Leading organizations strive to balance a focus on foundational capabilities with the pursuit of innovation. This Hype Cycle offers supply chain strategy leaders a snapshot of the maturity and benefits of key technologies, competencies and frameworks to support their goals.

Analysis

What You Need to Know

A defining characteristic of leading supply chain organizations is their ability to balance building a foundation to support operational excellence while simultaneously pursuing innovation to fuel long-term growth. At any point in time, they are capable of managing a portfolio of initiatives and investments in both mature and emerging capabilities.

For example, a supply chain organization might be revisiting the center of excellence organization structure while articulating its digital supply chain strategy. It might be doubling down on investments in cost-to-serve analytics while crafting its vision to embrace the circular economy.

To support CSCOs and supply chain strategy leaders, this Hype Cycle presents key capabilities spanning technologies, frameworks and operating models. For each capability, it describes its maturity level, business impact and potential obstacles. The Hype Cycle also offers supply chain leaders guidance for successful adoption.

The Hype Cycle

This Hype Cycle organizes the key capabilities into five categories:

- **Technologies:** These include digital supply chain twin and RPA.
- **Competencies:** These span machine learning, metrics and data literacy.
Examining the Hype Cycle, there are a healthy number of capabilities to the left of the peak, reflecting the many emerging capabilities that supply chain organizations are currently experimenting with.

For the capabilities heading toward the Trough of Disillusionment, there is a realization that, while essential, they don't all result in better supply chain performance. Organizations are looking to scale their adoption of tried-and-true capabilities, on the right side of the trough. These currently include network design, descriptive analytics and cost-to-serve analysis.

This year's Hype Cycle sees two new additions compared with 2020: supply chain resilience and diversity, equity and inclusion (DEI).

**Supply Chain Resilience**: More than ever, the pandemic has underscored the need for supply chain resilience. This is the ability of an organization to avoid or absorb the business impact of major disruptions through a risk-balanced approach to product design, supply chain strategy and network design. Achieving a resilient supply chain that maintains the ability to execute under stress and recover from it will be impacted by how well the CSCO achieves alignment across business peers in the executive suite.

**Diversity, Equity and Inclusion (DEI)**: This concept spans:

- **Diversity**: The collective mixture of differences and similarities that includes, for example, individual and organizational characteristics, values, beliefs, experiences, background, preferences and behaviors.

- **Equity**: Fair treatment and equality of access to opportunity, information and resources, built through identification and elimination of unfair biases, stereotypes or barriers that may inadvertently exclude underrepresented employees.

- **Inclusion**: The achievement of a work environment in which all individuals have equal access to opportunities and resources and can contribute fully to the organization's success.
You might notice that Supply Chain Risk Management has dropped the “End-to-End” qualifier, reflecting the broader understanding of the span of risk management practices. Similarly, the qualifier “Performance Management” was dropped from Metrics and Performance Management, as it is becoming superfluous when describing the scope of “Metrics” as a supply chain framework.

**Figure 1: Hype Cycle for Supply Chain Strategy, 2021**

The Priority Matrix helps supply chain strategy leaders identify the immediate and future opportunities to adopt technologies and build supply chain competencies based on their potential impact and maturity.

It is imperative that supply chain strategy leaders examine the trends whose benefits are transformational or high, and will reach the Plateau of Productivity in less than five years. If they haven’t done so yet, then they must dedicate resources to quickly build or expand competencies, such as a center of excellence and network design, that will soon become standard business practices.
Adopting the capabilities whose benefits are categorized as transformational or high that will plateau in five to 10 years in the Priority Matrix is critical to future competitiveness. For example, embracing ESG or digital security can position the supply chain organization for long-term, scalable and sustainable business growth.

Although it will be more than 10 years before capabilities like artificial intelligence, digital twins and modular operating models reach the Plateau of Productivity, strategy leaders must realize their potential for business transformation and start active exploration and experimentation. This understanding will afford them an active role as key partners in crafting the organization's long-term business direction.

Table 1: Priority Matrix for Supply Chain Strategy, 2021
(Enlarged table in Appendix)

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Years to Mainstream Adoption</th>
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<tr>
<td></td>
<td>Less Than 2 Years</td>
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<tr>
<td>Transformational</td>
<td>Customer Experience</td>
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<td></td>
<td>Diversity, Equity and Inclusion</td>
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<tr>
<td>High</td>
<td>Center of Excellence</td>
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<td></td>
<td>SC Segmentation</td>
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<td>Moderate</td>
<td>RPA</td>
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<tr>
<td>Low</td>
<td>Immersive Experience</td>
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Source: Gartner (August 2021)
Off the Hype Cycle

Descriptive Analytics and Diagnostic Analytics: Both techniques — as stand-alone capabilities — have reached the Plateau of Productivity. Now, they have become foundational, embedded in other frameworks like Cost-to-Serve Analysis, Supply Chain Control Tower and Metrics.

Internet of Things: IoT is an underlying technology that is an important data feed for deriving insights through supply chain analytics. We have retired IoT as a stand-alone capability as we believe the head of supply chain strategy would not develop a specific IoT strategy but instead will rely on specialists in operational technology to determine the best approach to leveraging IoT for supply chain insights.

Natural Language Generation: Natural language generation (NLG) automatically creates linguistically rich description of insights found in data. We have retired NLG as we believe supply chain strategy leaders would not pursue this functionally independently. Instead, the functionality would be offered in other capabilities like artificial intelligence or reporting.
On the Rise

Modular Operating Model

Analysis By: Jennifer Loveland

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

A modular operating model (MoM) breaks activities into composable chunks to enable plug-and-play process agility in meeting changing business and customer needs. MoMs are an advanced process segmentation that enable quick delivery of new capabilities and outcomes.

Why This Is Important

MoMs achieve different outcomes by composing independent service or capability building blocks together. Modularity increases the speed to shift capability, resource, governance and value stream components. MoMs allow fluid organizational structures and asset ownership, increasing flexibility over static one-size-fits-all or segmented designs. Capabilities drive design and operation (resource and cost alignment, investments, governance and metrics).

Business Impact

MoM adoption increases resilience to disruptions. It supports growth, changing business models and fluid, complex requirements. MoM counters external disruptions by increasing the speed to adapt, innovate and create new outcomes. Emerging in physical-oriented functions such as supply chain, MoM builds on IT service architectures. High-tech, food, consumer goods and healthcare industries have early SC MoM examples and adoption should progress across all industries.

Drivers

- Positioning: Continual disruptions and digital technologies’ simplification drive Hype Cycle progression.
Adoption: Organizational complexity and change fluidity drive required modularity. High-tech tends toward full modularity, most industries use partial modularity. Competitive advantage and external catalysts prioritize where to build modularity. Variability in modularity need and complexity to implement will lead to an extended adoption over more than 10 years.

Pandemic adoption acceleration: Maximizing supplier and capacity redundancy to provide options and resilience to disruption. Supply chains increased long-term modularity while adjusting processes to add suppliers or capacity in days or weeks, rather than months or quarters.

Support growth: Enables cost-effective support of low-volume and strategic plays or high-volume, short-term bursts; agility and resilience when lacking necessary infrastructure; brings new solutions to market, including offers that include physical, digital and service components.

Resource flexibility: Allows testing of a concept before heavy capital investment, optimizes for tax and tariff shifts, capitalizes on new market entrant innovation, leverages new technologies (such as advanced analytics, 3D printing, IoT and smart machines) and provides redundancy options during disruption.

Rapid context shifts: MoM shortens the time to create a new outcome. It enables profitable growth by allowing cost-effective handling of complexity. An increased focus on operating model speed to launch occurs due to: increased frequency and impact of disruptions; large demand swings (i.e., 400%+) driven by events (i.e., influencers); hypercompetitive industries; product, market and channel proliferation; increasingly diverse customer expectations; emerging digital technologies that change how processes are done; evolving business models; large partner ecosystems and service providers offering new models and technologies; and accelerated merger, acquisition and divestiture activity.

Obstacles

Large-scale change failure: Complexity of broad behavior change and new operational structures leads to execution failures.
Misaligned incentives: Lack of C-suite sponsorship and insufficient incentives for change from resources that the organization does not directly control (i.e., ecosystem partners, suppliers, customers, competitors) limits design options and benefits. Commercial struggles to articulate new value propositions and align incentives which slow adoption.

Lack of maturity: Successful implementation generally occurs above Level 3, which few supply chains have achieved.

Governance complexity: Lack of technology platforms and quality data to enable governance by capability limits design options, performance and speed of decision making. Ineffective coordination across organizations causes waste and unexpected results.

User Recommendations

- **Assess agility need** on a five- to 15-year time horizon by identifying areas of strategic importance, disruption, uncertainty or fluid requirements.

- **Postpone decisions and investments** to lock in how, where and what resources are used. Create modular providers (e.g., fast partner integration, redundancy), modular capacity or locations (e.g., mobile factories, pop-up warehouses or hospitals) or fully composable operating models.

- **Standardize interfaces** to allow quick changeover times between capabilities.

- **Implement a service catalog** providing a menu of well-defined activities or capabilities done with multiple standards.

- **Use a service portfolio** showing how standard components are used in common across processes for flexibility.

- **Provide service governance** where operational governance (accountability, performance, costs, resources and processes) is by service and desired outcomes.

- **Create a service strategy** of investments and change projects by service to support strategic goals, continuous improvement and innovation over multiple years.

**Gartner Recommended Reading**

*Video: Cisco — Supply Chain Services Orchestrating End-to-End Outcomes in a Fluid, XaaS Environment*
Circular Economy

Analysis By: Sarah Watt, Kristin Moyer

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

The circular economy is a practice that decouples growth from the consumption of finite raw materials. This concept is based on three principles: design out waste, keep materials in use at their highest quality as long as possible, and return material to the environment in a way that has a positive impact. The concept can be applied to products, supply chains, industry sectors or cities, enabling improved resource utilization, and in many instances, reduced environmental impacts.

Why This Is Important

The circular economy is an emerging trend, with the potential for rapid acceleration through mechanisms such as the EU Green Deal. It enables enterprises to improve raw material security and increase customer centricity through new business models. When embedded across an ecosystem, it enables goods to be kept in the economy at their highest value through innovative business models.
Business Impact

- **Value**: Circular economy drives value, allowing products to be returned, refurbished and placed back on the market, generating new revenue opportunities. For example, product-as-a-service business models extend the duration of touchpoint from a one-off sale to an ongoing customer lifetime relationship that goes beyond the life of one particular product.

- **Materials management**: As a minimum, the circular economy improves materials security by creating an ecosystem of raw materials.

Drivers

- **Financial drivers**: There are two financial drivers for the circular economy. First, in a constrained economic environment, customers may not have the appetite for large capital expenditure or the interest in owning assets, making new dematerialized or as a service business models more attractive. Second, in an uncertain and constrained trading environment, the circular economy provides access to another stream of raw materials, helping manage material price volatility.

- **Regulators**: Increased demands for state raw material security are being seen through public policy, such as the U.S. executive order on America's supply chains. The EU Green Deal includes a Circular Economy Action Plan, with a targeted sectoral approach to increase the utilization of resources.

- **Citizens**: Citizen consciousness on sustainability is high, with some being reflected in values-based procurement choices. Citizen movements are likely to increase pressure on governments and businesses to take proactive action on climate change. Circular products typically have a lower footprint than primary products.

- **Startup disruption**: Startup organizations using direct-to-consumer models with circular economy attributes have the potential to disrupt incumbents, tapping into consumer sentiment. For example, Remedichain takes back unused prescriptions, donating them to those in need.

- **Societal ecosystems**: Cities and intelligent urban landscapes are being created to bring business, local government, industry and citizens together, putting in place policy to manage resources, waste and urban assets. Many cities have committed to circularity through the circular cities declaration.
Obstacles

- **Design for circularity**: Poor design hinders circularity, as it increases end-of-life management costs associated with processing. Enterprises are putting in place circular economy design guides, such as Nike and IKEA.

- **Data alignment**: The circular economy creates a raw material ecosystem as opposed to a linear flow of material. Technology and data are needed to enable decision making about product processing routes so that material is returned to market as quickly and cost-effectively as possible.

- **Cannibalization of market share**: A common barrier to moving circular economy projects beyond the pilot phase is concerns about cannibalization of market share. Enterprises must define how circular products will complement new, and in which markets these will be deployed to grow market share.

- **Orchestration**: The circular economy requires a different skill set, with the ability to orchestrate across the enterprise and with industry partners; creating joint value to achieve common outcomes.

User Recommendations

- **Pilot-to-scale**: Pilot circular economy initiatives address business concerns regarding market share cannibalization by modeling and demonstrating how circular products can be sold in new markets, creating value.

- **New business models**: Explore new business models, which will increase customer centricity, but also enable the enterprise to plan for when it will receive returned products.

- **Design**: Use product design guides to prompt circular economy attributes to be included in the design process to enable ease of refurbishment, parts harvesting and recycling.

- **Partnerships**: Identify strategic partners, suppliers, startups and waste contractors, building alliances to create joint value and benefit from circular economy activities.

- **Data**: Build circular economy requirements into the enterprise's digital strategy. Define where data and automation can enhance decision making and speed up return of product to market.
Gartner Recommended Reading

Supply Chain Executive Report: Close the Loop to Create Future-Fit Raw Material Strategies

Employ Digital Technology to Enable a Circular Economy

Sustainable and Circular Supply Chain Evolution or Revolution

Video: Accelerating the Circular Economy at HP Inc.

Video: Lenovo — ONE Planet, ONE Goal Circular Economy and Innovative Packaging

Supply Chain Control Tower

Analysis By: Christian Titze

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Adolescent

Definition

Gartner defines supply chain control tower as a concept combining people, process, data and organization facilitated by appropriately combined technology elements. The task is to establish a central hub, preferably as an integrated part of a broader SCM platform, to capture and use data — structured and unstructured, internal and external — to provide enhanced visibility for short- and midterm decision making aligned with strategic organizational objectives.

Why This Is Important

Gathering, analyzing and using data to drive effective supply chain decisions are the biggest challenges for CSCOs. To be successful, supply chains must act within a business ecosystem rather than as stand-alone and disconnected activities. Visibility is about building the foundation, providing E2E data-driven insights as the basis for E2E smart decision making at various levels of granularity and time horizons.
Business Impact

Fundamental control-tower-type, technology-enabled capabilities, such as exception alerts and interactive dashboards to support areas like capacity shortage, inventory shortage or late shipments, are now foundational and fairly standard to modern SCM solutions, allowing the business to become more predictive and automated. However, advanced capabilities such as impact analysis, scenario simulation or a collaborative resolution/response room are lagging behind.

Drivers

- Companies are looking to develop a set of playbooks of appropriate actions and reactions, allowing them to enable visibility into current and predicted situations. This will enable companies to understand related impacts (financial impact or impact on other strategic and/or corporate metrics) and to provide options that identify suitable resolutions within a business ecosystem.

- Investing in such capabilities will: help increase visibility, process orchestration and aligned decision making by breaking down functional silos; allow scalable, timely and financially sound decision making; and increase performance (e.g., improved forecast accuracy, perfect order rates, inventory turns or customer satisfaction; reduced inventory, operating and expediting cost or costs of ownership).

- The need to develop and converge E2E aligned decision making (aka planning) and E2E supply chain visibility will eventually drive the coalescence of the digital supply chain twin and a single E2E supply chain control tower.

Obstacles

- The term control tower still means many things to many people, creating a recipe for confusion in the marketplace and making it difficult for buyers to select appropriate solutions. For many companies, control towers are designed as war-room-like environments that are focused on visualization and dashboards, are still more functionally siloed in their setup, and do not provide the anticipated E2E visibility, control, and decision-making support.

