The 2021 Supply Chain Technology Themes

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Initiatives: Supply Chain Technology Strategy and Selection; Supply Chain Head of Strategy Realization

> Innovative supply chain technologies create the potential for positive impacts on people, performance and industries. This research lays out the framework of technology themes for 2021 that supply chain technology leaders should use to determine strategic roles, impacts and investment priorities.

Overview

Impact

- The growing need for digitally interconnected supply chain networks warrants the exploration of innovative technologies that can be bundled together to deliver transformational supply chain outcomes.

Recommendations

Supply chain technology leaders responsible for technology innovation in supply chain and operations should:

- Solve specific supply chain business problems and deliver anticipated business outcomes by recognizing that innovative, breakthrough technologies must often be sequenced and bundled together.

- Implement a robust process for identifying, evaluating, selecting and deploying innovative technologies by first identifying your supply chain maturity, organizational risk culture and the industry sector. These have a significant influence on how organizations view technology innovations.

- Select the innovative technologies that have a positive impact on business performance by identifying your current challenges and how these technologies can help overcome them. Take the additional step of showing how the technology will impact the work people do and the future roles they may have.

■ Prioritize testing and implementation of these innovative technologies by following the strategy that was created in alignment to the overall supply chain maturity. Ensure a strong competency in process governance during ongoing business reviews for IT investment, strategy and decision making in order to guarantee success.

Introduction

For the purpose of this year's report on supply chain technology trends, we will focus on broader, overarching technology themes rather than individual technologies. This is because innovative, breakthrough technologies are often combined together in order to solve specific supply chain business problems that come together to deliver anticipated business outcomes. Supply chain technology leaders should examine the impact of the 2021 technology themes for supply chain on people, business objectives and systems, adjusting their supply chain IT strategies and operational models appropriately. We've selected these particular technology themes for their transformational potential, as the need for operational resiliency across business functions, technology, and service delivery has never been greater (see Figure 1).

Figure 1. 2021 Supply Chain Technology Themes

2021 Supply Chain Technology Themes
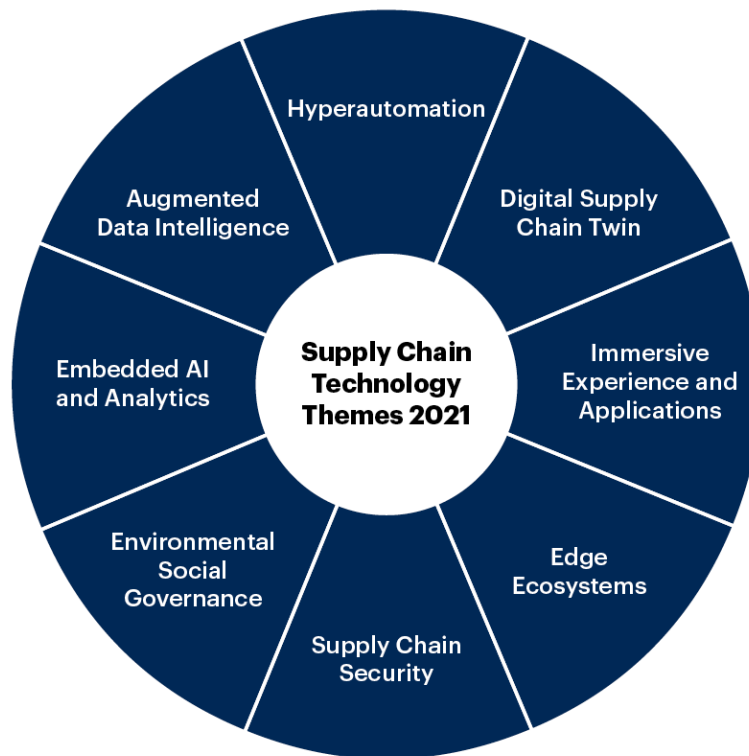
Source: Gartner
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Gartner

Note that individual technology trends previously listed — but not in this year's report — might still be relevant, but are now considered being part of the broader themes. This includes technologies such as continuous intelligence, 5G network or intelligent/autonomous things (including smart machines), next to blockchain in supply chain and robotic process automation (RPA).

