second, **operational resilience**, will equip organizations to deal with rapidly evolving and increasingly volatile supply/production situations and consumer needs. The final pillar, **institutional resilience**, recognizes key enablers (e.g., technology) required to proactively prepare for/ deal with supply chain crises.

Shifts in global trade flows

As more companies rethink supply chains, up to **\$4.6 trillion in trade flows** (across industries) can shift countries over the next 5 years. India can capture **up to \$1 trillion** of this trade flow, which makes it imperative for Indian executives to invest in supply chain resilience. Indian players are already preparing to leverage this opportunity: **75% supply chain leaders** are planning to **increase supply chain resilience**, with **44% leaders** even ready to **sacrifice short term efficiency**.²

¹ Survey of N=130 supply chain executives in APAC region

² Survey of N=97 supply chain executives in India



Key archetypes of supply chain risks

Supply chain risk manifests at the intersection of vulnerability and exposure to unforeseen events. The first step in mitigating that risk is a clear understanding of the organization's supply chain vulnerabilities. Exhibit 1 shows a comprehensive overview of the key types of modern supply chain risks. More often than not, organizations are unaware of the type, extent, and probability of these risks. For example, in a 2021 McKinsey survey of senior supply chain executives, **just under half** said they understood the **location of their tier-one suppliers and the key risks those suppliers face**. But only **2 percent** could make the same claim about **suppliers in the third tier and beyond**. This matters because some of the key operational disruptions originate in these deeper supply chain tiers.

Comprehensive management of supply chain risk not only helps organizations minimize the impact of disruptions (whenever they arise), but also realize lasting impact to core business operations.³

Reduced material/ manufacturing costs—As organizations simplify product complexity and make procurement & manufacturing innovations (e.g., flexible manufacturing), they can expect to reduce material costs by 3-5% and manufacturing costs by 2-3%

Reduced distribution costs—Adoption of dynamic optimization techniques for fulfillment channels (transport mode and routes) and other strategic levers can help reduce distribution costs by 3-5%.

Increase in topline—Use of advanced planning methods (e.g., demand sensing/ shaping, margin-based SKU rationalization) can reduce supply-demand mismatch and optimize sales, facilitating up to 4-8% improvement in topline.

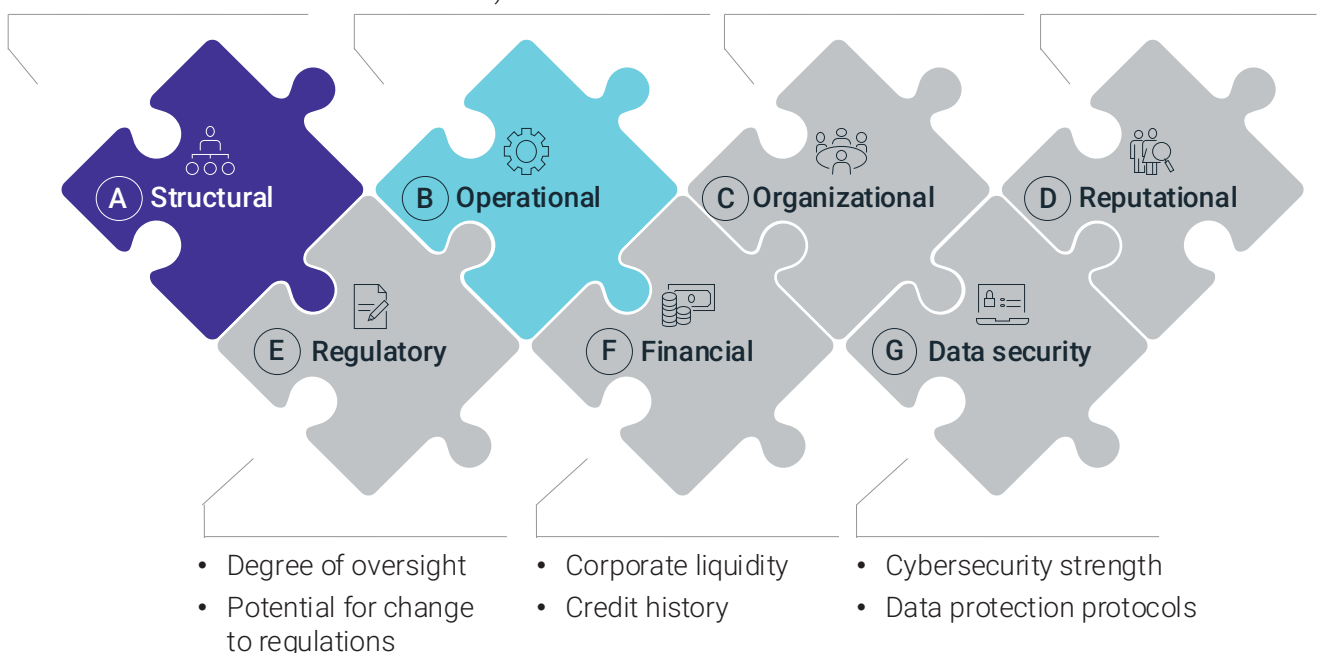
One-time cash release—Implementation of resilience levers which focus on simplification can inadvertently lead to release of ~10-25% of locked capital. Few examples of these levers are product simplification, inventory optimization, etc.