- Companies need to be mindful that they need to map out in their journey an E2E control tower versus a more functional approach, also being aware of major concerns, including: lack of clarity on the span of control, which processes to cover; resistance breaking down functional silos; functionally focused resource pool with deep yet siloed expertise; legacy organizational design constraints with often misaligned objectives; question on actual data ownership; no consensus on build-versus-buy decision; and inability to identify the right technology requirements.
User Recommendations

- Include this capability as being an inherent part of the overall SCM technology landscape, and in alignment with your overall supply chain and business strategy.

- Assess your current application landscape if eventually existing tools could be leveraged.

- Be aware that effective control tower type capabilities come from an appropriate combination of people, process and organization, together with big data and various categories of technology that have to combine in a suitable way.

- Distinguish between foundational capabilities (e.g., visibility, indicators, workflow) and advanced capabilities (e.g., simulation, recommendation, and automation).

- Learn that existing offerings serve a limited set of use cases. These often have a lack of intelligence capabilities and do not support E2E supply chain convergence.

- Select a platform that can grow with you as your needs mature through the upper stages of supply chain maturity. Look beyond the marketing hype when it comes to investing in technology.

Gartner Recommended Reading

How to Ensure Your Supply Chain Visibility Initiative Succeeds

What You Need to Know About Control Towers but Had No Time to Ask

Predicts 2021: Supply Chain Technology

Data Hubs, Data Lakes and Data Warehouses: How They Differ and Are Used in Supply Chain

Supply Chain Brief: Navigating Through the Ever-Increasing Complexity of Application Architecture

Artificial Intelligence

Analysis By: Noha Tohamy

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience
Maturity: Emerging

Definition

Artificial intelligence (AI) applies advanced analysis and logic-based techniques, including machine learning, to interpret events, support and automate decisions, and take actions. In the supply chain, AI can be deployed to improve supply chain functional and cross-functional performance. It augments human decision-making ability or automates routine and nonroutine tasks.

Why This Is Important

AI is a prerequisite to supply chain digitization. Unlike traditional decision support, AI combines a variety of data science techniques to analyze large sets of data. AI identifies and predicts patterns, and learns from past performance to arrive at conclusions. AI augments human decision making with actionable recommendations. AI supports the vision of digitalization by automating decisions and execution with little to no human intervention.

Business Impact

With increasing complexity, supply chain talent struggles to contextualize events, understand trade-offs and make timely decisions. With AI, organizations can support decision makers with data-driven insights and recommended actions. With more confidence in AI’s insights and conclusions, companies can further automate decision making, allowing a more agile and dynamic response. This will, in turn, free up human talent to take on higher value-added responsibilities.
Drivers

- Continued interest in AI from supply chain leaders looking to alleviate supply chain talent shortages
- Ability of supply chain technology providers to embed AI capabilities — such as machine learning or natural language generation — into their existing solutions
- More best-of-breed, AI-oriented supply chain technology vendors that position their solution as a complementary intelligence layer to augment current supply chain solutions
- Identifying more use cases for AI within individual functions such as planning, sourcing and manufacturing
- Interest in using AI to augment decision making with better actionable recommendations
- A better articulated vision for automating supply chain decision making, beyond initial use cases like demand forecasting and demand sensing
- Emphasis on supply chain agility as organizations cope with significant spikes in demand and supply variability due in response to the pandemic

Obstacles

- Continued challenges with the availability and quality of data that can accurately represent a supply chain process
- Limited data required to effectively train AI algorithms and generate accurate recommendations
- Shortage in data science talent attracted to supply chain organizations due to organizations’ technical immaturity and lack of attractive career paths
- Lack of organizational readiness to adopt complex AI solutions and rely on them in mission-critical decisions
- AI initiatives are mostly pilots, with few deployments — at scale — that have demonstrated technology maturity and ability to support supply chain objectives.
- Lack of transparency in AI technology, further challenging the willingness of users to trust their output
User Recommendations

- Experiment with AI in lower-order supply chain processes such as improving data quality and data harmonization.
- Engage directly with vendors to understand the role AI plays in current offerings, and how AI fits within the future product roadmap.
- Focus on specific use cases where you believe AI presents the highest potential, and embark on small pilots to gauge potential benefits and challenges to success.
- Ensure the availability of data science resources, internally or from service providers, to build and maintain AI solutions.
- Focus on cultural changes to ensure that the organization is in step with the AI vision. This includes training supply chain users on incorporating AI into their decision-making process.
- Define new career opportunities for supply chain users to pursue, once their nonroutine tasks are automated with AI.

Sample Vendors

Aera; Coupa; IBM; Noodle.ai; OMP

Gartner Recommended Reading

Infographic: Artificial Intelligence Use-Case Prism for Supply Chain

The 2021 Supply Chain Technology Themes

Agile Teams

Analysis By: Ken Chadwick

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Emerging
Definition

Agile teams are small, multiskilled groups with defined decision authority to deliver fast-cycle solutions for supply chain projects, innovations or challenges. They work in iterative cycles to design and implement minimum viable solutions. With a high tolerance for ambiguity and risk, they test assumptions as solutions are applied to real-world operations, redirecting actions quickly as they learn.

Why This Is Important

As disruptions continue to hit the supply chains, the theme of agility continues to increase in importance. Companies are looking to organize people to both respond to disruptions and to innovate in shorter cycles of decision making. Agile teams are one solution to this organizing challenge.

Business Impact

Gartner has seen successful application of agile teams to speed solution development in disruptions (trade and tariff network realignment), as well as in supply chain operations (manufacturing planning). Companies can use agile teams to increase the pace and adoption of innovations (digital technology), engage in better user design for supply chain processes (S&OP) or to get better outcomes from supply chain technology (planning systems).

Drivers

Agility is a core challenge for many supply chain leaders, driven in part by recent disruptions in supply chain as well as the need to innovate more quickly to keep pace with competition. Some of the specific drivers behind agility and agile teams are:

- A focus on delivering business-defined outcomes (reduced inventory, improved network capacity, etc.) at a faster pace.
- The need to speed up decision making in response to supply chain disruptions.
- Increased focus on end-to-end supply chain management, aligning goals and motivations of teams to business or customer outcomes rather than functional outcomes.
- A desire for faster cycle time for solution delivery (faster time to market) for either new products or process changes in the organization.
- Leaders wanting to deliver better user-defined outcomes (usability) in their systems and solutions.
The COVID-19 pandemic has heightened interest in the notion of agility:

- The lack of organizational structure solutions to delivering faster decision making and outcomes for the business.

The pandemic response has shown in real time that agile teams, in their many iterations, have the ability to make faster decisions in response to business needs.

- Companies are realizing that neither the pace of disruption, the pace of business, nor the pace of innovation will be slowing down.

- Many supply chain leaders are realizing that they cannot solve the agility problem with structural solutions (i.e., continuous realignment of supply chain organization structure), given that restructuring itself takes time. Agile teams then become a natural solution to the agility problem at hand.

**Obstacles**

- While “agile” is often in the press, we do not currently see significant application of true agile methods to team-based work in supply chains. Perhaps this is because the industry is conflating agility (speed of decision making) with more formal agile approaches.

- There are limited examples emerging of companies applying agile methodology (a descendant of IT agile) to supply chain environments. Those limited examples are picking up on agile team constructs, agile mindsets, sprint methodology and the concept of minimum viable product to accelerate time to development of innovations, projects or solutions to disruptions.

- While there is a lot of hype around agility, we see few instances in supply chain organizations where an agile team has elements of agility beyond being nonhierarchical and moving quickly.
User Recommendations

- Develop a clear definition for your agile teams. A typical agile team should have: a small team with representation and skills needed to design the solution with the customer in mind; clear accountability for decision making and access to enough information to make decisions; understanding of the goals and design parameters of the project; and an agile development process with work broken down into sprints to ensure fast-cycle design, test and delivery (defined as the "minimum viable product").

- Empower your team to make decisions and accept the risks of failure that come with each sprint. The team must embrace its decision-making role, be willing to make decisions with less than perfect information, be willing to take risks, and to deliver the MVP while learning from each success and failure.

Gartner Recommended Reading

Adaptive Decision Process (Schneider Electric)

The Agile Supply Chain Imperative: Empowering Agile and Self-Forming Teams

Survey Analysis: How Decision Making Can Drive an Agile Supply Chain Culture

Supply Chain Executive Report: Designing a Social Supply Chain

Digital Supply Chain Twin

Analysis By: Tim Payne

Benefit Rating: Transformational

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Definition

A digital supply chain twin is a high-resolution digital model of the physical supply chain used to make decisions across an E2E supply chain. It replaces the supply chain models that sit at the heart of any E2E supply chain decision-making environment. It is built from granular data to form a dynamic, synchronized, real-time representation of the various associations between the data objects and entities that ultimately describe and make up how the physical supply chain operates in reality.
Why This Is Important

The digital supply chain twin was born out of the world of supply chain planning, which is essentially decision making. Its primary purpose is to enable higher quality decision making for the end-to-end supply chain. This increase in decision quality is the essence of the supply chain planning maturity journey that companies embark on. Therefore, it sits at the heart of any digital planning initiative and is transformational.

Business Impact

- Any company with a supply chain looking for higher maturity planning/decision making should care about acquiring a digital supply chain twin. Hence the amount of hype surrounding it.
- Key impact is through the resulting high-quality decisions (e.g., plans and scenarios) an organization can drive, with increased value generation and reduced value loss.
- A digital supply chain twin enables the digitization of planning by aligning and automating decisions, raising the impact of low latency and granularity data, and providing the basis for innovation.
Drivers

- The majority of technology providers working in the supply chain visibility and decision-making space are messaging around digital supply chain twins. This is increasing the hype. Vendors in areas such as supply chain planning, supply chain analytics, supply chain visibility, big data and machine learning are marketing their interpretation of the digital supply chain twin.

- The evolution (and combination) of technologies such as hyperscale cloud platforms, AI and ML, and graph data models is helping data-derived digital supply chain twins to emerge to replace previous human-derived abstract models of the E2E supply chain.

- The end-user market’s desire for outcomes such as agility, responsiveness and resiliency through the application of E2E visibility, insight and recommendations is driving significant interest in digital supply chain twins.

- The end-user market’s desire to move away from fragmented and siloed decision making to horizontally and vertically aligned decision making is driving significant interest in digital supply chain twins.

- The end-user market’s desire to digitally transform E2E supply chain planning is driving significant interest in digital supply chain twins.

- The market desires to enable end-to-end visibility and support end-to-end decision making by being in lockstep with the real-world supply chain. Through this linkage to the real world, situational awareness, supply chain decision making and risk management are greatly enhanced. Moreover, a digital supply chain twin provides the basis on which all existing and new predictive and prescriptive analytics can run, allowing their full value to be realized by the organization.

- The desire to converge execution visibility and decision making is driving significant interest in digital supply chain twins.
Obstacles

- Acquiring a digital supply chain twin is not easy — it is an emerging capability. Gartner has yet to see a fully evolved digital supply chain twin at either a technology provider or an end-user organization.

- A digital supply chain twin evolves in breadth and depth dimensions — breadth in terms of scope of the supply chain that is being modelled, and depth in terms of how detailed and synchronized to real world that model is. This often leads to initiatives trying to address each dimension separately and potentially missing the required connection between model breadth and model depth that a digital supply chain twin requires.

- Enabling a fully evolved digital supply chain twin requires the ability to handle and process huge amounts of low latency granular data from numerous internal and external data sources. These issues will take significant time to fully resolve.

- There is significant confusion between digital supply chain twins and control towers, which is slowing the progress.

User Recommendations

- Take an uncompromising position on reducing planning solution models across the supply chain. A digital supply chain twin initiative implies a single model of the E2E supply chain.

- Establish a roadmap that incorporates the evolution from breadth and depth perspectives. Understand that acquiring a digital supply chain twin is a journey and a fully evolved one cannot currently be purchased or built. Drive the breadth through the supply chain planning (SCP) technology roadmap and the depth through the execution visibility/control tower roadmap.

- Merge the technology roadmaps for the digital supply chain twin and visibility control towers at an appropriate point along the breadth and depth spectra.

- Examine early opportunities to add digital-supply-chain-twin-like capabilities (e.g., predictive lead times and throughput rates) to your existing technology landscape. This might involve pairing up the new capability with existing supply chain visibility and/or planning executional solutions. Be prepared to experiment and/or go outside of your usual technology providers to get this capability.
Gartner Recommended Reading

Supply Chain Brief: Digital Planning Requires a Digital Supply Chain Twin

Mastering Uncertainty: The Rise of Resilient Supply Chain Planning

Innovation Insight for Resilient Planning

Innovation Insight for Digital Supply Chain Twin
At the Peak

Data Literacy

Analysis By: Noha Tohamy

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

Data literacy is the ability to read, write and communicate data in context, with an understanding of the data sources and constructs, analytical methods, and techniques applied. It is the ability to describe the use-case application and resulting business value or outcome.

Why This Is Important

With increased complexity, the need for data-driven decision making is pervasive across supply chains. Yet, organizations continue to cite lack of talent and cultural readiness as major hurdles for returns on investment. Data literacy offers the staff the requisite foundational principles in data and analytics to support more adoption. This spans their knowledge of data constructs and analytics approaches. With higher levels of literacy, organizations are more successful at leveraging data and analytics to maximize their value.

Business Impact

The ability of the supply chain organization to embrace and leverage data and analytics is critical for supply chain digitalization. Data literacy allows the staff to understand the data elements needed to represent supply chain conditions. A data literate organization appreciates the role of analytics in turning data into insights. Data literacy training drives organizational change by helping the users articulate the business value generated by data and analytics.

Drivers

- A majority of supply chain organizations have been actively investing in digital technologies that rely on data and advanced analytics.
To support their organization’s digital readiness, leaders are investing in their staff’s overall digital competencies.

Supply chain organizations seek to increase the adoption of data and analytics initiatives by educating their staff on how to leverage data and analytics insights in their decisions.

There is a growing realization by supply chain leaders that the lack of data literacy is at the root of unsuccessful data and analytics initiatives.

As analytics become pervasive in supply chain decision making, foundational understanding of analytics techniques and their role in use cases enable business users to effectively leverage data and analytics while still capitalizing on their domain expertise.

Analytics leaders’ need for building a business case for additional funding depends on the users’ ability to articulate business value, which is one of the tenets of data literacy.

**Obstacles**

- Data literacy initiatives intended to drive organizational change can be overwhelming to immature organizations still focused on building the technical foundation for data and analytics.
- A piecemeal approach to data literacy training and certification.
- Lack of initiatives to address cultural and data literacy challenges within strategies and programs.
- Lack of support and sponsorship of business leaders, focusing more on short-term, more critical supply chain priorities.
- Lack of understanding of the required scope of data literacy training programs and how to measure their efficacy.
- Lack of clarity of scope of services from external service providers, whose data literacy programs can range from training on visualization to fostering curiosity in data and analytics.
- Weak governance of data literacy training program with lack of clarity on ownership among supply chain, HR, and data and analytics functions.
User Recommendations

- Connect data literacy to improved supply chain performance and business outcomes.
- Tailor data literacy training programs to different user persona and business roles.
- Use data literacy assessments to evaluate current data literacy levels and desire to participate.
- Partner with HR to create a comprehensive curriculum, align and connect to competency models, role description, and career paths.
- Define data literacy as a required competency to future supply chain jobs.
- Identify service providers that have a defined data literacy training offering or partner with trusted service providers to develop a tailored training program.
- Go beyond vendor product training to focus on people’s other role-related skills.
- Use a mix of training delivery methods (classroom, online, community, on the job) to improve overall learning effectiveness.
- Ensure a top-down executive sponsorship to evangelize the need for data literacy.
- Track and measure the efficacy of data literacy programs to refine content and methodology.
- Build communities of practice to share knowledge, best practices and lessons to keep staff engagement, and create a fun learning experience.