Impacts and Recommendations

The Need for Digitally Interconnected Supply Chain Networks Warrants the Exploration of Innovative Technologies

Gartner surveys of supply chain leaders reveal that chief supply chain officers (CSCOs) will need to navigate six major shifts in the upcoming years. The CSCO's imperative will be to meet purpose-driven goals whereby product sourcing, manufacturing and delivery processes serve a higher purpose and maintain economic viability. These shifts include:

- Increased digitalization, both functional but also cross-functional and end to end.

- Increased interest in automating manual and resource-intensive tasks.

- Reimagination of globalization and offshore manufacturing.

- Migration to greater levels of e-commerce (including e-fulfillment and e-services).

- A more connected and proactive customer experience.

- Hybrid workforce model (humans and machines).

These purpose-driven supply chains move beyond transactional relationships, focusing on innovation and collaboration, and will integrate this concept into how business is done. In enabling these shifts, supply chain technology is becoming more important than ever.

Why Companies Need to Watch Emerging and Innovative Technologies

Why are technologies important for supply chain transformation and how should organizations identify and select the themes that matter? It is because organizations that continuously evaluate technology themes will be better prepared to incorporate them into their immediate and longer-term planning requirements in support of changing business models and strategies. Certain technology themes can offer a distinct advantage that helps organizations not only to reach out to new customers or markets, but also to internally mature their supply chain organization. Bottom line, these technology themes can enable companies to seize competitive advantage at the right moment.

Certain technology themes can provide a distinct advantage to help companies extend their reach to new customers and markets. They can also enhance their levels of data, digital and supply chain maturity, and seize a competitive advantage through the right piloting and deployments of technologies at the right place and time.

However, certain factors influence how organizations prioritize investments. Overall supply chain maturity, organizational risk culture and its industry sector, all have a significant influence on how users position technologies on their transformation journey. When evaluating innovative technologies, organizations follow a more exploratory and experimental pathway (aka Mode 2) rather than the traditional methods of technology evaluation (aka Mode 1). When considering technology candidates, look for the potential impact, the trend's degree of maturity, market dynamics and what they'll mean for the organization. This will then lead to incorporating the appropriate themes into the tactical planning and strategic roadmap, well-aligned with the overall business strategy (see Ignition Guide to Creating a Digital Supply Chain Roadmap).

The 2021 Supply Chain Technology Themes

The need for a digitally interconnected supply chain ecosystem warrants evaluating innovative technologies that can be sequenced and combined to deliver transformational outcomes. Think about a specialized Internet of Things (IoT) application that not only integrates into other operational systems but can be configured to capture and collate specific data relating to a product, asset or service. This is done at a particular phase in its life cycle that is used by some advanced analytics. Conversely, also think about the digital supply chain twin, which incorporates graph technology, machine learning and predictive analytics. So it is about both, bundling and sequencing of emerging capabilities into broader technology themes.

Hyperautomation

Definition: The range and combination of advanced technologies that can facilitate or automate tasks that originally required some form of human judgment or action is called "hyperautomation." The term "tasks" refers to not only tasks and activities in the execution, working or operational environment, but also in thinking, discovering and decision making. Hyperautomation involves a combination of technologies that include RPA, machine learning (ML), artificial intelligence (AI), robotics and smart machines, and many others.

Impact and Outlook: Connectivity and digitalization is pervasive in our society as intelligent technologies surround us. Over the next 10 years, people and businesses will continue to progressively need to delegate authority of decision making to intelligent applications, physical robots and software service assistants. In contrast to legacy solutions that heavily relied on human judgment, new supply chain technology portfolios offer a wide range and combination of advanced capabilities and processes that facilitate maturity for advanced progressive automated tasks at scale, namely hyperautomation. Hyperautomation is expected to help automate transactional processes (order to cash, for example) and complex decision making (supply chain planning, for example), eventually augmenting humans' decision-making capabilities and supporting the creation of an autonomous supply chain. It is further the ability to realign resources to focus on exceptions in conjunction with digital network reconfiguration. Such a supply chain of the future will be able to automatically plan in real time and run automated operational actions in a frequent, granular and cost-effective way.