³ All improvement levers detailed ahead

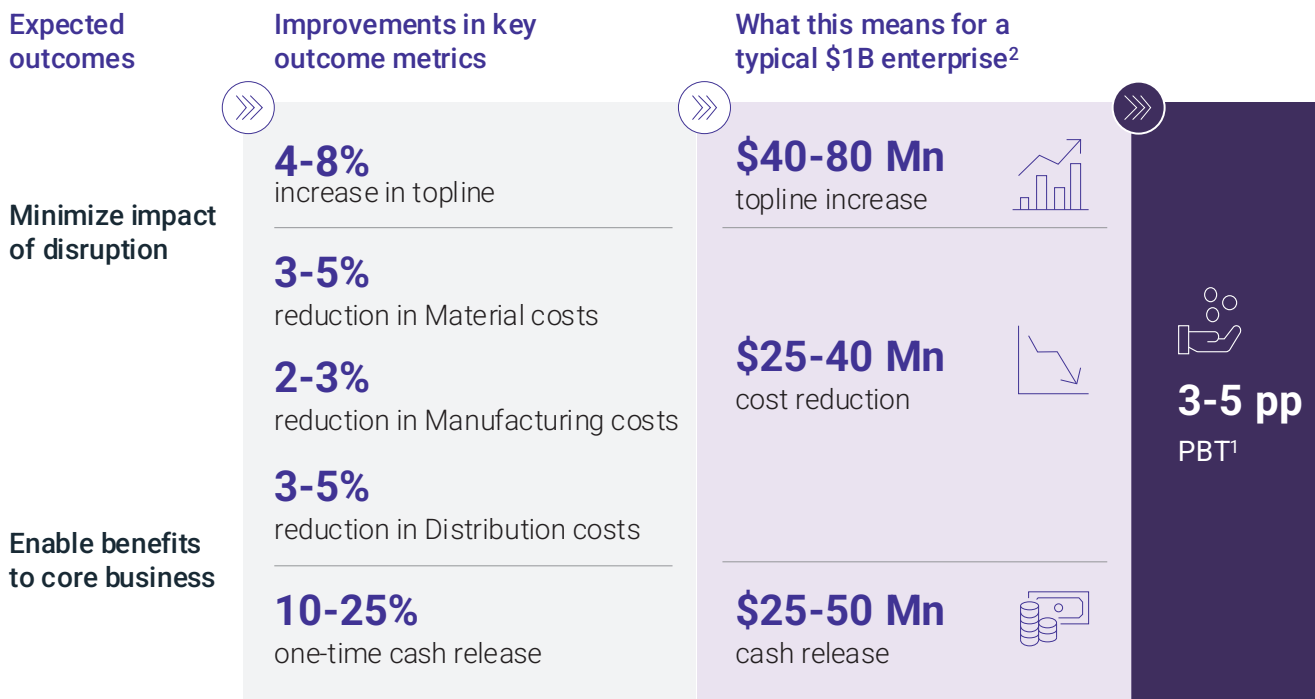
Exhibit 1

Companies need to take targeted actions to address supply chain vulnerabilities across 7 key areas