Gartner Recommended Reading

Unlock Supply Chain Digitalization With Data Literacy

Toolkit: Assessment of Data Literacy in the Supply Chain

Roadmap for Data Literacy and Data-Driven Business Transformation: A Gartner Trend Insight Report

Data Literacy Providers Will Accelerate the Time to Value for Data-Driven Enterprises

Supply Chain as a Service

Analysis By: Michael Dominy
Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition
Supply chain as a service (SCaaS) is an externally focused revenue-generating digitally enabled service that delivers ongoing management of one or more supply chain functions to other enterprises. These services tap into business process expertise or operational capabilities of an enterprise or service provider to deliver revenue.

Why This Is Important
SCaaS is an opportunity to optimize costs and grow revenue by using existing or new capabilities to deliver one or more of the three types of SCaaS business models. First is operations as a service, which involves contracting out physical operations. Second is business process as a service, in which the provider or enterprise performs business process activities for others. Third is new or improved supply chain capabilities required to enable product-as-a-service offerings.

Business Impact
- Increased revenue for manufacturers, retailers, distributors or healthcare providers with factories, private fleets, warehouses or stores with operational capacity or business process capabilities to deliver physical or digital SCaaS to organizations
- Brand owners with as-a-service business models, particularly in high tech and industrial manufacturing industries
- Distributors, third-party logistics, consulting, IT, BPO and manufacturing providers targeting higher margin digital business services
Drivers

- **Digital business models.** Subscription- or usage-based as-a-service business models force a blurring or blending of what was historically the forward or delivery supply chain with the service and support supply chain. The supply chain organization must monitor the location, performance and needs of the product or asset after it has been delivered or installed. Service must be orchestrated from a physical supply perspective for items such as parts, but also from a digital perspective for needs like software patches and upgrades.

- **Pandemic.** The global pandemic upended established supply chains. Some industries such as retail experienced significant capacity issues, struggling to support the dramatic shift from store to e-commerce sales. Food and beverage manufacturers faced surging demand in the consumer channel and a big drop in food service volumes that previously went to restaurants and businesses.

- **Cloud platforms and applications.** Cost-effective availability of cloud computing infrastructure services, multitenant SaaS applications, open-source software and analytics tools have enabled service providers and some enterprises to create, launch and sustain supply chain business process services.

- **Connected and intelligent things.** Lower technology costs and increased connectivity with products changes what the supply chain function must do. In the past, the supply chain managed products. Today, intelligent connected things are starting to manage the supply chain essentially turning the supply chain organization as a service provider for the physical object. For example, a piece of equipment or appliance that is tracking inventory or activity on its own can order replacement inventory or create a service order.
Obstacles

- **Identifying and selling physical operational SCaaS.** Most buyer and provider matchmaking in physical operations has been between companies and providers versus company to company.

- **Onboarding SCaaS customers from a digital and process perspective.** Whether it is physical operations-as-a-service or business process services, integrating systems and defining roles, responsibilities and required activities is complex and time-consuming.

- **Differing commercial arrangements.** Instead of an order to cash process, with invoicing and collections triggered by a shipment, a contract with service agreements governs payments.

- **Transforming talent.** SCaaS requires new ways of working. Supply chain professionals must switch from an internal orientation to an external client mindset. Not all individuals are comfortable and skilled to do so. Because all SCaaS involve digital skills, individuals in the supply chain organization will need to develop or expand digital competencies.

User Recommendations

Enterprises such as retailers or manufacturers contemplating offering SCaaS:

- Determine physical asset SCaaS opportunities by analyzing capex and capacity forecasts.

- Evaluate which processes can technically support multitenancy and scalability requirements by reviewing your IT architecture.

- Assess your competitiveness by benchmarking your against existing providers including 3PLs, contract manufacturers and BPO providers.

- Create customer journey maps by documenting physical and digital flows from customers back through your supply chain.

Enterprises considering contracting for SCaaS:

- Target lower-performing supply chain activities by using maturity assessment and benchmarking.
Audit and monitor areas of higher risk such as global trade management by asking how systems such as denied-party lists are updated.

Assess SCaaS for specialized purposes such as network design or inventory optimization by assessing skills of those in the supply chain organization.

Sample Vendors
Arrow Electronics; Celestica; DHL; Entercoms; Genpact; Jabil; KPMG; Mayo Clinic; TCS; UPS Supply Chain Solutions

Gartner Recommended Reading
Supply Chain as a Service Converges Physical and Digital Supply Chain to Deliver Revenue

Take Four Steps to Develop Your Supply-Chain-as-a-Service Strategy

Market Guide for Supply Chain Strategy and Operations Consulting

Forecast Analysis: Digital Business Process Services, Worldwide

Magic Quadrant for Third-Party Logistics, Worldwide

Metrics for the Circular Economy: If You Can't Measure It, You Can't Manage It

Digital Security
Analysis By: Mark Atwood

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Adolescent
Definition

Gartner defines “supply chain digital security” as a holistic and integrated approach to protecting the supply chain from malware, implants, viruses, ransomware or other similar threats. Another term could be “integrated supply chain cybersecurity.” Supply chain digital security aims to protect data and IT, product, and “connected things” such as Internet of Things (IoT), cyber-physical systems, operational technology (OT) and physical technology (PT).

Why This Is Important

Supply chain cyberattacks continue to occur, and according to some reports, they are only growing. The latest data from the Identity Theft Resource Center (ITRC) indicates that there has been a “a 42% increase in the number of supply chain attacks in Q1 2021 versus Q4 2020.” It appears this data is specifically related to the software supply chain because it mentions specifically Accellion and SolarWinds. However, we clearly see spillovers into the “physical” supply chain, recent examples being Colonial Pipeline and JBS Foods. Supply chain leaders need to understand the extent of the threat and some mitigation techniques.

Business Impact

Failure can be crippling. There is a wide variety of highly undesirable outcomes that can result from a supply chain susceptible to a cyberattack. These include disruption of the actual operation of the supply chain, significant damage to brand and reputation, impact on product safety and integrity, loss or theft of IP, and substantial fines and fees.

Drivers

- Continued occurrence of threats impacting a variety of supply chains
- Automation and digitization of supply chains
- High costs associated with operational shutdowns
- Media visibility/awareness of some of the attacks
- Other roles in the supply chain becoming more aware of the threats in addition to CSCO, especially procurement and manufacturing
Obstacles

- Breadth of data and technology in need of protection
- Need for a joint response from supply chain and IT/information security
- Pace of threat expansion
- Lack of supply chain talent knowledgeable in this area
- Fragmentation of the security tools and solutions currently available
- Volume of upstream, downstream, and IT partners that present potential third-party cyber-risk to the supply chain
User Recommendations

- Partner with CIOs and IT security and risk management leaders to develop a governance model for identifying, assessing and addressing the various cyberthreats to the supply chain.

- Work across the supply chain to include cybersecurity strategy into the overall supply chain risk management approach.

- Assess the cyber talent need and required skill set for the supply chain organization. Become familiar with industry mitigation frameworks applicable to supply chain cybersecurity. Utilize the updated identify, protect, detect, respond and recover phases of the NIST CSF (April 2018) with IT to collaboratively protect and defend supply chain assets.

- Map the flow of high-value supply chain data and assets across systems outside their core IT systems, including equipment in manufacturing operations or logistics networks as well as software and hardware components within products. Assess their risk and security posture.

- Become familiar with the Cybersecurity Maturity Model Certification (CMMC) from the U.S. Department of Defense. This is a new compliance framework for doing business with the DoD, and supply chain leaders will need to adhere to this eventually when doing business with the DoD at any level.

- Conduct cybersecurity penetration testing exercises on your supply chain operations.

- Define security specifications with their high-value supply chain partners, then extend those to the extended network.

- Implement partner assessment and audit and ranking.

- Explore network segmentation, especially of the cyber-physical systems in the manufacturing networks.

- Identify those offerings that can be integrated to provide a complete supply chain cyber-risk management solution. Understand that few, if any, of the providers tackle all of the digital risk areas described above, yet are useful as they each address pieces of the overall puzzle.

Gartner Recommended Reading

Supply Chain Executive Report: Weathering the Storm — Supply Chain in an Age of Disruption
Customer Experience

Analysis By: Beth Coppinger, Jennifer Loveland

Definition

Customer experience (CX) is the customer’s perceptions and related feelings caused by the one-off and cumulative effect of interactions with a company’s employees, systems, channels or products. It links to CX management: the discipline of understanding customers and deploying strategic plans that enable cross-functional efforts and customer-centric culture to improve satisfaction, loyalty and advocacy.

Why This Is Important

Supply chain’s focus has expanded beyond sensing, shaping and responding to the demand signal to addressing the full range of customer expectations. This is driving an expanded focus beyond cost-efficiency to enhancing customer experience (CX). Digital is accelerating this transformation: 83% of supply chain leaders support improving customer experience as one of the top two drivers of digital business strategy, with another 14% planning to do so within the next two years.
Business Impact

55% to 60% of supply chain leaders cite customer satisfaction (a measure of CX) as a key driver of both top- and bottom-line growth. Adoption varies by industry, with high-tech and large energy companies leading, and life sciences, chemical and heavy industrial lagging. These trends have led to 10% to 25% of supply chains investing in customer collaboration, segmentation and targeted service initiatives each year, with improved value realization over the past three years.

Drivers

- Fewer forms of sustainable business differentiation, driving senior executives to have a greater focus on CX as a means of differentiation. This includes assigning “chief of CX” leaders, dedicated CX resources (centrally and within the SC function) and CX specific investment pulling SC into CX activities.
- Supply chain elevation as a strategic partner and portion of the value proposition that provides differentiation through better CX.
- Evolving customer expectations in business-to-business settings driven by increasingly convenient, personal and digital transactions as a consumer-consumerization of business CX.
- Greater customer access to information and power in the supplier-customer relationship, resulting in more customer willingness to switch suppliers and tell others about poor CXs associated with the supply chain.
- More case studies and documented evidence of businesses that are delivering excellent CXs via the supply chain, obtaining a positive ROI and demonstrating financial benefits as a result.
- Higher-profile examples of organizations associated with dreadful CXs that have humiliated management and damaged credibility and stock prices.
- Improved ability for technology to provide real-time insights on customer perceptions allowing a broad portion of the organization to take CX-focused actions.

CX is peak on the Hype Cycle, and we believe it will be two to five years before it becomes mainstream for all components of customer centricity to be standard across all aspects of design and operation within the supply chain. Adoption of, and supply chain focus on, customer experience should accelerate given the consistent CEO focus on customer-centric strategies to handle the increased uncertainty caused by disruptions and the rise of digital business.
Obstacles

- There are three key barriers to achieving excellence in CX: understanding customers, setting and adapting the strategic direction, and driving a customer-centric culture and governance.

- Supply chains with lower maturity lack an understanding of what customers want and focus only on providing fast, efficient, transparent transactional service. As the supply chain matures, the focus shifts to include a deeper understanding of customer wants and needs and enhancing CX. Many of these supply chains often underestimate investments required to build new capabilities to understand and respond to customer needs.

- SC struggles to break down functional silos to act on insights. Once a strong understanding of CX exists, it is challenging to drive an overall culture of CX into processes and decisions further removed from day-to-day customer interactions.

User Recommendations

Supply chain contributes to the holistic CX through design and operations:

- Align design strategy, operating model, measures, culture, products and service options to address customer needs/preferences and create competitive advantage.

- Deliver products, services and experiences reliably and seamlessly to meet customer expectations.

Actions often in support of companywide initiatives include:

- Elevate measures of CX (i.e., quality, reliability, customer satisfaction, loyalty, advocacy, service level, customer effort, employee experience).

- Create a SC CX leader role.

- Establish voice-of-the-customer programs and analytics to capture insights and create a feedback loop.

- Invest to anticipate unarticulated customer needs.

- Create personas and customer journey mapping to develop insights into gaps and pain points at critical customer touchpoints.

- Provide differentiated (segmented) customer service.
Create collaborative customer relationships in B2B (VMI, joint forecasting, joint innovation).

**Gartner Recommended Reading**

- The Gartner Customer Experience Management Maturity Model for Supply Chain Leaders
- Extend Your Supply Chain Service Metrics to Cover the Full Customer Experience
- Answers to Key Questions for Establishing a CX Program in Supply Chain
- How Supply Chain Leaders Can Use Voice of the Customer to Improve Customer Experience
- Customer Collaboration, Stages 2 and 3: Build the Foundation for Collaborative Customer Partnerships
- Supply Chain Customer Centricity Part 1: Leadership Alignment and Capability Development
- Supply Chain Customer Centricity Part 2: Leverage Personas and Journey Mapping to Understand and Design the CX
- Supply Chain Customer Centricity Part 3: Using Customer Journey Analytics to Enhance CX

**Supply Chain Blockchain**

*Analysis By:* Andrew Stevens, Dwight Klappich

*Benefit Rating:* High

*Market Penetration:* 5% to 20% of target audience

*Maturity:* Emerging

**Definition**

A blockchain is an expanding list of cryptographically signed, irrevocable transactional records shared by all participants in a predefined network. Each record contains a timestamp and reference links to previous transactions. With this information, anyone with access rights can trace back a transactional event, at any point in its history, belonging to any participant. A blockchain is one architectural design of the broader concept of distributed ledgers.
Why This Is Important

Supply chain blockchain pilots early small-scale deployments, tied to movements, contractual service requirements and transactions of physical goods, and continue to emerge with solutions in early stages of development. There are few, if any, supply chain blockchain projects being deployed at scale. Interest in potential applications across supply chains has slowed down despite the supply chain organizations continuing to show interest in blockchain potential.

Business Impact

Value perception of blockchain in supply chains has shifted significantly. In the last few years, there has been much interest, discovery and hype around potential platforms across supply chains. In 2020, shifts in revised value perception included assessing blockchains’ more agile role as a service to a broader portfolio of applications, its role in shaping digitized workspace and its ability to ratify contractual requirements in B2B or B2C transactions.
Drivers

- Though the potential is high, there are significant differences in the execution of blockchain applications for supply chain compared to its origins in financial services use cases (Fintech). This is especially in areas that require readiness for collaboration and the digital exchanges of data between participants.

- Recent trends and shifts have seen blockchain being offered more as a service component to complement existing technology deployments supporting functional or high-risk initiatives. It is also being used in network planning in areas such as responsible sourcing, sustainability, data mobilization, security and digitalization.

- Presently, initiatives continue to be a mix of vendor-led, stakeholder-, industry- and consortium-driven discussions. Multiple business use cases for blockchain across supply chains are yet to be proved. As supply chains become more mature and digital, they are likely to see increasingly higher volumes of adoption but at slower rates.

- In contrast to early trials and pilots across extended pools of supply chain participants, solution adoption is anticipated to see acceleration in compact ecosystems of stakeholders (or even focused on single B2B or B2C transactions). This will happen especially in supply chain zones with heavy transaction and processing load such as logistics, supply and transportation. Smaller, compact ecosystem partners allow greater cadence to formalize governance, shared-value creation opportunities and lockdown rules of engagement that would constitute a block (immutable record) or groups of connected blocks — the “blockchain.”
Obstacles

- Blockchain technologies must adapt to use cases that can empower maturity to bridge physical levels of authentication and data capture as well as the needs for interoperable digital data exchange across all types and tiers of responsible trading partners.