Use Cases:

- In supply chain planning, predictive demand planning delivers better forecast accuracy and further significant savings in context of frequent changes to the product portfolio and demand variability.

- In supply chain fulfillment, order-to-cash processes become more automated and intelligent, striving for autonomous fulfillment for greater customer experience.

- In the physical fulfillment spectrum, a number of new developments in smart physical robotics are automating and streamlining warehousing activities, while advances in various autonomous vehicles and drones are creating new innovative methods for delivery.

- In manufacturing, the phased elimination of manual interventions in repetitive, technical tasks (aka smart factory). Progressive incorporation of machine learning and analytics tools in legacy/existing infrastructure supporting operations and RPA to mine, cleanse and analyze data to create optimized intelligence to configure robust, scalable automated networks. Continuous improvement of data insights in areas such as quality safety, security and speed.

Recommendations:

- Create a multiyear, integrated digital supply chain strategy and roadmap to experiment, pilot and roll out hyperautomation. Consider organizing this roadmap in three steps: automation, augmentation and autonomy.

- Prioritize IT investments based on an iterative multiyear journey premised on multiple concurrent, business-driven hyperautomation initiatives. This ensures speedy delivery and business agility, while optimizing ongoing management, governance, several process types and technical debt.

- Use hyperautomation as a key strategic communications tool to encourage broader collaboration across functions and domains, especially those that are disparate or siloed.

Research References:

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

- Emerging Technologies and Trends Impact Radar: Hyperautomation

Sample Vendors: Amazon, Appian, Google, Leapwork, Microsoft, Oracle, rapidMATION

Digital Supply Chain Twin

Definition: A digital twin is a digital representation of a real-world entity or system. The digital supply chain twin (DSCT) is a digital representation of the physical (often multienterprise) supply chain. It is a dynamic, real-time and time-phased representation of the various associations between the data objects that ultimately make up how the physical supply chain operates. It is the basis for local and end-to-end (E2E) decision making for the supply chain that ensures that this decision making is aligned horizontally and vertically throughout the supply chain. The DSCT is derived from all the relevant data across the supply chain and its operating environment.

Impact and Outlook: DSCTs are part of the digital theme that describes an ever-increasing merger of the digital world and the physical world, yet this is aspiration for the time being and will take years to mature. The DSCT theme focuses on creating the appropriate digital representation of the physical supply chain. It creates end-to-end visibility and supports end-to-end decision making by being in lockstep with the real-world supply chain. Through this linkage to the real world, situational awareness and supply chain decision making are greatly enhanced. Organizations would use a DSCT for supply chain decision making, connecting from strategic through to executional level systems. Appropriate predictive and prescriptive analytics (including ML and AI) would be applied to the DSCT, enabling aligned — and to various degrees automatic — decisions to be made across the variety of supply chain domains. By being a truer representation of the real-world physical supply chain, these decisions would be faster and of a higher quality.

Use Cases:

■ In general, use a digital twin for enhanced decision making. Appropriate predictive and prescriptive analytics, including ML and AI, should be applied to the digital supply chain twin, enabling aligned — and to various degrees automatic — decisions to be made.

■ In warehouse management, warehouse and delivery execution analysis and optimization, simulation of alternatives due to change in demand or other influencing parameters.

- In inventory management, ingest data from internal and external sources, and run AI and ML models to generate predictive insights on where inventory risks are occurring in the network. This enables planners to take action prior to risks materializing, like optimizing inventory positions across the network.

Recommendations:

- Develop a digital roadmap that enables aligned supply chain decision making. Put the notion of a DSCT at the center of this technology roadmap as is a prerequisite for Stage 5 maturity planning (aka decision making) maturity.

- Examine early opportunities to add DSCT-like capabilities to your existing technology landscape. Most likely, this will involve pairing up the new capability with existing supply chain visibility and/or planning solutions.

- Be prepared to experiment and/or go outside of your usual technology providers to get this capability. It is emerging and still underdeveloped.