- Footprint concentration of value chain parts
- Exposure of value chain to geopolitical, economic and environmental disruptions
- Visibility into tier-2+ suppliers (including sourcing risks)
- Planning accuracy and agility
- Make and delivery performance (e.g., OTIF, lead time)
- Talent management, capabilities and culture
- Organizational changes (e.g., acquisition)
- Reputation/Legal matters
- Labor management
- Risk of business dealings



Supply chain resilience transformation can help achieve significant impact



1. Will vary by industry; Assuming 60% Material cost, 15% Manufacturing, 5% Inventory & Logistics, 5% Other SG&A, 2% Interest, 3% D&A;

2. Not always additive; some overlap possible; impact depends on starting point of supply chain

Organizations across industries have started building their resilience playbook.

Case Study

European TMT company's success with improved supply chain resilience

Context: A European multinational OEM faced challenges in managing daily operations and right/ timely decisioning of supply chain across different countries, as several countries went into lock-down during the onset of COVID-19.

The firm defined a framework to guide daily actions/decisions in the short-term and facilitate a long-term resilience strategy to cope with different potential scenarios, which involved following elements:



- Establishing **decision log** and **governance structure** for daily actions
- Establishing **dashboard** to monitor latest COVID-19 developments in different regions

- Modelling **customer demand scenarios** considering change in competitive dynamics and customer network roll-out capacity
- Understanding **supply risks** considering impact on logistics, material supply & production
- Creating **action plan** for each scenario & setting-up **cockpit of KPIs** to monitor progress

Bad time scenario: Through the COVID-19 pandemic, the firm weathered multiple lockdowns and economic uncertainties, and recorded **ZERO pandemic related supply disruption by November 2020.**

Good time scenario: The firm saw ~50% reduction in capital required for inventory build-up, using targeted approach of modelling customer demand and supply chain risks.

Companies focused and established resilient supply chain

	Auto OEM Supplier in India	Tyre Manufacturer in India	Beverage Manufacturer in Asia	Consumer Products Company in Asia
What did they do 	Established flexi tier network from rigid 2 tier network Simulated future demand density based location selection	Established flexible back-up production capacity for high margin rush orders Leveraged all plant-product compatibility with back-up moulds	Established flexible last-mile delivery operations for high volume segments Deployed dynamic route/dispatch planning with end-to-end visibility	Established predictive demand forecasting to understand existing and new channels Deployed multi-echelon based inventory setting
Impact achieved 	26%+ logistics savings by avoiding sub-optimal movement	90%+ service level adherence for rush/expedited orders	16%+ cost reduction per case	15%+ pp increase in demand forecast accuracy

Source: Supply Chain Digest; Biogen & Resilience case study: Proactive risk mitigation in hurricane season; Nike News; FM News; McKinsey Global Institute analysis