- Blockchain in the supply chain will be dependent on cultural and maturity factors impacting modern supply chain networks. This includes lack of standards for governance across transactions, scalable distributed consensus systems and technical expertise enhancing the strategic positioning or placement across formalized technology planning and process roadmaps.

- The potential of this technology to radically transform economic-related interactions should raise critical questions for society, governments, and enterprises. Although, at present, there are no clear answers to these questions, it is important to find the answers during the rise of the programmable economy and more mobilized work environments.

User Recommendations

- Identify how the term is being used and applied internally and by providers to better understand the possible return on capital employed, and the incremental value that could be realized beyond proven technology options.

- Identify high-risk or process-intensive areas of supply chains that exhibit transactional complexity across multiple stakeholders. These are prime candidates for blockchain, e.g., trade contracts, automation, asset management, transportation and traceability.

- Shift to a broader and more thorough review of other viable technology options for consideration against objectives. Place more emphasis on blockchain services or its complementary role as part of a strategic positioning in roadmaps.

Sample Vendors

arc-net; CHAINSTEP; Chronicled; Circulor; Guardtime; IBM; Omnichain; Origintrail; SupplyBloc; VeChain

Gartner Recommended Reading

Predicts 2021: Supply Chain Technology
Truth and Transparency in Supply Chain: 3 Case Studies on How Blockchain, AI and IoT Are Shedding Light

Social Learning Platforms
Analysis By: Ken Chadwick

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition
Social learning platforms are an extension of traditional systems for learning and knowledge management, incorporating social software features to support structured social, informal and formal learning activities in the supply chain. A social learning platform enables learners to establish a social profile reflecting their expertise and interests; capture, create, discuss, share and validate learning content; and interact with supply chain and functional peers in their social networks.

Why This Is Important
With retirement rates on the rise worldwide, supply chain leaders are concerned about how to capture existing knowledge and share it with younger workers. They also want to scale knowledge across multiple business units and geographies. Younger workers and technology-savvy employees of all ages are looking for a more engaging and interactive learning environment. Microlearning (e.g., via YouTube videos), allows for more accessible, relevant and immediate uptake of knowledge.

Business Impact
Social learning will impact how global supply chain teams work together in a digital world. It will allow for more adaptive processes, with robust best-practice sharing across business units and geographies in key areas, such as planning, procurement, product management and manufacturing. It can also significantly improve innovation, employee engagement, productivity and efficiency of processes by reducing the time it takes to find solutions to problems.
Drivers

- Businesses are investing in social learning platforms (such as Skillsoft or Degreed) to provide a more fluid and continuous learning experience, which is critical as the pace of change accelerates in the supply chain.

- Supply chain organizations are looking to enhance their learning culture through improved collaboration and knowledge sharing. They are adopting social learning platforms and microlearning strategies as a tactical way to drive cultural transformation (i.e., create more of a learning culture), improve workforce engagement and scale best practices globally.

- The ongoing retirement of employees with long-term, experiential knowledge is another key driver. Even as companies look to redesign core processes and to digitize them, there is substantial knowledge long-term workers can impart to newer employees.

- Designing mechanisms to record and translate this knowledge is important to companies.

- The acceleration of remote work has elevated challenges with recruiting, onboarding and developing employees. People in hybrid/remote environments may not have the ability to learn through informal connections, so having access to easy-to-digest and topical subjects is critical to understanding the content of work and the culture of the organization. Social learning platforms allow employees to connect virtually to learn from each other as well as formal coaches and mentors.

- Social learning platforms support the desire of learners to access learning in a more continuous fashion and in smaller increments. This category of learning solutions acknowledges the importance of social networks and the need to access the expertise of colleagues and different communities.

- Organizations and educational institutions have begun tapping into the collective knowledge of employees, customers, partners and students to help increase their capacity to learn, thus advancing social learning platforms.
Obstacles

- CIOs, IT and HR tend to be the decision makers when it comes to enterprise social learning platforms. Supply chain heads may not be involved, potentially leading to low adoption or shadow solution selection.

- Many supply chains deal with multiple, critical core system issues, so learning and knowledge sharing are low investment priorities. Getting support from executives for learning initiatives and systems is challenging, as the impact on bottom line is difficult to quantify.

- Curating knowledge on social learning systems is not a process that can be left alone and has become a considerable obstacle. Leaders need to develop strategy and structure for the learning modules, and then crowdsource content from the employee base. They must also designate resources to actively pursue content creators, curate content and ensure the knowledge base represents accurate (if not compelling) content.

User Recommendations

- Seek to partner with IT to leverage truly enterprisewide social learning networks, if possible. Where workable enterprise solutions lag, supply chain leaders may decide to invest in their own cloud-based deployments. When going this route, mitigate the fallout from the "shadow IT" approach and work with HR and IT to align supply chain needs.

- Gain support for investment by defining specific use cases where this type of learning can be applied and will add value. Articulate the impacts to the supply chain in terms of knowledge capture and sharing, talent development, employee engagement and bottom-line results.

- Focus on core areas where knowledge transfer, learning and collaboration are fundamental, such as in sales and operations planning (S&OP), product life cycle management (PLM) and integrated order management.

- Drive a deep understanding of supply chain user needs, how they collaborate and what learning solutions will drive a high level of adoption.

Gartner Recommended Reading

Learning Experience Platforms (LEP): Features and Implementation
Supply Chain Resilience

Analysis By: Kamala Raman

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition

Resilience is the ability of an organization to avoid or absorb the business impact of major disruptions through a risk-balanced approach to product design, supply chain strategy and network design. Achieving a resilient supply chain that maintains the ability to execute under stress and recover from it will be impacted by how well the CSCO achieves alignment across business peers in the executive suite.

Why This Is Important

The COVID-19 pandemic has brought with it an unprecedented level of disruption in supply and demand, as well as operating models around the world. As businesses face these challenges, in addition to those from severe weather events, cybercrime, trade policy uncertainty and other risk sources, improving supply chains’ resilience to meet customer needs in the face of disruption is now a key priority. At the same time, the pressure to contain costs remains a constant for many companies.

Business Impact

Given the high costs of managing through each disruption and the higher frequency of these disruptions occurring, the inflection point between investments to improve resilience and being cost-efficient is shifting. From viewing the expense of upfront investments for resilience as inefficiency to be eliminated, leading organizations are looking at them in a more favorable light to protect revenue and even grow market share at the expense of less resilient competitors.
Drivers

- Over the last several decades, global supply chains have fine-tuned operating models that are facilitated by inexpensive labor, specialized providers in a few geographic clusters, just-in-time inventory policies, efficient and cost-optimized global logistics, and benign international trade policies. At the same time, the COVID-19 pandemic is only the latest and biggest disruption in a time of growing external shocks that have led companies to reassess their heavy weighting toward cost efficiency.

- Every crisis has led to expensive workarounds and disruptions to continuity of service to customers, which can range from minor delays to calamitous stoppages of supply. Different industries and different companies within each industry are responding to this need for greater resilience based on their risk appetite and the relative ease of adjustment given the availability of and ability to reconfigure established supply ecosystems.

- Improving supply chains’ resilience is not a binary all-or-nothing act. Actions can range from risk monitoring in the supplier network to shifting to existing supply or manufacturing locations for multisourcing on the low cost end. On the other end of the spectrum, resilience could revolve around qualifying alternate suppliers that require significant amounts of time and money or a capital intensive shift of manufacturing locations.

- As resilience rarely comes for free, successful options will be led by strong market leaders making big bets to transform their networks. Hybrid supply chain models that continue to utilize global networks for key components, or manufacturing steps that are hard to shift while creating regional networks for final assembly and proximity to markets is one such example.
Obstacles

- As the pressure to contain costs comes from customers and competitors, cash-rich organizations are much better placed to invest in resilience than their weaker counterparts.

- A brand owner's overall resilience might often depend on parts they don't have visibility of in the extended supplier network. Significant ongoing investments in network visibility and risk monitoring is essential in this evolving space.

- To view resilience holistically and protect continuity of supply for customers, off-the-shelf tools may not be able to solve these challenges across the network. Investments in analytics to democratize insights and improve risk-based decision making becomes essential.

- Resilience is uniquely difficult to measure and provide a return on investment for. The further an organization is from the last crisis, the less important it might become as organizations lean back toward cost efficiency and just-in-time supply chains.

User Recommendations

- Emphasize maintaining continuity of supply to customers and factor in the cost of long-term mitigation actions.

- Identify and prioritize risks using a value-at-risk approach. Identify key points of failure that focus less on the risk event and more on the impact of the location being out of service.

- Define realistic levels of supply continuity with time to recover and time to survive.

- Highlight foundational actions (visibility to the network or targeted investments for redundancy) that are nearly agnostic to specific disruptions.

- Determine how much resilience is appropriate through periodic reviews that define the organization's view on risk appetite, critical partners, and how costs of resilience investments will be shared.

- Review resilience scenarios and investment decisions periodically to align your resilience strategy with evolving business needs.

Gartner Recommended Reading

Supply Chain Executive Report: Future of Supply Chain — Crisis Shapes the Profession
Immersive Experience

Analysis By: Christian Titze, Andrew Stevens

Benefit Rating: Moderate

Market Penetration: 5% to 20% of target audience

Maturity: Emerging

Definition

Immersive experience reimagines the user experience by enabling users to perceive the virtual world using virtual reality (VR), augmented reality (AR) and mixed reality (MR). It can enable users to interact with the virtual world using conversational systems, chatbots and interactive virtual assistants. Key technology tools, such as 5G data services and edge computing, are anticipated to define next generations of immersive experiences and evolving service applications across supply chains.

Why This Is Important

Business and personal interactions are changing, becoming more mobile, virtual and distributed. The user experience is undergoing a significant shift in user perception and interactions across the digital and physical world, and is transitioning to a rich, multidimensional and personalized experience. The evolution of continuous, immersive and conversational user experiences will have a profound impact on supply chains’ ability to reimagine the user experience.

Business Impact

Immersive experience technologies have the potential to radically influence the trajectory of the technology supporting supply chain processes. It presents new interaction models through the product life cycle, not only with humans, but with other core processes, machines and applications, such as manufacturing execution systems (MES), quality management systems (QMS) and warehouse management systems (WMS). The new interaction models will augment human capabilities and the nature of standard work.
Drivers

- Onboarding of new workers in, for example, manufacturing, maintenance, warehouse operations or services through immersive on-the-job training in a safe, realistic, virtual environment or providing critical step-by-step instructions to remote workers.

- The use of augmented reality headsets in warehousing has garnered interest and deployments indicate some improvements in worker efficiency versus existing methods.

- In transportation, there is potential for solutions targeted at productivity, such as augmented reality, that support drivers’ mission, navigation and safety. Wearable solutions could, for example, monitor driver fatigue.

- In supplier management, remote supplier audits can be enabled with immersive experience technologies, maintaining supplier quality when travel is not possible or desirable.

Obstacles

- Cost, complexity, integration and scaling challenges remain the biggest obstacles to wider adoption of immersive experience technologies.

- Technology maturity is limited. The degree of maturity of advanced technology is a big barrier to wide adoption, but the technology will become more stable and mature over time.

- The lack of good user experience (UX) design is a large barrier (after technology sophistication) to the wide adoption of immersive technologies.

- Beyond technology and design challenges, immersive experience technology has additional challenges, such as development cost or production volume, to overcome before mass market adoption can be achieved.
User Recommendations

- Start by identifying supply-chain-specific use cases, such as field service, logistics, warehousing, manufacturing, maintenance or design, that can benefit from immersive experience technologies.

- Prioritize the value of immersive experiences and newly emerging applications to provide safer, secure and more transparent working, training, onboarding and processing environments.

- Set the business goals, requirements and measurements for your implementation before choosing a provider or solution. Rich and robust offerings can bring value, but only if you have a clear intention for the deployment.

- Identify critical gaps in customer and user interactions, such as a remote workforce being exposed by the pandemic. Determine new targeted business outcomes to address using immersive experience capabilities.

Gartner Recommended Reading

Innovation Insight for the Supply Chain Technology Heat Map

Top Strategic Technology Trends for 2021: Total Experience

Drive Effective Remote Supplier Quality Audits

The 2020 Top Strategic Technology Trends for Manufacturing Operations

The 2021 Supply Chain Technology Themes

Diversity, Equity and Inclusion

Analysis By: Dana Stiffler

Benefit Rating: Transformational

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent
Definition

Diversity, equity and inclusion are a combination of activities and outcomes associated with better business performance; the ability to attract and retain talent; and in 2020/2021, a growing matter of equity and fairness for investors and customers in addition to employees. When all individuals are treated fairly and respectfully, and have equal access to opportunities and resources, they are able to contribute fully to the organization’s success.

Why This Is Important

Diverse, inclusive and equitable organizations and teams are positively correlated with superior business outcomes, including innovation, resilience and profitability. They’re correlated with improvements in human capital indicators as well — for example, the time to fill an open position, employee engagement, discretionary effort and intent to stay. Supply chain university graduates of all backgrounds report that they want to work for diverse, inclusive organizations.

Business Impact

Companies with above-average diversity, equity and inclusion (DEI) have:

- Higher innovation revenue — 19% points higher innovation revenue from new products and services. (Source: How Diverse Leadership Teams Boost Innovation, Boston Consulting Group).

- Higher profitability — 9% points higher EBIT margins. (Source: How Diverse Leadership Teams Boost Innovation, Boston Consulting Group).

- Organizations in the top quartile for racial and ethnic diversity are 36% more likely to have financial returns above their respective industry median (Source: Diversity and Inclusions as a Social Imperative, S&P Global).

- Diverse organizations see a 12% increase in employee discretionary effort.

- Companies with lower gender and ethnic diversity scores underperform peers on profitability (Source: Diversity Wins: How Inclusion Matters, Mckinsey & Company).
Drivers

2020 marked an important turning point for the corporate DEI agenda. As millions took to the streets globally to protest the murders of George Floyd, Breonna Taylor and Ahmaud Arbery, they brought their concerns, fears and demands into the workplace as well. CEOs who had previously been neutral or silent were moved to speak and act. Those with lukewarm or underperforming commitments to DEI recommitted.

And so we saw 40% of S&P 500 earnings calls in mid-2020 addressing diversity compared with 6% the previous year. We saw Nasdaq recently file a proposal that would require listed companies to have at least one woman and one other ethnically diverse or LGBTQ+ board member. This sense of urgency may have set in motion what two decades’ worth of business case data showing diversity benefits could not. It’s becoming increasingly clear that less diverse, equitable and inclusive organizations will lose valuable talent, customers and investors.

Obstacles

Current and prospective employees, investors and customers want to see action in the form of real investment: budget, resources and internal changes. They also want transparency regarding how the organization arrived at the chosen actions and its progress against those actions. Without sustained action and transparency, leaders run the risk of disengaging employees and tarnishing the supply chain career and leadership brand.

The right actions matter too. Over the last year we saw a nearly 100% increase in initiatives targeting racially and ethnically diverse talent, typically education and awareness (30%). Recruiting (20%) and integrated pipeline planning (20%) were also popular.

In education initiatives, the focus often has been on raising awareness of unconscious bias, helping participants recognize that everyone has it. But this training is falling short, often failing to change behaviors and impact inclusion or equity. Further, training emphasizes individual barriers, rather than broader systemic challenges. In Gartner’s Inclusion Index research, anti-bias training is identified as a high-prevalence, low-impact activity.
User Recommendations

- Prioritize DEI as a business imperative by setting goals and objectives, and aligning specific projects and initiatives to achieve them.