Research References:

- [Innovation Insight for Digital Supply Chain Twin](#)

- [Hype Cycle for Supply Chain Planning Technologies, 2020](#)

Sample Vendors: bluecrux, eccenca, E2open, o9, r4

Immersive Experience and Applications

Definition: Immersive experience reimagines the user experience by enabling users (including customers and employees) 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. Emerging 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. Head-mounted displays (HMDs), wearables, smartglasses, 5G, thing/object recognition and even smartphones or tablets provide the infrastructure and enhancements to immersive experiences through the mix of graphic processing, AI and other individual business applications.

Impact and Outlook: Immersive experiences leverage applications that support both physical devices and integrated software capabilities, business and personal interactions are significantly and permanently changing and becoming more mobile, virtual and distributed. The user experience undergoes a significant shift in user perception and interactions across the digital and physical world, and transitions to a rich, multidimensional and personalized experience. The evolution of continuous, immersive and conversational user experiences will have a profound impact on the supply chain's ability to accelerate governance around data privacy, IP, permissions and security. Immersive experience technologies have the potential to radically influence the trajectory of supply chain management (SCM). 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 could augment human capabilities and the nature of standard work. Companies utilizing immersive experience technologies already benefit from outcomes, such as safer working environments, faster repair times, improved work error rate, better collaboration, and better retention of skills and knowledge. Looking even further out, the total experience (TX) will create superior shared customer and employee experiences, the combination and alignment of multiple experiences, customer (CX), employee (EX) and user experience (UX).

Use Cases:

- Onboarding of new workers 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 AR headsets in warehousing has already 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 AR, that support drivers' mission, navigation and safety. Wearable solutions could monitor driver fatigue, for example.

Recommendations:

- Start by identifying supply-chain-specific use cases, such as field service, logistics, warehousing, manufacturing, maintenance or design, that can benefit from those 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, only if you have a clear intention for the deployment.

- Identify critical gaps in customer and user interactions exposed by the COVID-19 pandemic.

- Determine new targeted business outcomes to address using immersive experience capabilities.

Research References:

- Innovation Insight for the Supply Chain Technology Heat Map

- Top Strategic Technology Trends for 2021: Total Experience

- Hype Cycle for Supply Chain Execution Technologies, 2020

Sample Vendors: Accelogix, Apprentice, Honeywell, NVIDIA, Qualcomm, Ubimax, Upskill, Virsabi, Vuzix, Zebra Technologies

Edge Ecosystems

Definition: Edge ecosystems constitute combinations of edge computing and edge data processing applications. These are delivered through networks of human resources, devices, smart machines, sensors and computing systems that allow people to make informed, reliable, secure and agile decisions.

Impact and Outlook: The rapid evolution of the internet, IoT devices, digital maturity and anticipated increases in remote data processing power (such as 5G and indoor Wi-Fi) provides a more open framework. This allows supply chain technology leaders to realign IT resources, data bandwidth and systems to exploit the combined benefits of edge data processing and edge computing. Across the supply chain, the edges of a centralized operating system, data processing platform, enterprise and functional operations areas (such as the warehouse or manufacturing) are the physical locations where things and people connect. They also interact with the networked, digital world through edge computing. Edge ecosystems allow supply chain technology leaders to reassign and replan large swaths of data processing capacity (often in real time) to the edges of enterprises, where things and people can produce or make decisions. An edge ecosystem can constitute networks of hardware, smart machines and mobile devices, which serve as gateways and distribution points for data capture, processing and analytics. Clusters of IoT edge data capture and communications devices, such as RFID, temperature monitoring sensors, vision systems and smart cameras, can work at a complementary level to harmonize captured edge data. Edge ecosystems boost efficiency for transactional workflows across products and assets by enhancing opportunities to transact digitally across disparate stakeholders in areas such as supply networks, extended yard and warehousing environments, without an overreliance on continuous routing through centralized data processing systems such a cloud.

Use Cases:

- In sourcing and industrial environments with high-value, service-based field assets (for example, mining extraction equipment or wind turbines) planned edge ecosystems of embedded, interconnected communicating devices and monitoring sensors track performance, optimization, efficiency and parts degradation.

- Edge ecosystems can be valuable tools in which to support demands of more virtualized and digitalized workspaces.