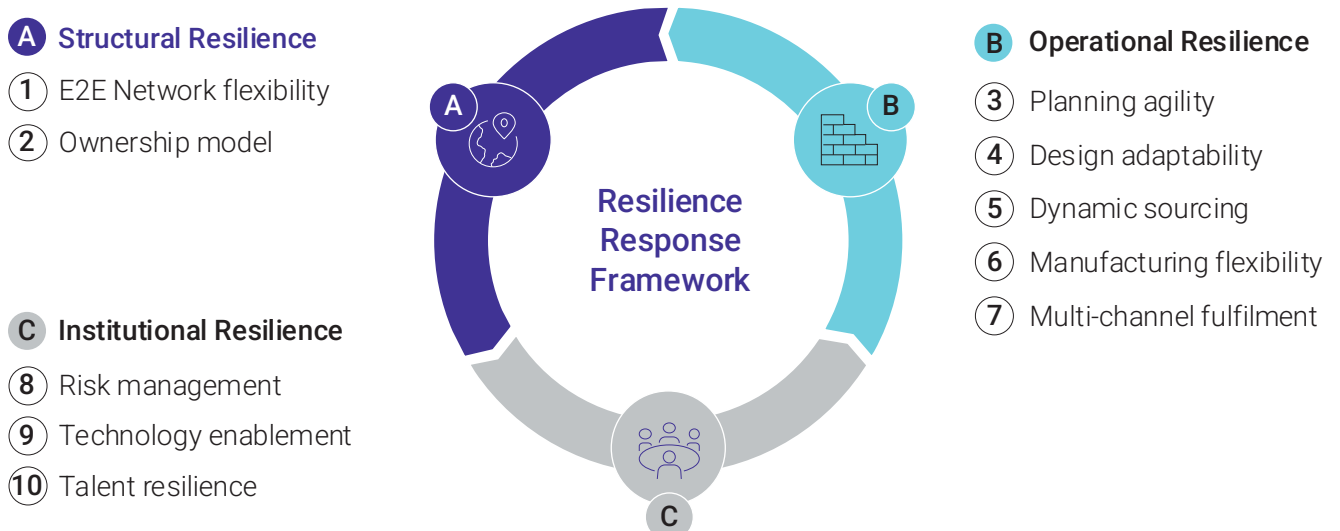
Few more case examples started focusing resilient supply chain include Auto OEM supplier in India, Tyre manufacturer in India, Beverage manufacturer in Asia and Consumer Product Company in Asia (Exhibit 3).

Tackling these supply chain risks requires interventions across multiple fronts, from smart management tools and digital warning systems, structural changes to the supply chain, to a significant revamp of management talent and org. structure. These interventions can be summarized under the 3 strategic pillars of supply chain resilience (Exhibit 4).

Addressing risks in global supply chains

Exhibit 4

Structural, Operational, and Institutional resilience needs to be built to address the risks and strengthen capabilities in global supply chains



A. Structural Resilience

Structural resilience focuses on **optimizing supplier network & production footprint**, while **building redundancy/ backups** to combat sudden disruptions. Footprint optimization includes use of strategies like near-shoring of suppliers and production capacity, and regionalization of supply chain based on proximity to suppliers/ consumers. Redundancy, on the other hand, looks at diversification of geographical footprint of suppliers/ own plants, re-design of warehousing network and building redundancy in material sources.

Sourcing redundancy, in particular, requires a thorough assessment of current sources for raw materials/ critical parts/ MRO to identify risks of **supply shortage**, e.g., single-sourced (critical) parts, changes in supplier quality standards etc. Use of historical information and data modelling methods can help forecast disruption scenarios and determine optimum level of backup capacity (for suppliers, production, inventory) to minimize impact.

Organizations also need to routinely re-assess **the ownership model for production and distribution** i.e., manufacturing intermediary components in-house vs buying from suppliers, leasing vs owning of truck network etc. to adjust with latest developments (e.g., sudden volatility in logistics costs).

B. Operational Resilience

In order to build operational resilience, organizations need to review each major step of the value chain, starting from product design and sourcing, to delivery fulfillment.