- Choose recruiting initiatives and integrated pipeline planning initiatives because they show superior DEI results. Implicit bias training, for example, has little correlation to improved DEI indicators.

- Ensure that senior people or members of the majority demographic are co-leading and facilitating initiatives that target processes where decisions are made, rather than appointing members of the underrepresented group to do yet more work in an employee resource group-type format.

- Do not communicate DEI as an internal and external priority unless you are prepared to deliver transparency and progress. There are serious product, investor and employment brand reputation penalties for leaders who overpromise and underdeliver.

Gartner Recommended Reading

2021 Supply Chain Diversity, Equity & Inclusion Survey: Commitment Skyrockets, Requires Follow-Through

2021 Women in Supply Chain Survey Shows Resilience, Improvement in Representation

Ignition Guide to Developing a Diversity Recruitment Strategy for Supply Chain

Revisiting Predictions for the Postpandemic Future of Work

Solution Supply Chains

Analysis By: Jennifer Loveland

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent
Definition

Solution supply chains (SSCs) are collaborative networks designed to provide customers with a personalized collection of products, data and services, or products coordinated with later deliveries of additional value (e.g., data) from a digitally enabled ecosystem of partners. This model taps into opportunities to capture incremental value often beyond the scope of individual firms and is increasingly seen in high-tech, life science, consumer and industrial sectors.

Why This Is Important

SSCs provide increased value to the business by enabling a differentiated customer value proposition, opportunities for premium pricing, recurring revenue streams and deeper customer relationships. Customers have increasing expectations for companies to provide outcomes or solutions to problems rather than individual products. Supply chains must be designed and optimized to deliver such solutions to ensure new business models are profitable.

Business Impact

Complex, personalized solutions addressing customers’ critical problems enable collaborative advantage, increased customer loyalty, larger sales volumes and recurring revenue streams. Solution value is often greater than the sum of its parts. SSCs optimizing leverage of network assets can enable better margins. Risk reduction stems from faster response to unexpected changes and stronger barriers to entry as entrants compete against the capability of the entire network.

Drivers

- **Positioning:** The Hype Cycle position of SSCs is based on emerging technologies and the adoption of digital business models such as consumption- and outcome-based offerings.

- **Adoption:** Digital business growth and rise of business ecosystems will continue to drive year-over-year adoption. Adoption of SSCs is also increasing based on firms’ ability to deploy technologies, such as visibility and analytics. Broader adoption is also dependent on organizations’ ability to form and orchestrate collaborative partnerships that solve customer problems and provide advantage to all trading partners.

Focus on creating SSCs is increasing in response to:

- **Competitive action** against low-cost competitors, new entrants or other innovators.
■ **Customer and market differentiation** to provide more holistic service to a targeted portion of the market.

■ **XaaS enablers:** While innovators are on a journey to transform the traditional, linear supply chain design to a highly leveraged network of trading partners, SSCs focus on providing solutions combining physical, digital and/or often bidirectional, ongoing service components. This is often in support of everything as a service (XaaS) business models or using technology to personalize physical products during and after purchase.

**Obstacles**

■ **Limited adoption** — Low use of relevant, solution-oriented business models limits adoption.

■ **Lack of maturity** — New relationship dynamics, collaboration approaches and partnerships inside and outside the company are required. Effectively harnessing the broad ecosystem required for SSCs occurs at high maturity levels, which many organizations have not yet achieved.

■ **Scaling challenges** — Most supply chains already support multiple business models, but digitally enabled value propositions increase complexity. Due to late involvement in business innovation, supply chains miss opportunities to align processes, resulting in inability to scale efficiently.

■ **Lack of cost transparency** — Data, software and digital service are part of the value proposition rather than just operational support. To enable this, SSCs may need to develop and manage the life cycle of services. This further complicates understanding of cost to serve, making profitability in solution-oriented business models difficult.
User Recommendations

- View a transformation to a solution-centric model as similar to large-scale change management initiatives. Chief supply chain officers (CSCOs) must act as a catalyst in the solution-centric transformation by demonstrating how the supply network drives efficiency, value and competitive advantage.

- Promote supply chain expertise in value stream mapping, network optimization, sales and operations planning, and advanced analytics.

- Leverage upstream and downstream ecosystem linkages to provide required technologies, innovations or services to connect resources, orchestrate activities, synchronize information, monetize assets and align processes around customer-defined solutions.

- Identify potential points of failure in solution-centric partner networks and develop contingency plans to abate risk from business model experimentation or transformation.

- Segment the supply chain operating model to support multiple business models, including solution-focused models.

Gartner Recommended Reading

How to Change Your Supply Chain to Support Digital Products

Consumer Goods Trend: Personalized Products

New Dimensions in Collaboration: Scale Shared Value and Develop Supply Chain Ecosystem Partnerships
Sliding into the Trough
Supply Chain Cost Optimization

Analysis By: Paul Lord

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition
Supply chain cost optimization is a comprehensive approach for designing and operating complex networks to efficiently fulfill demand. The methodology centers around stakeholder alignment on performance requirements for reliable product supply and effective service delivery. Success requires advanced organizational maturity and decision support capabilities to enable aligned design choices, profitable supply balancing with demand and performance management for continuous improvement.

Why This Is Important
While median supply chain overhead costs range from 0.5-2% of revenue (varying with company size), well-developed capabilities have the potential to impact assets, product costs and operating expenses that represent between 25% to 75% of revenue. Supply chain leaders must create the organizational alignment for making the network design choices and investments in capability that mitigate risks while efficiently delivering products and services that fulfill demand and enable profitable growth.

Business Impact
Successful adoption of cost optimization principles and capabilities can contribute increased cash flow in the range of 5% to 10% of revenue annually beyond conventional approaches to functional cost management. Primary impacts can include reductions of 5% to 15% in logistics spend and 5% to 15% of inventory. Optimal sourcing and planning that optimizes supplier spend and capacity utilization can contribute an additional 2% to 5% benefit to cost of goods sold.

Drivers
- Expectations for revenue growth, return on investment and continuous improvement of profitability from shareholders
Compressed margins due to increased competition drive customer demands for lower prices

Strategies for product and service customization to increase customer value and protect market share increase business complexity

Underperforming innovation and revenue growth strategies put pressure on the supply chain to deliver cost improvement that supports increased profitability while maintaining market competitiveness

Obstacles

- Isolated, simplistic network design choices that default to lowest cost supply targets while overlooking the impact on supply risk, inventory requirements or operating feasibility
- Challenges aligning with business stakeholders on realistic performance expectations and commercial commitments that match network capabilities
- Conventional performance management practices that focus on control by location and function while overlooking interdependencies, incentives that drive high inventory and the need to reliably deliver products and services that fulfill demand
- Underdevelopment of S&OP governance and constrained supply planning make it difficult to achieve profitable balancing with demand
- Challenges aligning independent supply functions (sourcing and manufacturing) to create feasible, optimized supply plans that control inventory risk

User Recommendations

- Build a foundation of safe, reliable operating practices to meet quality and service requirements.
- Control inventory levels by balancing supply while fulfilling demand through S&OP governance.
- Align with commercial stakeholders on performance requirements required for market competitiveness.
- Align supply and distribution networks periodically to ensure alignment to demand with sufficient agility and resilience.
- Construct and manage supplier portfolios for materials and services that enable desired performance of the supply network.

- Improve the agility and precision of operating decisions by developing technology-enabled network planning capabilities.

- Invest in digital operating capabilities that increase efficiency while supporting growth, quality and speed.

**Gartner Recommended Reading**

- Focus on Operating Outcomes, Not Reduction Targets, to Optimize Supply Chain Cost

- Network Diagnostics and Planning Excellence Are at the Heart of Supply Chain Cost Optimization

- Supply Chain Brief: Protect Operating Outcomes While Pursuing Short-Term Cost Reduction

- Supply Chain Brief: Deliver Efficient “Manufacturing Perfect Orders” to Optimize Supply Chain Cost

- Orchestrate 3 Decision Layers for Inventory Excellence and Supply Chain Performance

- Optimize Cost and Cash Flow With Three Supply Chain Performance Lenses

**Machine Learning**

**Analysis By:** Noha Tohamy

**Benefit Rating:** Transformational

**Market Penetration:** 5% to 20% of target audience

**Maturity:** Adolescent
Definition

Machine learning is an AI discipline that solves business problems by utilizing statistical models to extract knowledge and patterns from data. There are three major approaches that relate to the types of observation provided. These are supervised learning, where observations contain input/output pairs (also known as "labeled data"); unsupervised learning (where labels are omitted); and reinforcement learning (where evaluations are given of how good or bad a situation is).

Why This Is Important

Machine learning (ML) enables many supply chain decisions that were previously based on rudimentary manual analysis or traditional analytics techniques to now take advantage of massive amounts of text, video, image and sound data to identify patterns, generate insights and predict future outcomes. ML needs are pervasive across supply chain functions from planning to sourcing and transportation. ML can improve overall productivity, freeing up human resources to focus on higher-value tasks.

Business Impact

ML algorithms identify undetected patterns with fewer preconceived user assumptions or relation definition. They rely on data to identify patterns to generate insights and predict trends. These insights improve over time, as algorithms self-learn from prior performance. ML can be embedded in a number of supply chain processes, such as predictive maintenance, risk management or demand forecasting.

Drivers

- Interest in ML is driven by the surge in data — structured and unstructured, internal and external — and supply chain complexity, making traditional analytics techniques and manual analysis inadequate. With ML, supply chain organizations can take advantage of available data and rely on the algorithms to identify patterns and correlations, and predict outcomes to find the best course of action.

- Adoption of ML is driven by organizations’ vision for an autonomous supply chain. A prerequisite technique in AI, companies look to ML to further refine recommendations and continuously self learn from previous performance.

- This past year, ML progressed along the curve, as organizations looked to respond and recover from conditions precipitated by the COVID19 pandemic. With ML, they were able to leverage dynamic data from across the supply chain and business networks and consider external factors to predict future demand and supply trends and plan resources and capacity to meet customer service requirements.
Obstacles

- Lack of good quality, available and representative data can deteriorate ML algorithms’ output and recommendations.
- Lack of user trust in the logic and workings of complex models can limit adoption and take away from potential success.
- Lack of ongoing maintenance of ML models can render them obsolete, generating inaccurate insights and predictions.
- Inability to industrialize ML pilots can prevent organizations from demonstrating return on investment, further challenging broader adoption.
- Confusion over technology options and fragmentation of the market challenge organizations’ ability to choose the best ML-enabled solution to support specific needs and best fit with existing technology footprint.

User Recommendations

- Gauge ML's incremental benefits, compared to more traditional techniques, such as time series analysis.
- Quantify the technical resources required to develop and deploy ML models. This includes data engineers and scientists to acquire and analyze data and build and train ML models.
- Dedicate analytics coaches to train supply chain users on using ML output to augment and improve their decision-making process.
- Ensure the availability and readiness of the data that will be used by ML algorithms. Given that ML relies on training datasets to identify patterns and relationships, good contextual, representative data is paramount to the success of these techniques.
- Vet technology providers’ claims to offer ML capabilities in their solutions. Due to the high level of interest in ML capabilities, vendors’ marketing positions might sometimes outpace current capabilities.

RPA

Analysis By: Simon Bailey

Benefit Rating: Moderate
Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Definition
Robotic process automation (RPA) technology uses scripts to guide automation to replicate the user interface path that a human would use, to conduct tasks on structured digital data. These scripts integrate applications via the user interface (UI) and are orchestrated via a controller dashboard which automates routine, repetitive, rule-based, predictable tasks using structured digital data.

Why This Is Important
RPA can execute scripted tasks around the clock, faster, with fewer errors and at less cost than manually executing the same process for tasks that are routine, repetitive, rule-based and predictable. This capability can be offered as a stand-alone technology solution or it can come integrated as part of a broader solution. End-user adoption has been consistently growing, and tools are expanding to automate more extensive process workflows. Vendors have grown and made extensive R&D investments.

Business Impact
- Stand-alone RPA can be an inexpensive, quick fix to reduce manual workload, improve efficiency, speed up processes and eliminate keying errors.
- To learn more about integrated RPA, supply chain leaders can talk to specific technology vendors to explore the degree of current and future RPA support they can offer or is built into their tools.
Drivers

- There has been a tremendous amount of hype around RPA, with the supply chain trailing behind finance and accounting in terms of adoption.

- The desire to automate has been heightened with the sharp increase in a work-from-home environment due to COVID-19 which requires the default to be digital.

- Supply chain departments such as procurement and sourcing, and customer fulfillment have seen the highest levels of adoption at over half of those surveyed indicating they have piloted RPA in 2020.

- The business case for RPA should look at the total cost to operate a process today and the potential for improved business outcomes. ROI depends on how inefficiently the process is performed today.

- Even if an organization has been outsourcing or offshoring heavily labor-based data entry work for some time, RPA could still decrease costs further and increase quality.

- RPA allows organizations to automate manual work and look at new ways to automate work to deliver business outcomes.

- Potential savings will depend on the total cost of ownership (TCO). TCO is driven by the pricing model of the RPA vendor (typically, annual robot licenses or RPA as a service) or the package for the supply chain tool, and your organization's IT capabilities in terms of script writing and RPA tool maintenance.

Obstacles

- Some companies have found that due to issues with poor governance, poor data or lack of a center of excellence, they have struggled to move from pilot to scale effectively. Without appropriate oversight, UI-level integration leads to further technical debt as companies underestimate the ongoing governance and maintenance of scripts.

- A rush to RPA can also lead supply chain leaders to neglect addressing the poorly formed/followed processes. They can also seek to bypass IT and, in so doing, overlook more practical, time-tested alternatives such as intelligent business process management suites (iBPMSs).
User Recommendations

- Forge the right balance of RPA task and other process-level automation, by positioning RPA within the broader hyperautomation strategy.
- Identify use cases through uncovering non-value-added activity such as high levels of manual rekeying with high-error rates.
- Validate applicability by focusing on standardized, repetitive tasks that occur between stable systems using structured, stable data.
- Quantify potential benefits based on an ROI calculation that not only include resources, but also positive impact on areas like customer experience and potential to drive growth.
- Prioritize — based on the quantified business impact compared to ease of implementation — lowest risk and alternative automation strategies such as iBPMS.

Gartner Recommended Reading

Supply Chain Executive Report: Pursuing an Autonomous Supply Chain With Hyperautomation

Video: Schneider Electric's Approach to an Autonomous Supply Chain

Workforce Analytics

Analysis By: Ken Chadwick

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Adolescent

Definition

Workforce analytics includes tools to enable supply chain leaders to go beyond traditional metrics, creating analytical models on employee engagement as well as recruitment and progression. Workforce analytics uses data from human capital management (HCM) systems to improve measurement of employee performance at operational and support levels while forming insights for use in driving workforce engagement, productivity and retention.
Why This Is Important

Research inside and outside of Gartner points to the heightened risk that talent identification, acquisition, development, engagement and retention poses to supply chain success. Companies taking traditional approaches to recruiting, development and engagement will fall behind those deploying workforce analytics in support of their talent strategy. This is particularly true for specific workforce strategies, such as improving diversity, equity and inclusion across all levels of the supply chain.