- In healthcare and life sciences, the ability to track and monitor condition and temperature monitoring requirements across multiple phases of a product's life cycle, including critical raw materials, intermediate phases and finished goods distribution.

Recommendations:

- Assess the value of edge ecosystems for tactical and future planning requirements in optimization of existing legacy and cloud-centralized data processing systems.

- Explore use cases to identify edge devices, tools and connectivity in conjunction with machine learning to analyze patterns on material handling and processing activities involving operational machines, people and robots.

- Assess the value of edge ecosystems in conjunction with new anticipated (for example, 5G data and indoor Wi-Fi) services to deliver new generations of enhanced immersive shopping and personalized services experiences.

Research References:

- Top 10 Strategic Technology Trends for 2020: Empowered Edge

- 2021 Strategic Roadmap for Edge Computing

- Top Trends in Data and Analytics for 2021: Data and Analytics at the Edge

Sample Vendors: ACSIS, DSI, German Edge Cloud (GEC), IBM, Swim, Ori

Supply Chain Security

Definition: Across supply chain networks, the enforcement of security spanning physical levels (devices, machines, products, operations infrastructure and assets) as well as information and digital data (customer information, intellectual property, proprietary coding, transactions and personal data).

Impact and Outlook: Supply chain security brings together a more comprehensive approach to embrace security risks holistically across the end-to-end supply chain. With progressive technology investments critical to future growth across supply chains, the impacts of cyber, digital and data security have been elevated in recent years, supplementing more traditional approaches to physical and product security. Security risk across E2E supply chain networks can originate at any place or any time. Digital and cyber risks include phishing, data privacy infringements and IP breaches (targeting the IT that a supply chain uses to manage its operations and also the operational technology and IoT technologies used as products go from raw materials through finished goods delivery). Product security events include thefts, counterfeits and fakes. With digitally connected E2E value chain networks as an aspirational goal for many organizations, a new generation of scalable supply chain security technology solutions are anticipated to evolve. The market currently is highly fragmented, with technology solutions mapping the highest priority risks faced by supply chains at either the physical or the digital level. Gartner anticipates a wave of new solutions to emerge for supply chain networks, especially targeting high-risk products, high-value assets, privacy, cybersecurity and data security.

Use Cases:

- Security intelligence platforms, hubs and applications for digital networking mapping across the supply chain, continual risk analytics, threat alerts and collaborative intelligence making across security peer and networking communications.

- Specialist asset tracking, smart packaging and labeling solutions to optimize inventory control and minimize theft and diversion.

- Multilayered authentication and verification techniques; for example, smart particles/codes to embed unique/robust fingerprints into products across life cycles to eliminate fakes and counterfeits.

Recommendations:

- Prior to assessing a broad range of technology solutions and services for enhancing supply chain security, first address existing capabilities across planned and new E2E supply chain networks, especially in areas such as data quality, digital maturity, supply chain visibility and traceability.

- Conduct thorough risk assessments across all product, digital criteria and transactions attributes to align with the correct choices and sequence of technology solutions and/or products that could fulfill more scalable security.

- Reach out to your organization's supply chain, C-suite and IT leaders to assess current security and risk management culture, and perceived security and risk concerns and gaps that may exist. Present a consolidated approach to future supply chain security, outlining the key relationships and interdependencies between the digital and physical level.

Research References:

- Serialization Regulatory Outlook for Anticounterfeiting and Fake Medicines Across the Healthcare Value Chain

- Innovation Insight for the Supply Chain Technology Heat Map

- Cybersecurity Is a Business Decision

Sample Vendors: Arjo, BlueVoyant, EVRYTHNG, Honeywell Forge, IronNet, Red Points, Systech

Environmental Social Governance

Definition: Environmental, social and governance (ESG) refers to a collection of corporate performance and evaluation measures that assess the robustness of a company's governance mechanisms and its ability to effectively manage its environmental and social impact. Increasingly, technology solutions are evolving to support supply chains to govern, report, manage and communicate these impacts. These might include climate change and emissions, fair and ethical trade and labor conditions, and obligations for transparency and traceability to the general public, investors and stakeholders.