We can therefore address operational resilience under following levers:

Planning agility: One of the key enablers for planning agility is to establish **E2E network visibility** (via digitization) – multiple resilience levers, such as early warning systems, scenario planning, forecasting etc. can be implemented on top of rich, transparent supply chain data. Availability of rich historical data can also enable use of **dynamic optimization and advanced analytics methods**, such as:

- Digital twins for – a) predicting future issues in plant equipment; b) dynamic inventory placement
- Dynamic multi-echelon inventory optimization

- Risk-based re-allocation of strategic inventory i.e., reduce inventory for low-risk SKUs and increase for high-risk SKU or SKUs where downtime would mean significant lost revenue/margin
- Demand sensing and shaping
- Tactical and mid-term supply chain planning (incl. demand/supply planning, inventory mgmt.)
- Sales and operations decisioning based on different customers' cost-to-serve

In addition to digital-based levers, successful organizations also collaborate with suppliers and customers to get strong supply/ demand signals and plan better.

- **Design adaptability:** To improve design resilience, organizations can use **complexity reduction principles** like SKU rationalization, production postponement and modularization. **Clean-sheeting of product designs** can reduce complexity and optimize design-to-value, while addressing latest supply chain constraints, environmental cost, & upstream supply needs.
- **Dynamic sourcing:** These strategies focus on increasing flexibility of material sourcing, establishing N-tier supplier visibility and creating strategic supplier partnerships. **Flexible sourcing** can be achieved by instituting processes for spot procurement & multi-sourcing, using flexible supplier contracts (e.g., no-penalty agreements) and creating standard playbooks for tackling sudden changes in material availabilities/ timelines/ prices. **Strategic partnerships** help minimize supplier risks via partial backward integration e.g., buying raw materials on suppliers' behalf, providing advice/ expertise/ capital to suppliers, acquiring controlling stake etc. Finally, **N-tier supplier visibility** enables continuous supplier risk monitoring and sets processes for rapid re-negotiations & RFPs in response to cost increases or supply shortages.
- **Manufacturing flexibility:** Organizations can look at improving asset and labour flexibility to increase manufacturing resilience. Asset flexibility entails use of best practices like enabling mfg. lines to produce multiple products, reducing changeover time between products, agile scheduling (incl. rapid production ramp-up/ down), and utilizing digital & analytics to predict/ assess discontinuities. **Labour flexibility** equips plant manpower to leverage asset flexibility by implementing elastic work-shift structures

to ramp-up/down workforce, upskilling and multiskilling across mfg. lines/ products and enhanced labour planning. Workstation automation is another important lever to boost manufacturing resilience.

- **Multi-channel fulfillment:** Achieving resilience in product delivery requires dynamic optimization of transport routes & modes, based on real time cost, schedule, and ESG impact data. Organizations use a variety of sub-levers such as direct shipment from plants, warehouse network redesign, outsourcing to 3PL/4PL players and strategic delivery partnerships with competitors/ 3PLs further minimize delivery risks.

C. Institutional Resilience

The final resilience pillar leverages 3 critical enablers to prepare the organization for the 5 remaining types of supply chain risks, as explained below:

- **Risk management:** Building a proactive risk management culture in the organization requires re-wiring management processes to periodically undertake risk-identification exercises (e.g., pre-mortems, social media listening, E2E supply chain digitization), adopt org-wide risk-scoring frameworks and launch targeted mitigation measures (e.g., preparing for sensitive supply chain financials, assessing current supply chain w.r.t. regulatory standards). Lastly, appropriate governance structures, such as monthly/ quarterly reviews, disruption scenario-based risk management SOPs, external audits, etc. are needed to close risk management gaps.
- **Technology enablement:** This lever emphasizes on building a strong tech backbone for the supply chain to avoid loss/ misuse of confidential data. Some of the key digital strategies used by successful companies are - moving from On-prem to Cloud based solutions/data storage, building network redundancies for various parts of the supply chain (e.g., procurement, production, delivery systems), periodically assessing cyber-security hygiene, and using advanced analytics to build risk management tools & enable algorithmic risk rating of supply chain.
- **Talent resilience:** This lever addresses the human aspect of resilient supply chains. Being prepared to respond swiftly to supply chain disruptions requires **agility and flexibility in org. structure and decision making** (e.g., lower span of control and layers in hierarchy, crisis/disruption

scenario-based roles & responsibilities and SOPs), **capability building** (esp. on supply chain resilience topics) and **ingrained culture of risk management** (say by defining and incentivizing resilience related KPIs in employee goal sheets).