Business Impact

Most organizations monitor basic talent metrics, such as employee turnover, retention and satisfaction. Linking workforce data with operational data can provide deeper insight into workforce-related strategies:

- Behaviors and trends of successful leaders and teams
- Factors that improve employee engagement and retention
- Backfills and succession planning
- Skills requirements and training needs
- Applicant screening or targeted, inclusive and diverse recruiting campaigns
- Outsourcing versus internal hiring
Drivers

- The biggest driver is the need to recruit, hire, and retain employees in the supply chain. Since the 2008 recession, talent is often a top challenge for supply chain leaders, and developing a proper talent strategy can be daunting.

- Companies that have a clear employee value proposition (EVP) and are able to target audiences for recruitment and retention will be the ones with a more stable supply chain talent foundation and are more likely to be destinations for talent.

- Workforce trends require supply chain leaders to know more about their current and potential workforce so they can develop targeted talent strategies and expand their potential pools of internal and external candidates: The pandemic is shifting expectations around work flexibility; the potential shift to remote and/or hybrid work is opening up new possibilities for recruiting, hiring and retention; there is a renewed focus on diversity, equity and inclusion in the supply chain; digitalization is changing the nature of skills required for supply chain roles; Millennials and Gen Z have evolving needs in their EVP; hourly and on-site employees prioritize different elements of EVPs.

Obstacles

- Advanced analytics is a core topic for many supply chains, usually focused on operational metrics rather than talent, which is often owned by HR. To shift analytical resources toward workforce analytics, use cases and business cases must be developed and sold to the leadership team.

- A more challenging issue is supply chain’s access to data, since some of the information is deemed “sensitive” and may be protected by local and federal laws. Once those hurdles are overcome, analysts assigned to the workforce analytics initiative must develop and refine the right analytical models.

- Use of the insights may prove to be difficult since they frequently challenge long-held beliefs and require changes in management and behavior.
User Recommendations

- Create a partnership with HR to identify the technology and data available. Work with IT steering committees when HR HCM systems are falling behind to prioritize investment in those systems as well as workforce analytics.

- Engage HR in developing use cases where capabilities exist.

- Identify performance, skill and behavioral patterns that can aid in retention and development of supply chain talent.

- Identify issues behind engagement, turnover and productivity in knowledge workers as well as workers in supply chain line operations, such as warehousing, logistics and manufacturing.

- Target recruiting strategies and interview approaches to better match applicants with the needs and culture of the business.

- Identify the downstream impact of new employment models (such as increased remote/hybrid work) and prioritized investments.

Gartner Recommended Reading

HCM Technology Transformation Primer for 2021

Deliver on Employee Experience in the New Workplace When HCM Technology Replacement Isn't an Option

Tool: Checklist of Considerations for Talent Analytics Leaders Facing Disruption

Prescriptive Analytics

Analysis By: Noha Tohamy

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent
Definition

Prescriptive analytics describes a set of analytical capabilities that finds the best course of action to meet a predefined objective, such as maximizing revenue or minimizing costs. The most common examples of prescriptive analytics are optimization methods such as linear programming, rule-based decision making and heuristics. Prescriptive analytics differs from descriptive, diagnostic and predictive analytics, in that its output is a recommended action.

Why This Is Important

Prescriptive analytics is critical to making data-driven, fact-based decisions. It generates actionable recommendations while taking into account supply chain constraints and costs. Through prescriptive analytics, an organization can find strategies to meet its objectives by balancing trade-offs among conflicting goals.

Business Impact

Prescriptive analytics helps organizations understand the best strategy to achieve their objectives. For example, prescriptive analytics can recommend optimal inventory levels to minimize costs. Organizations can also conduct scenario planning by altering costs and constraints and analyzing the impact on stated objectives.

Drivers

- Supply chain organizations dependent on human domain experience for decision making are now looking to data and analytics to make data-driven decisions.

- Due to the complexity of the supply chain, business users face millions of possible choices when taking an action. This makes it impossible for human users to identify the best action to meet supply chain objectives.

- As supply chains become more distributed, spanning functions, regions and extending to external trading partners, business users cannot take into account all priorities, costs and constraints. This drives the need for prescriptive analytics to account for all potential choices and make the optimal trade-offs to balance conflicting objectives.

- Supply chain talent shortage is driving the need for decision-making automation. The goal of automation is to free up human users to focus on qualitative priorities, such as collaboration with trading partners or team communication.
Obstacles

- As with other advanced analytics techniques, accurate and timely data is a prerequisite for useful results but is not always available.

- Lack of analytics maturity is also hindering adoption of prescriptive analytics. Many organizations have still not moved beyond "What has happened?" They lack a forward-looking view focused on "What might happen?" and "What can we do about it?"

- Organizations lack technical talent to build and maintain prescriptive analytics models.

- Lack of transparency of more complex prescriptive models results in users’ resistance to accepting the models’ recommendations.

- Processes need to be redesigned as prescriptive analytics deviates from current business practices, goals and constraints.

- Already deployed supply chain applications lack prescriptive analytics capabilities.

User Recommendations

- Identify the prerequisites for success, ranging from organizational buy-in to redesign of current processes.

- Ensure organizational structure and governance enable the company to implement and maintain functional as well as cross-functional prescriptive analytics recommendations.

- Ensure the availability, quality and readiness of the data required to conduct prescriptive analytics.

- Secure the internal or external skill sets to generate, implement and consume prescriptive analytics.

- Identify the supply chain processes that can benefit from prescriptive analytics, and clarify how the output will be embedded in the process. This includes identifying the level of process automation and human intervention.

Gartner Recommended Reading

Adopt Analytics Platforms to Support Evolving Supply Chain Needs
Four Categories of Benefits to Track Supply Chain Analytics’ Full Value

Environmental, Social and Governance

Analysis By: Sarah Watt, Stephen Adams

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Definition

Environmental, social and governance (ESG) is a set of metrics and principles to assess enterprise nonfinancial performance data.

Why This Is Important

Customers (63%), investors (48%) and regulators (46%) are the top three stakeholder groups creating pressure on enterprises to act on sustainability initiatives. A segment of customers are interested in enterprise and product ESG performance, which shape their buying decisions. Investors are moving capital into ESG funds. Countries are making increased pledges, such as those seen on Earth Day, to cut GHG emissions which will influence regulations, impacting enterprises.

Business Impact

- **Balance:** Enterprises are faced with the need to balance ESG-related risks (regulatory intervention, investor activism) and opportunities (access to capital, customer loyalty).

- **Timing:** Decide when to act. From a business perspective, acting too soon may lead to additional costs, while acting too late may lead to stranded assets.

- **Boundaries:** Material ESG issues are now being extended into the value chain, principally supplier greenhouse gases (GHG) performance and biodiversity metrics.
Drivers

- **Regulators**: Major global economies have made commitments under the Paris Agreement to reduce their greenhouse gas emission and decarbonize their economies. For example, the European Union is proposing a new Climate Law, to enable the bloc to meet climate neutrality by 2050. In the U.S., President Joe Biden has signed an executive order on tackling the climate crisis at home and abroad. This focuses on capacity building and clean job creation. These types of regulatory frameworks will impact enterprises through incentives, taxation mechanisms and bans.

- **Investors**: Investor momentum behind demand for ESG transparency is increasing as a holistic view of opportunities and risks are being undertaken. Investors are rightly concerned about stranded assets due to a changing operational context.

- **Citizens**: Citizens are concerned about enterprise environmental and social impacts, and some will make value-based choices, buying products or voting for officials. Citizen action has been seen in activism such as the Fridays-for-future movement putting pressure on regulators or through the Extinction Rebellion, which has targeted both government and business with protest action.

- **Enterprise partners**: Enterprises are assessing supplier ESG performance. This is focused on responsible sourcing, assessing labor, health safety and environmental risks. These assessments are extending into Scope 3 GHG emissions.

Obstacles

- **Responsibilities**: Responsibilities and competencies for collecting ESG data and implementing a sustainability program are not consistently defined.

- **Data alignment**: ESG data comparability, except through indexes such as the DJSI, FTSE4Good and CDP, is challenging due to lack of standardization. Some ESG data sources rely on voluntary participation, meaning poor performers (or/and nonparticipants) are not visible.

- **Quantifying benefits**: Improving ESG performance is often seen as an intangible benefit, difficult to connect to direct investment or financial reward. Enterprises that hold sustainability as part of their purpose are likely to take a leadership position, whereas other enterprises will aim not to be bottom of the pack.

- **Visibility of impact**: Although ESG reporting may take place through financial or sustainability teams, the majority of impacts are in the value chain. Supply chain organizations struggle to get subtier visibility of sustainability performance.
User Recommendations

- **Identify material issues**: Don't wait for external pressure to set up a corporate social responsibility program by identifying material issues. Identification of material issues will enable the enterprise to identify opportunities (new products) and head off risks (reputational crisis). Draw up a governance framework enabling the organization to set performance goals, select standards and report on ESG performance.

- **Capital investment**: Focus not only on retrospective reporting but future enterprise risks when reporting ESG performance. Build in a consideration of risk to capital investment strategy and product development to avoid stranded assets and to meet new customer needs.

- **Include the value chain**: Identify environmental and social impacts, not only under the enterprises direct control, but also in the value chain. Track supplier performance.

- **Key performance indicators (KPIs) and compensation**: Build ESG measures into senior leaders KPIs, including tying performance to compensation.

Gartner Recommended Reading

- The State of ESG Disclosures
- ESG by the Numbers: Benchmarking ESG Disclosures
- How to Create Audience-Centric ESG Disclosures
- 3 Sustainability Trends Shaping Supply Chains in 2021
- Maverick* Research: Supply Chains Need Radical Action as ‘Our House Is Still on Fire’

**Predictive Analytics**

*Analysis By:* Noha Tohamy

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream
Definition

Predictive analytics is a form of advanced analytics that examines data or content to answer the question, "What is likely to happen?" It includes techniques such as regression analysis, multivariate statistics, pattern matching, predictive modeling and forecasting.

Why This Is Important

By anticipating future trends, predictive analytics allows organizations to make informed decisions when responding to evolving business environments. Predictive analytics is required to support the vision for automated decision making. Predictive analytics leverages internal and external data, historic sales or weather patterns. Today, there are many successful examples of the use of predictive analytics, spanning demand forecasting, risk monitoring or predictive maintenance.

Business Impact

Predictive analytics improves organizations’ ability to anticipate further conditions. These can range from better predicting demand, supply variability or disruptive events. Predictive analytics can result in supply chain process redesign. Processes that fully relied on human judgment can now be heavily powered with predictive analytics. The adoption of predictive analytics requires additional investment in technology or technical data science talent.

Drivers

- Supply chain organizations that have heavily relied on human domain experience are now looking to rely on data and analytics to understand trends and anticipate future environments.

- Supply chain talent shortage is driving the need for automating processes such as demand forecasting or supplier risk predictions. The goal of automation is to free up human users to focus on qualitative priorities, such as collaboration with trading partners or team communication.

- Predictive analytics has traditionally targeted problems in the strategic and tactical time horizon like long-range forecasting or demand planning. Now, with more advanced techniques, predictive analytics can be deployed in real time or the near-real-time horizon in areas such as dynamic pricing, product quality testing and demand sensing.

- Recently, interest and adoption of predictive analytics has enjoyed a significant increase thanks to corresponding interest in machine learning techniques that are capable of generating more accurate predictions with little human intervention.
Obstacles

- Data availability and quality. As with other advanced analytics techniques, the timeliness and accuracy of the data will determine the accuracy and usefulness of the output of prescriptive analytics.

- Lack of analytics maturity that can drive further adoption of predictive analytics. Many organizations are still focused on answering “what has happened?” without a forward-looking focus on “what might happen?” and “what can we do about it?”

- Lack of technical talent to build and maintain prescriptive analytics models.

- Lack of transparency of more complex predictive models resulting in users’ resistance.

- Lack of predictive analytics capabilities in current supply chain applications.

User Recommendations

To take advantage of predictive analytics, supply chain leaders responsible for analytics strategy must:

- Identify the supply chain processes that can benefit from predictive analytics and clarify how predictive analytics’ output will be embedded in the process and incorporated in users’ decision making.

- Plan to allocate significant time and resources to preparing the data to conduct predictive analytics.

- Build a foundation of descriptive and diagnostic analytics. Without understanding what is going on and what might be the problem, it is unrealistic to accurately predict future outcomes.

- Educate your organizations on new predictive analytics technologies that can handle more dynamic data sources and satisfy requirements for faster response times.

- Secure the internal or external skill sets to create and deploy predictive analytics solutions.

Supply Chain Risk Management

Analysis By: Kamala Raman

Benefit Rating: High
Market Penetration: More than 50% of target audience

Maturity: Mature mainstream

Definition
Supply chain risk management (SCRM) aims to make businesses resilient to supply chain risks across the physical and digital ecosystem. A comprehensive approach to SCRM focuses on the ability to identify and mitigate risks across the extended network footprint. It is strengthened by technology used for risk identification and monitoring, holistic risk impact analysis and coordinated operational mitigation/response.

Why This Is Important
While the risks of supply and operational disruptions have become front and center in global networks during the COVID-19 pandemic, supply chain risks could be commercial, financial, regulatory, reputational, environmental or digital in nature. Organizations have found that existing risk frameworks have largely not been effective in managing pandemic response and at the same time, the importance of balancing risk against other competing network objectives has shot up.

Business Impact
Businesses are finding that the cost of managing each risk event reactively can get prohibitively expensive in the near term and reduce the ability to grow in the long term. A holistic framework to tackling predictable risks, as well as unpredictable events, is essential to build a risk management program that combines business continuity management at the operational level with a resilience program at the organizational level.
Drivers

- Conventional risk mitigation has been focused on mitigating operations disruptions once they happen or utilizing inventory or capacity buffers to avoid disruptions, but these are expensive to maintain. This reactive approach to risk management is not enough in a world where risks that are harder to predict are here to stay. Intensifying geopolitical competition is threatening unfettered global trade.

- Data breaches and cyberattacks that severely disrupt operations or impact products are growing. Climate change, extreme weather events and the threat of resource constraints must be managed.

- As outsourcing expands, the adoption of tools to monitor multiple tiers of suppliers for quality, performance or social responsibility risks is growing. Users may need to invest in technologies and data-sharing platforms to support SCRM, combining multiple analytics approaches or solutions as needed. Examples include network design tools to design for resilience, and supply chain visibility tools for live incident monitoring and intelligent response.

Obstacles

- Investments in buffer capacity or inventory are not easy to maintain. At best, such investments can be sustained for select products or locations. At worst, the scope is too complex, and when it competes with operational efficiency, it tends to be deprioritized.

- Having visibility to the extended supply network is a herculean task. With global, complex networks where the subtier partner ecosystem might be continuously shifting, identifying weak points beyond direct suppliers is expensive in time and resources.

- Identifying and prioritizing risks is complicated in global issues with high uncertainty, such as climate change or trade policies, or when the view is clouded by normal human tendencies, such as availability bias.

- Digitalization of ecosystems and the availability of data on subtier suppliers or level of impact from risk events in far-flung regions of the world are an impediment.

- Organizations must dedicate funds and resources for ongoing risk management, along with governance.
User Recommendations

- Identify product design stage gates, key suppliers, and transportation hubs to track interdependencies, bottlenecks and potential failure points.

- Identify and prioritize most impactful risks by impact, likelihood of occurrence, level of control and value at risk.

- Identify where individual risk events cannot be predicted, establish measurement criteria, such as time to survive and time to recover, and set thresholds for notification.

- Create strategies focused on risk reduction, avoidance, transfer or acceptance. Simulation and scenario planning can aid risk mitigation. Escalation plans for vendors can aid risk transfer. Business continuity plans refine risk response strategies, while inventory can help cover recovery time during disruptions.