Impact and Outlook: Global supply chains have a pivotal role to play in their contribution to both map and assess ESG risks and opportunities, as well as contributing to performance data to formulate key indicators of long-term performance. Within the complex, interdependent and extended nature of modern supply chains having the ability to orchestrate, ESG assessments can often be complex, resource-intensive and far-reaching. These assessments may include diverse material issues, such as fair trade, human rights, ethical and responsible sourcing, supply chain greenhouse gas emissions reduction and natural capital impacts.

ESG responsibilities can originate through regulatory mandates sometimes solely impacted by a single product or source material within a single geographic region or country. Given the highly connected and interdependent nature of modern supply chains, it is becoming of increasing importance for supply chain technology leaders to look to technology innovation (and aligned services). This is necessary to help the organization manage, govern and embed greater levels of resiliency and robustness across their supply chain networks in order for them to be more prepared and informed as to ESG opportunities, risks and impacts. Failure to invest in tools and solutions that govern, predict and adapt to new ESG impacts could have a significant impact on brand or company image, customer value perception, and the cost and availability of goods.

Use Cases:

- Tools and solutions to map sourcing networks and tiers of suppliers to trace and locate the origins for products, such as palm oil or soy, aligned to corporate objectives for reduction and eventual elimination of deforestation, biodiversity and climate change criteria.

- Risk assessments, visibility and collaboration tools to map, track and monitor performance across outsourced manufacturing stakeholders networks in sectors such as consumer products, electronics and apparel for worker conditions and labor rights.

- Tools deploying track and trace, AI, and analytics continuous monitoring and transparency of environmental impacts, greenhouse gas emissions, political and geographic risks to identify critical paths adjustments to chains of custody of goods. This is necessary in order to mitigate potential security, legal or regulatory impacts.

Recommendations:

- Establish a cross-functional working group to assess and prioritize supply chain impacts and responsibility for embedding more robust measures and processes for all factors pertaining to ESG.

- Ensure ESG communications and strategy is progressively incorporated into all technology strategy and planning discussions, especially when extending beyond the enterprise to stakeholders in procurement, logistics, supply and outsourcing partners.

Research References:

- [Define Sustainability and Leverage Materiality to Drive More Effective Strategy](#)

- [Apply Digital Business to Sustainability](#)

- [Truth and Transparency in Supply Chain: 3 Case Studies on How Blockchain, AI and IoT Are Shedding Light](#)

Sample Vendors: Aravo, Circulor, EcoVadis, Greenstone, NAVEX Global, Sourcemap, Trane Technologies, Transparency-One, Worldfavor

Embedded AI and Analytics

Definition: Embedded AI and analytics are software capabilities that deliver real-time reporting, interactive data visualization and/or advanced analytics and intelligence — including ML, predictive and prescriptive analytics — directly into an enterprise business application. The data is managed by the supply chain application, and the visualizations and reports are placed directly within the application user interface (UI) to improve the context and usability of the data for supply chain business users and analysts.

Impact and Outlook: In the past, analytics was often viewed as an optional nice-to-have feature often provided by analytics partners as an add-on capability to core business systems. That has changed. Business application providers now recognize that end-user organizations are evaluating them on analytical and intelligence capabilities rather than the core functionality. With the growth of data, analytics and intelligence could be applied to even further explore, transforming data into information and further insights. Business application platforms now provide a full stack of integrated analytic functions — from reporting and dashboards to self-service analytics, alerts, collaboration, data preparation and ML on a unified, scalable architecture with common administrative and management functions.

Use Cases:

- In manufacturing, applying embedded analytics and intelligence to boost predictions and automation, such as for preventive asset management, lights-out production or smart factories (creating a hyperflexible and self-adapting manufacturing capability).

- In customer service, virtual customer assistants (VCA) or voice of customer tools (VoC) for informational exchange and improvement of CX.

- In warehousing, mobile robot control or intelligent robotic picking systems leverage those capabilities to further optimize operations.

Recommendations:

- Determine who will use the embedded analytics and intelligence and the questions they are trying to answer. Those could be clever business users, business analysts or sophisticated data scientists.