Transforming supply chain resilience

Resilience transformation is an 9-12 month journey for most organizations, and successful implementation requires them to undertake 3 critical steps, as shown in Exhibit 5.

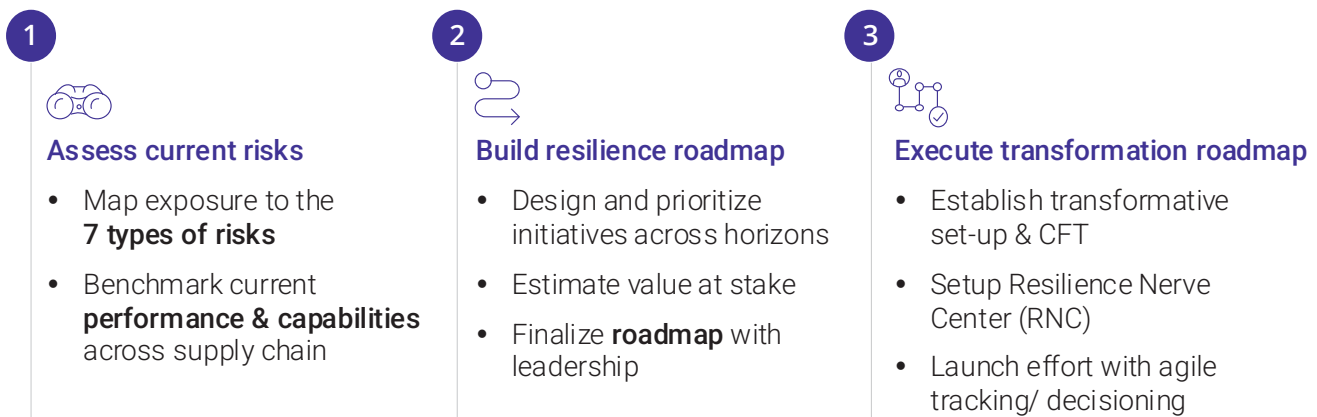
The key to get sustained impact from transformation effort is to establish a “Resilience Nerve Center” (RNC) at the heart of your operations. The resilience nerve center is a **cross functional** executive decisioning body responsible for running/ managing predictive efforts (e.g., demand forecasting, early warning systems), maintaining oversight over suppliers/ market/ org. metrics, and taking calls on overall supply chain planning & optimization.

By seamlessly connecting various information sources (internal structured, internal unstructured, external structured and external unstructured), with the supply chain, a resilience chain nerve center becomes the “enterprise brain.” Its promise stems from a new ability to sense high-impact threats and opportunities across the extended supply chain visibility (partner, organizational and market), predict early warning signals of risks & exceptions and respond through “what-if” scenario planning and dynamic optimization, so they can be addressed quickly and collaboratively (Exhibit 6).