- Regularly review and test business continuity plans. Resilience needs speedy execution of remedial actions once a risk event has been detected.

- Perform a continuous improvement assessment of risk responses that updates the SCRM framework.

Gartner Recommended Reading

Supply Chain Executive Report: Future of Supply Chain — Crisis Shapes the Profession

Assess Supplier Business Continuity Plans for Risk Mitigation and Operational Resilience

Stress-Testing Direct Material Supply Chains: A Resilience Trend for 2021
Climbing the Slope

Metrics

Analysis By: Marco Sandrone

Benefit Rating: High

Market Penetration: More than 50% of target audience

Maturity: Early mainstream

Definition

Metrics, also referred as KPIs, are measures of quantitative assessment commonly used for comparing and tracking supply chain performance. This activity refers to the effort to define the right balance of leading and lagging metrics, set targets for each end-to-end supply chain and monitor performance against targets.

Why This Is Important

Tracking metrics allows organizations to improve results and align people and processes with organizational objectives. Initiatives to improve supply chain performance are gaining momentum, but there are no quick fixes. Fixing goes beyond defining the right metrics. It requires changing processes, people, culture and tools. Some change can happen as quickly as six months. More fundamental change typically happens over up to 24 month, and ongoing improvements are needed after that.

Business Impact

Selecting a good mix of lagging and leading metrics allows companies to keep under control their business outcomes, while identifying and correcting root causes for disappointing performances. Companies that align the different parts of their supply chain to a consistent set of metrics with a clear overarching goal — e.g., profitable service — are in a better position to make informed trade-off decisions and are able to reduce costs and improve working capital while enhancing the service level.

Drivers

The increased complexity of supply chains leaves many organizations lacking the confidence that they measure strategic and operational performances properly. Supply chain leaders must take into considerations the following recent developments when defining their metrics’ sets:
Organizations striving to develop circular economy initiatives need new ways to measure progress and performance. Often, supply chain leaders struggle to define circular-economy-related metrics because they lack a framework of standardized measurement or an industry-led approach.

Since the pandemic started in 2020, many organizations have accelerated their efforts in digitizing their supply chains. The leaders of these supply chains are now asked to monitor the progress of these initiatives and assess their effectiveness.

Recent events in the U.S. have again brought forth the issues regarding social injustice. Supply chains need to adapt their metrics to highlight organizational needs for DEI improvements and demonstrate current DEI progress.

To improve their ability to respond to an increasing number of disruptions, most supply chains rely on visibility, resilience and agility strategies. As supply chains play an instrumental role in realizing these strategies, they need to define measures to track performance and progress of their initiatives.

Obstacles

- The increased complexity of supply chains leaves supply chain leaders lacking the confidence that they measure strategic and operational performances properly. This interferes with their ability to make trade-off decisions.
- They aim to manage an excessive number of metrics that do not necessarily add to their understanding of the supply chain contribution in achieving the corporate objectives.
- Metrics are often used in isolation from each other, which makes it hard to prompt consistency across functional initiatives.
- The difficulty establishing and adhering to consistent metric definitions across the organization prevents a standardized approach in managing performances.
- Strategic and operational metrics are often treated as equal, even if they should cover different time horizons and drive decisions at separate levels of the organization.

User Recommendations
- Develop a performance management plan that outlines the current and future state of the performance management strategy. This includes the supply chain metrics, the technology to help access the data and the processes within which they will use the metrics to manage supply chain performance.

- Develop governance structures with clearly defined roles, responsibilities and ownership for the metrics and the way performance will be managed. These metrics need to balance the need for global consistency and visibility with the need for local differentiation.

- Embed the use of metrics in your supply chain strategic planning, S&OP, S&OE and day-by-day operation execution processes.

- Set supply chain targets by starting with the desired end-to-end outcome of each supply chain segment; then optimize the functional metric targets to achieve that outcome, consciously managing the trade-offs of each end-to-end supply chain.

Gartner Recommended Reading

Improve Supply Chain Planning Performance by Differentiating Metrics Based on 4 Planning Horizons

Tool: Operational Metrics for Distribution, Production and Material Planning

Metrics for the Circular Economy: If You Can’t Measure It, You Can’t Manage It

Supply Chain Brief: Extend Your Productivity Metrics Beyond the Supply Chain Function

Digital Supply Chain Strategy

Analysis By: Pierfrancesco Manenti

Benefit Rating: Transformational

Market Penetration: More than 50% of target audience

Maturity: Early mainstream
Definition

A digital supply chain strategy prepares the supply chain to create a short- and long-term vision that aligns stakeholders behind an integrated set of principles, and digitally enabled capabilities and investments. The strategy defines a supply chain digital roadmap that supports the ambitions of their enterprise while balancing both transformation and optimization initiatives.

Why This Is Important

A digital supply chain strategy must align to executive priorities and the business strategy for profitable growth. In a recent Gartner survey, 80% percent of CEOs in supply-chain-intensive industries planned to increase investments in digital. The COVID-19 pandemic has exposed many supply chain vulnerabilities and the need for agility and resilience. Further, a lack of advanced digital technologies for increased visibility and coordination is ranked as a top-five barrier to resilience.

Business Impact

Digital supply chain impacts revenue, margin, ROA and risk by enabling:

- The prediction of events that impact a supply chain by sensing demand change, supply disruption, quality causes and machine maintenance
- Visibility across the end-to-end supply chain and decision making by translating big data into insights and prescribing actions using advanced algorithms and hyperautomation
- Supply chain cost reduction by automating repetitive tasks and processes, in both process executions and operations
Drivers

- The board of directors are prioritizing digital following COVID-19, where 69% of members surveyed said they will accelerate digital business investments.

- New digital business models require digital supply chain capabilities to succeed. Examples include services delivered by connecting to customer assets and omnichannel delivery required by changing consumer shopping patterns.

- Supply chain operating models are being reinvented, such as using machine learning to perform autonomous supply chain planning or using blockchain to change how regulated information is shared with trusted partners.

- Customer expectations for information are evolving, such as having increased visibility into the order or transportation status.

- Existing processes are being optimized, such as using robotic process automation (RPA) to streamline order-to-cash or using cloud and mobile devices to improve data access across the extended supply chain.

- Digital ecosystems are emerging to enhance how partners serve customers. Eighty percent of those surveyed expect to have a technology platform in place to integrate with partners within two years.

- Hyperautomation will apply a range and combination of advanced technologies to facilitate or automate tasks that originally required some form of human judgment.

- Supply chain risk is an executive concern driven by a steady cadence of unfamiliar and high-impact events. Sixty-seven percent of survey respondents agreed that their supply chains have insufficient time to recover before another high-impact event hits.
Obstacles

- No common definition of a digital supply chain is communicated to all stakeholders within and beyond the supply chain.
- There is a narrow scope of how digital leads to functional optimization versus transformation of the operating model.
- The emerging versus mainstream technology landscape is not understood, nor are there methods in place to exploit them for near and long-term value.
- Organizational silos inside and outside the supply chain limit improvement impacts.
- Governance structures, such as centers of excellence and executive-level digital steering committees are lacking and lead to poor funding prioritization and cross-functional accountability.
- Continuous improvement and innovation is mismanaged, leading to unrealized business value.
- Digital supply chain talent is insufficient to utilize digital tools and adopt new practices.
- A lack of data accuracy and interoperability impacts the effectiveness of the digital strategy.

User Recommendations

- Engage the executive team to develop a vision of the enterprise digital business ambition. Take the lead in driving this if others are not.
- Communicate to all stakeholders the digital supply chain vision and its value to both top- and bottom-line business goals.
- Develop a cross-functional workforce with digital dexterity to create a digital supply chain strategy and roadmap.
- Design the digital supply chain roadmap to support future business scenarios by prioritizing a mix of digital initiatives that simultaneously optimize and transform current capabilities.
- Implement a governance process that aligns digital supply chain to business goals and then ensures execution toward the long-term vision.
Cost-to-Serve Analysis

Analysis By: Marco Sandrone

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition

Supply chain cost-to-serve (CTS) analysis refers to the capability to allocate costs of supporting customers and products based on the complexity they drive in supply chain operations. This cost transparency allows organizations to calculate their true profitability along multiple dimensions, such as customer, product, product category or market.
Why This Is Important

CTS analysis has been a popular topic raised by Gartner supply chain clients during the past three years. They recognize that the current allocation of supply chain costs to customers and products is not well-tied to the actual drivers. A lack of visibility to true profitability leads to less-profitable products and services being offered. As a result, many supply chain strategy leaders, in partnership with finance, are creating analytical models that more closely reflect these relationships.

Business Impact

CTS models enable a deeper understanding of the cost of supporting customers and products based on the complexity they generate. Business leaders at many companies use these models to set more-targeted policies for which services are offered to specific customers and develop differentiated approaches for how products are sourced, made and delivered through the supply network. The benefits of introducing differentiation into supply chain operations can result in improvements of more than 10% to cost and inventory levels.
Drivers

Despite broad industry interest in being able to leverage cost-service trade-off models for improved profitability, many companies still struggle. The most common challenges when implementing a CTS capability are:

- **Availability of quality data and adequate technology architecture:** Gaps in the ability to accurately summarize and group logistics spending in a timely fashion are common hurdles to proposing consolidation and other efficiency changes.
- **Lack of engagement from the finance function:** This may delay time to decision, based on insights from the model, and limit the depth to which organizations can develop the model.

Obstacles

Despite broad industry interest in being able to leverage cost-service trade-off models for improved profitability, many companies still struggle. The most common challenges when implementing a CTS capability are:

- Since the pandemic started in 2020, the need to protect the business profitability in a highly volatile environment has led to an increased importance of CTS capabilities. As many supply chains have struggled to keep their logistics and operating costs under control, CTS has proved the right tool to enable trade-off decisions between inventory levels, service levels and cost.

- Through this year’s Supply Chain Top 25 research and client conversations, Gartner found that some leading companies in a few industries have or are launching CTS initiatives to support their S&OP processes. At different stages of the S&OP cycle, CTS can be used to identify opportunities to enhance the profitability of the organization and enable an informed decision process to close gaps with year-end objectives.

- Along the traditional CTS use cases, some retailers are now considering leveraging this capability for the creation of a marketplace. A marketplace is a solution that allows external vendors to leverage an existing online platform and/or logistics service to sell their own products. Amazon Marketplace is one example.

- The past few years have seen an increase in vendor-based solutions and consulting resources offered to assist companies with building the CTS capability.

- Some CTS vendors are extending the use of cost-to-serve capabilities to monitor the production of CO2 emissions of a supply chain. This new capability is referred to as emission-to-serve.
Lack of organizational appetite: Companies may see resistance to exposing operational costs and performance levels, both internally and with outsourced providers.

Decentralized organizational structure and reporting lines: This hinders the ability to drive efficiencies through spend consolidation and other changes that require accountability and responsibility for overall spending across the organization.

**User Recommendations**

- Enlist an exploratory team to discuss and understand the highest-value areas of opportunity for leveraging CTS analysis.
- Craft a business case that draws a clear connection between the profitability of customers and/or products and the most important corporate strategic goals. Use it to start engaging your partners in finance and commercial functions.
- Assemble a project team to manage the CTS initiative and build focused and flexible models.
- Take a phased, pilot-based approach to implementation. The first pilot model should focus on a defined geographic region, a particular business group or product line.
- Use Excel-based models or an already-installed business intelligence platform for the early stages of your CTS roadmaps.
- Evaluate the ROI of using an external partner once the first CTS capability is stable, to assist with data infrastructure and model creation where skill and system gaps exist.

**Gartner Recommended Reading**

*Create Cost-to-Serve Model in 6 Steps, Part 1 — Scope Data Analysis for Action*

*Create Cost-to-Serve Model in 6 Steps, Part 2 — Unveil the True Profitability*

**SC Segmentation**

Analysis By: Jennifer Loveland

Benefit Rating: High

Market Penetration: More than 50% of target audience
**Maturity**: Mature mainstream

**Definition**
Segmentation defines a menu of outcomes and optimized processes to deliver them. Supply chain (SC) uses are end to end (E2E), for distinct customer experiences from order through services, or targeted to a role, function or process. Each has: two-to-five distinct operational outcomes and standard procedures; different targets for relevant financial and operational metrics; defined flows through the physical and digital SC; and required behavior changes across and outside SC-owned activities.

**Why This Is Important**
All supply chains balancing growth, efficiency and increasing SC complexity benefit from segmentation techniques. Segmentation can also enable a shift to an outside-in value focus required of high-maturity supply chains. Historically, application of segmentation in the SC has been ad hoc, preventing a tie to metric targets and performance. Successful implementations have a repeatable, standardized playbook and ongoing segmented governance.

**Business Impact**
SC segmentation allows organizations to effectively handle complexity.

- **E2E segmentation** efficiently supports product, market and channel expansions that add to SC complexity. It helps plan change roadmaps and shift the cultural focus toward customer and business value.

- **Targeted segmentations** realize near-term value through smaller-scale differentiation within specific functions (i.e., new product introduction, procurement, planning, manufacturing, inventory, logistics and customer service).

**Drivers**
The Hype Cycle position represents an average of adoption of the two extremes of segmentation complexity and has further climbed the Slope of Enlightenment driven by:
■ **End-to-end (E2E) segmentation:** Over the last two to five years, about half of large, leading supply chains in all industries have successfully implemented E2E segmentation. SC maturity of Level 3 and above is critical for successfully sustaining implementation, so lower-maturity or smaller organizations will adopt E2E segmentation as they mature. More companies have begun design of E2E segmentation, moving it closer to the productivity plateau. Many initial implementation attempts fail due to lack of maturity-based prerequisites; thus, it will be five to 10 years before it is mainstream for companies to operate differentiated E2E SC models globally.

■ **Targeted segmentation:** Smaller-scope targeted segmentations (categorizing suppliers, ABC inventory categorization, targeted customer collaboration, etc.) are formally documented in about half of all supply chains, with almost all having ad hoc targeted SC segmentation in place. Successful implementation examples can take days, weeks or months in organizations of maturity Level 2 and above. There are identified use cases for each SC function.

■ **Complexity:** Disruptions and growing complexity in customer requirements have increased interest. Given the recent rate of disruptions, 55% of respondents indicate they are investing in segmentation now to achieve greater resilience and/or agility (see *Supply Chain Executive Report: Future of Supply Chain — Crisis Shapes the Profession*).

■ **Standardized approach:** We expect it will be two to five years for a consensus, formal segmentation approach to be documented that will enable full mainstream adoption with explicit ties to financial and operational metrics.
Obstacles

- **Maturity prerequisites** — Many implementation attempts fail due to lack of maturity-based prerequisites. Successful targeted segmentation implementation requires maturity Level 2 and above. E2E segmentation entails highly complex changes, taking two to three years to implement and greater than Level 3 maturity.

- **Ineffective design** — Segment definitions are too conceptual, without enough detail of sufficient cost-to-serve analysis to ensure implementation feasibility with profit. Segmentations are informal and lack differentiated metric targets or governance by segment. Business dynamics prevent implementation of optimal designs.

- **Stakeholder roadblocks** — Vague discussions create stakeholder fear that needs will not be met. Project teams may lack influence or ability to create incentives that will drive required behavior changes.

- **Inadequate results** — Designs do not push far enough to identify new sources of value and just rehash existing assumptions, leaving waste in the process.

User Recommendations

- Standardize a segmentation playbook by appointing a leader to develop it and drive continuous improvement.

- Create an E2E segmentation aspiration by moving from “one size fits all” to a menu of E2E customer-need-based operating models.

- Develop prerequisites by creating a multiyear roadmap, Level 3 or above maturity, cost-to-serve analysis, common metrics and collaborative decision making.

- Ensure segmentations are relevant by identifying significant, quantifiable impact to financial and operational measures warranting added complexity and behavior change.

- Ensure segmentations encourage behavior changes by specifying approach differences and justifying when, why and how resources must choose between ways of completing a task.

- Ensure segmentations are sustained by refining, deploying, operating, maintaining and governing multiple approaches to a single process. Refine each collection of segments as business and customer needs change during strategic planning and events (i.e., new product launches, new routes to market, or mergers and acquisitions).
Gartner Recommended Reading

**Segmentation 101: Apply Supply Chain Segmentation to Serve Diverse Needs and Reduce Waste**

**How to Choose the Right Type of Supply Chain Segmentation for Your Objectives**

**Use End-to-End Supply Chain Segmentation to Support Growth, Operational Excellence and Increasing Complexity**

**Five Phases for Successful Supply Chain Segmentation**

**Part 1 — Enable Competitive Advantage With End-to-End Supply Chain Segmentation: Segment Based on Customer Order Needs**

**Network Design**

**Analysis By:** Kamala Raman

**Benefit Rating:** High

**Market Penetration:** 20% to 50% of target audience

**Maturity:** Early mainstream

**Definition**

Gartner describes network design as the creation of a supply chain model to optimize the network for chosen strategic objectives. These may include a network that is highly responsive to changing customer needs, cost-efficient, flexible to handle demand variability, rationalized after an acquisition or one that is resilient. Developing pragmatic scenarios defined on known network attributes and testing for sensitivity to changes in key variables are necessary to successfully execute on a design.

**Why This Is Important**

The volatile business environment of today, marked by rapid shifts in demand and supply patterns, transformative growth in e-commerce and continued uncertainty on global trade policies, is one where network configurations of the past are being questioned. Organizations that invest in an analytics-driven approach to supply chain design can better assess the trade-offs between cost, service-level requirements and inventory to optimize capacity and network flows for conflicting priorities.
Business Impact

As supply chains balance competing on customer experience, disruptions, shifts in demand channels and global trade uncertainty, the role of supply chain network design has shot up in prominence. Intentional design of the physical footprint can fine-tune trade-offs between cost-efficiency, growth and resilience. Optimizing product flows through a network of suppliers, factories, warehouses or retail outlets can improve utilization of existing capacity, while prioritizing the customer experience.
Drivers

- Leading organizations have had to move from a singular focus on cost-efficiency to delivering the best customer experience. Examples of such use cases include delivering segmented customer service using risk-balanced and cost-optimized network models, or balancing near-term cost-efficiency against resilience and total costs to serve in the long term.

- The need to respond to repeated demand and supply disruptions across ecosystems, manage transformative growth in online sales and remain agile while doing so. Aligning footprint, capacity and product flow with business model changes such as a regional manufacturing model or optimizing the network for the growth in multichannel fulfillment are examples of these.

- Given the shifts in trade policies around the world, optimizing global manufacturing capacity and extended supplier networks in response to trade policy fluctuations has become an essential capability.

- For these reasons, investments in analytics to democratize insights and improvements in decision making through better scenario planning capabilities become critical to help organizations respond to fast-moving trends.

- Pragmatic scenario analysis can help with placing considered strategic bets amid uncertainty.

- Creating a suitable design early in a product life cycle, before functional constraints are in place, allows for better optimization of the total costs.

- Periodically testing fulfillment options and policy settings can ensure a physical configuration that enables appropriate trade-offs between inventory, cost and service-level requirements.

- Cloud-based platforms offer scalable and collaborative solutions that can cut the solution time for large and complex models.

- This complexity presents a need for dedicated analytical resources and the learning curve for technology limits mainstream adoption of software tools.

- Software vendors are offering configurable applications to tackle focused problems and service providers are responding with delivery models that range from one-off network analysis to ongoing model management.

- 3PLs and contract manufacturing partners also offer design services for clients.
Obstacles

- Designing supply chains requires a focus on long-term objectives that are often not easy to decipher.

- Obtaining visibility to supplier tiers and network costs can be a barrier in global supply chains.

- Technology investments to automate data collection and model building can be high in complex networks.

- Given the specialization and geographic concentration of many supplier ecosystems, diversifying the network may be a task of enormous cost, complexity and time.

- Obtaining buy-in for network alternatives that weigh monetary benefits against network impact and execution complexity is essential to reducing implementation risk.

- Policy changes (on inventory, distribution flows, etc.) that impact multiple suppliers, manufacturing or distribution locations may be hard to translate into execution.

- For organizations in analytics solutions, the availability of skilled data scientists and supply chain experts who understand business objectives can be a limiting factor.

User Recommendations

- Make network design a mainstay of analytics initiatives within the supply chain. For large projects, define network objectives, project scope and delivery expectations in a robust early planning phase.

- Design and shortlist scenarios with stakeholders. Create the baseline and provide trade-off analysis for selected scenarios. Conduct sensitivity analysis to explore creative options around the optimal solution.

- Select the final “to-be” design on its expected performance to the chosen objectives but also on qualitative criteria. These include complexity of implementation, social and environmental impact of policies, and brand value of the ability to mitigate or avoid disruptions.

Gartner Recommended Reading

Capacity Constraints in Your Distribution Network? Ask These Questions Before Committing to Expansion
Center of Excellence

Analysis By: Caroline Chumakov

Benefit Rating: High

Market Penetration: More than 50% of target audience

Maturity: Mature mainstream

Definition

A center of excellence (COE) is a physical or virtual center of knowledge, concentrating on existing expertise and resources in a supply chain function, capability or process to attain and sustain world-class performance across the supply chain. COEs operate adjacent to groups that execute core business functions. They find, design and implement changes to business processes, people or technologies.

Why This Is Important

Adapting capabilities and infrastructure to the emerging realities of the business is central to the success of supply chains. Shifting economies, competition and the digital business evolution challenge organizations to continually adapt to the quick pace of change. Change is the new normal, and COEs are common organizational structures that enable the supply chain organization to navigate uncertainty and prepare for the future.

Business Impact

COEs are leveraged for five major use cases:

- Providing governance to refine decision making
- Transforming processes and systems
- Enhancing supply chain's people capabilities
- Providing expertise as a service to the organization
- Disrupting legacy ways of working
Data shows that organizations using one or more COEs are two to three times more likely to report exceeding their goals (revenue growth, margin and return on assets [ROA]) in the prior fiscal year than organizations that do not have COEs.

**Drivers**

- Gartner research indicates that 78% of supply chain organizations surveyed have one or more COEs. COEs find and develop best practices to support functional excellence (e.g., planning, manufacturing), process excellence (e.g., sales and operations planning, product life cycle management) and enabling capabilities (e.g., talent, technology).

- COE teams deploy these best practices across global, regional and local units to improve service, lower costs, engage talent or increase visibility of inventory. They are often developing specific ways in which the supply chain can improve operational execution or better orchestrate decision making across their organization.

- They are thought leaders in the business, looking to innovate and find new ways of working that can be operationalized to improve the growth and profitability of the business. For example, COEs are often created to define or execute digital supply chain initiatives. We find that 80% of supply chain organizations have a formal and documented vision for their digital supply chain and 96% of this group has one or more COE(s) to define and execute digital initiatives (versus only 85% of those organizations without a vision).

- Despite the global economic downturn of 2020 and 2021, we predict that the use of COEs as a method for driving change in supply chain will continue. We believe that supply chain organizations will likely proceed to bring new COEs on board, add additional COEs or work to improve the effectiveness of existing COEs.
Obstacles

- A significant number of lower maturity organizations that would benefit from supply chain COEs are still not using them.

- Companies using COEs are challenged to engage the organization and maintain funding for the ongoing use of the COE. Much of this has to do with the lack of structure built within and around COEs, including weak mandates, uncertain missions, unsuccessful stakeholder relationship management, unclear governance and no repeatable methodology. This all occurs within the context of large global organizations where the business units tend to reject initiatives that create global standards, consolidate IT systems or shift decision making.

- In response to an economic downturn, the development of new COEs may be put on hold and existing COEs may be challenged to validate their existence and contributions to business performance.

User Recommendations

Supply chain leaders that are either implementing or revising their existing COEs should:

- Clarify the problems the COE is meant to address, the core objectives the COE intends to deliver on, as well as the services COEs will provide.

- Develop a business case communicating the value the COE will deliver to the organization in terms of business impact.

- Articulate the balance of power, decision-making authority and process ownership between the COE and its network of partners in the business.

- Build a team with the right set of capabilities, enthusiasm and credibility in the business to deliver on COE objectives. Develop clear role profiles and performance metrics for COE positions.

- Design and deploy a methodology that helps the team scale and drive repeatable outcomes. The team must have a set of processes and tools with which to engage the business.

- Develop a roadmap of initiatives that map to those things most critical to the supply chain strategy and issues within the business.

Gartner Recommended Reading

How to Demonstrate the Value of Supply Chain COE Activities
How to Manage the Supply Chain COE Internal Customer Relationship

Toolkit: Measuring Internal Satisfaction With Your Supply Chain COE

Toolkit: Supply Chain COE Project Charter Template
Figure 2: Hype Cycle for Supply Chain Strategy, 2020

Appendixes

Hype Cycle for Supply Chain Strategy, 2020

Source: Gartner (August 2020)
# Hype Cycle Phases, Benefit Ratings and Maturity Levels

## Table 2: Hype Cycle Phases

(Enlarged table in Appendix)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Innovation Trigger</strong></td>
<td>A breakthrough, public demonstration, product launch or other event generates significant media and industry interest.</td>
</tr>
<tr>
<td><strong>Peak of inflated Expectations</strong></td>
<td>During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the innovation is pushed to its limits. The only enterprises making money are conference organizers and content publishers.</td>
</tr>
<tr>
<td><strong>Trough of Disillusionment</strong></td>
<td>Because the innovation does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.</td>
</tr>
<tr>
<td><strong>Slope of Enlightenment</strong></td>
<td>Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the innovation’s applicability, risks and benefits. Commercial off-the-shelf methodologies and tools ease the development process.</td>
</tr>
<tr>
<td><strong>Plateau of Productivity</strong></td>
<td>The real-world benefits of the innovation are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. Growing numbers of organizations feel comfortable with the reduced level of risk; the rapid growth phase of adoption begins. Approximately 20% of the technology’s target audience has adopted or is adopting the technology as it enters this phase.</td>
</tr>
<tr>
<td><strong>Years to Mainstream Adoption</strong></td>
<td>The time required for the innovation to reach the Plateau of Productivity.</td>
</tr>
</tbody>
</table>
### Table 3: Benefit Ratings

<table>
<thead>
<tr>
<th>Benefit Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transformational</strong></td>
<td>Enables new ways of doing business across industries that will result in major shifts in industry dynamics</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings</td>
</tr>
</tbody>
</table>

Source: Gartner (August 2021)
Table 4: Maturity Levels
(Enlarged table in Appendix)

<table>
<thead>
<tr>
<th>Maturity Levels</th>
<th>Status</th>
<th>Products/Vendors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embryonic</td>
<td>In labs</td>
<td>None</td>
</tr>
<tr>
<td>Emerging</td>
<td>Commercialization by vendors&lt;br&gt;Pilots and deployments by industry leaders</td>
<td>First generation&lt;br&gt;High price&lt;br&gt;Much customization</td>
</tr>
<tr>
<td>Adolescent</td>
<td>Maturing technology capabilities and&lt;br&gt;process understanding&lt;br&gt;Uptake beyond early adopters</td>
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Source: Gartner (August 2021)

Document Revision History

Hype Cycle for Supply Chain Strategy, 2020 - 6 August 2020
Hype Cycle for Supply Chain Strategy, 2019 - 15 July 2019
Hype Cycle for Supply Chain Strategy, 2018 - 13 July 2018
Hype Cycle for Supply Chain Strategy, 2017 - 20 July 2017
Hype Cycle for Chief Supply Chain Officers, 2016 - 11 July 2016

Recommended by the Author

Some documents may not be available as part of your current Gartner subscription.

Understanding Gartner’s Hype Cycles
Supply Chain Executive Report: Future of Supply Chain — Crisis Shapes the Profession
Flexible Supply Chain Strategic Planning Starts With Strategic Assumptions
Unlock Supply Chain Digitalization With Data Literacy
### Table 1: Priority Matrix for Supply Chain Strategy, 2021

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Years to Mainstream Adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less Than 2 Years</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Transformational</td>
<td></td>
</tr>
<tr>
<td>Customer Experience</td>
<td>Digital Supply Chain Strategy</td>
</tr>
<tr>
<td>Digital Supply Chain Strategy</td>
<td></td>
</tr>
<tr>
<td>Circular Economy</td>
<td></td>
</tr>
<tr>
<td>Artificial Intelligence</td>
<td></td>
</tr>
<tr>
<td>Modular Operating Model</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>Center of Excellence</td>
</tr>
<tr>
<td>Agile Teams</td>
<td>Digital Security</td>
</tr>
<tr>
<td>Network Design</td>
<td></td>
</tr>
<tr>
<td>SC Segmentation</td>
<td>Social Learning Platforms</td>
</tr>
<tr>
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<td>Solution Supply Chains</td>
</tr>
<tr>
<td>Solution Supply Chains</td>
<td>Workforce Analytics</td>
</tr>
<tr>
<td>Workforce Analytics</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>RPA</td>
</tr>
<tr>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>
**Table 2: Hype Cycle Phases**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Innovation Trigger</strong></td>
<td>A breakthrough, public demonstration, product launch or other event generates significant media and industry interest.</td>
</tr>
<tr>
<td><strong>Peak of Inflated Expectations</strong></td>
<td>During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the innovation is pushed to its limits. The only enterprises making money are conference organizers and content publishers.</td>
</tr>
<tr>
<td><strong>Trough of Disillusionment</strong></td>
<td>Because the innovation does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.</td>
</tr>
<tr>
<td><strong>Slope of Enlightenment</strong></td>
<td>Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the innovation's applicability, risks and benefits. Commercial off-the-shelf methodologies and tools ease the development process.</td>
</tr>
<tr>
<td><strong>Plateau of Productivity</strong></td>
<td>The real-world benefits of the innovation are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. Growing numbers of organizations feel comfortable with the reduced level of risk; the rapid growth phase of adoption begins. Approximately 20% of the technology’s target audience has adopted or is adopting the technology as it enters this phase.</td>
</tr>
<tr>
<td><strong>Years to Mainstream Adoption</strong></td>
<td>The time required for the innovation to reach the Plateau of Productivity.</td>
</tr>
<tr>
<td>Phase</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Transformational</td>
<td>Enables new ways of doing business across industries that will result in major shifts in industry dynamics</td>
</tr>
<tr>
<td>High</td>
<td>Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td>Moderate</td>
<td>Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise</td>
</tr>
<tr>
<td>Low</td>
<td>Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings</td>
</tr>
</tbody>
</table>

Source: Gartner (August 2021)
### Table 4: Maturity Levels

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<tr>
<th>Maturity Levels</th>
<th>Status</th>
<th>Products/Vendors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embryonic</td>
<td>In labs</td>
<td>None</td>
</tr>
<tr>
<td>Emerging</td>
<td>Commercialization by vendors</td>
<td>First generation</td>
</tr>
<tr>
<td></td>
<td>Pilots and deployments by industry leaders</td>
<td>High price</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Much customization</td>
</tr>
<tr>
<td>Adolescent</td>
<td>Maturing technology capabilities and process understanding</td>
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