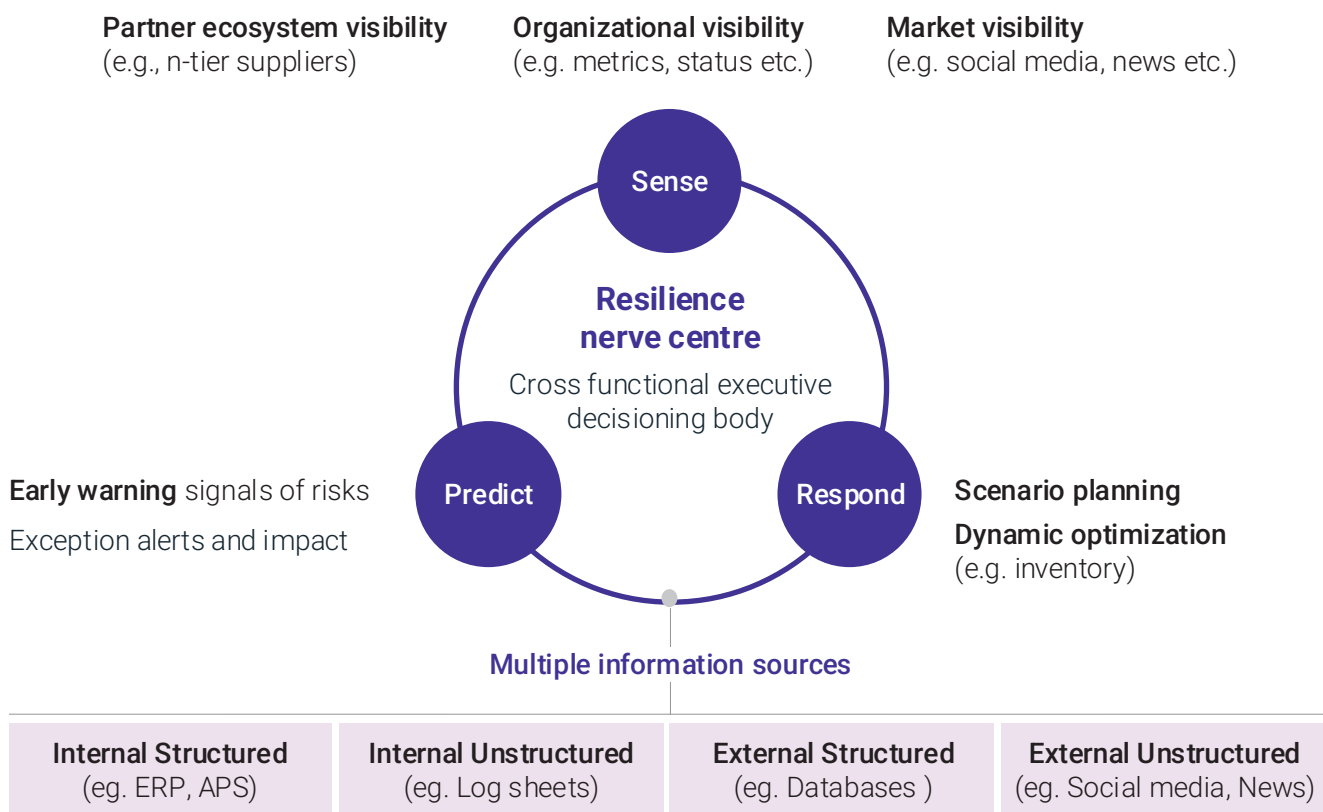
These new capabilities can support resilience, as all actors move in concert with another, rather than acting individually on outdated data—and then firefighting to realign. Because all data sources and projections use a single, interconnected engine, planners have a more complete view of how every decision affects all areas of the supply chain. This resiliency and transparency allow them to be more confident that recommended plans are feasible for everyone and optimal for the enterprise, leading to fewer iterations (and emergencies).

But while the end-state vision is relatively clear, it is less obvious where to start and how to get there. A big-bang approach, bringing in all data at once, is usually too daunting and runs the inherent risk of never-ending implementations because of its massive complexity.

Approach to rapidly Assess, Design and Execute supply chain resilience



Resilient Never Center at the heart of operations for holistic resilience transformation



At the other extreme, narrow pilots may be easier to start, but yield limited impact and rarely scale to more complex scenarios.

An alternative identifies a few high-impact, cross-functional use cases that, when interconnected, unlock value and create a foundation for further scaling as the changes build momentum. The exact combination of connections will naturally vary according to the organization's needs and capabilities.

Successful supply chain resilience transformations require **cross-functional buy-in** from the organizational leadership, focus on all **3 types of resilience build, digital-first approach** to capability building, and most importantly, a **radical mindset change** to embrace supply chain risk as the new BAU, not as life insurance. For many companies, this will likely require a change in mindset from the top leadership, with new resilience metrics being considered alongside the traditional ones focused on cost, capital usage, service, and quality.

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