- Look for solutions that not only support embedding of charts and visualizations, but also go deeper and integrate the data, analytics and intelligence into the fabric of the business application.

- Drive to integrate the analytics and intelligence into workflows where it can deliver more contextualized insights at the point of impact while performing specific tasks in the application.

Research References:

- Hype Cycle for Artificial Intelligence, 2020

- Infographic: Artificial Intelligence Use-Case Prism for Supply Chain

- Effective Use of Supply Chain Analytics to Mitigate Business Disruptions

- Supply Chain Artificial Intelligence (AI) Use Case Collection

Sample Vendors: Blue Yonder, E2open, IBM, Infor, Manhattan Associates

Augmented Data Intelligence

Definition: A tool consisting of existing and new technologies (such as graph technology, advanced analytics, AI/ML or modeling) combined with near-real-time data from the business ecosystem. It facilitates advanced data processing and further allows for the delivery of insightful information, predictions and suggestions that are contextually relevant and adaptive to user experiences toward more connected supply chain data.

Impact and Outlook: Organizations typically face challenges, first in curating the needed data due to incomplete or inaccessible data, poor data quality and lack of advanced, intelligent data integration capabilities. Secondly, this leads to gaps in their knowledge of supply chain insights as a base for intelligent decision making, together with reaching a higher level of automation. So they look for an intelligent, data and analytics-enabled tool to achieve sustained visibility and derived insights, to then effectively manage actions. That is the overarching challenge; companies in their current technology portfolio are missing support for certain use cases, which they then use this tool/vendors for. That tool uses real-time or near real-time data from disparate sources, and leverages rules, relationships and innovative technologies to drive anticipated business outcomes. In essence, it consists of the data pipelines from acquiring, processing and analyzing, but yet not responding and delivering, which would require different technology capabilities at each stage.

Use Cases:

- In production, yield optimization, managing and mitigating shop floor production issues or production schedule optimization.

- In supply networks, AI insights on connected data for mitigating supply chain risk.

Recommendations:

- Examine opportunities to add augmented data intelligence to your existing technology landscape. Most likely, this will be an additional tool next to your existing application architecture and goes beyond the well-established tools of business intelligence — but for specific narrow use cases as of now.

- Start your initiative using commercial software from a public cloud service provider to build up your knowledge and explore possibilities. Then tackle broader use cases and requirements by starting to link together local use cases through the application of other technologies, such as the digital supply chain twin.

Research References:

- Hype Cycle for Data Science and Machine Learning, 2020

- Adopt Analytics Platforms to Support Evolving Supply Chain Needs

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

Sample Vendors: C3.ai, Clearmetal, Cognite, ConverSight.ai, Course5 Intelligence, Google, Noodle.ai, OpsVeda, SAS, Tada

A Retrospective View: Four Years of Supply Chain Technology Trends Research

Back in 2017, we first introduced our key strategic technology trends research for the supply chain, closely working with our core-IT analyst community. In the note Identify the Technology Trends Supply Chain Leaders Need to Track we talked about how to identify and respond to technology trends relevant to one's organization. This then led us to the actual trends note The 2018 Top 8 Supply Chain Technology Trends You Can't Ignore.

Since then, we updated the trends note each year (see The 2019 Top Supply Chain Technology Trends You Can't Ignore and The 2020 Strategic Supply Chain Technology Trends), even added supplementary notes, here the history (note that most notes are already archived but listed retrospectively):

- Leading Technology Trends and Initiatives From the 2019 Supply Chain Top 25

- Use a Trendspotting Method to Identify the Technology Trends You Need to Track

- The 2020 Top Strategic Transportation Technology Trends

- Innovation Insight for the Supply Chain Technology Heat Map

Below is the year-by-year listing of our leading supply chain technology trends (see Table 1). Please note that there is no prioritization included; however, in 2020, we listed them by maturity level starting from less mature to a higher degree of maturity.

Table 1: Supply Chain Technology Trends Yearly Overview

Trends 2018 ↓	Trends 2019 ↓	Trends 2020 ↓
Artificial intelligence	Artificial intelligence	Hyperautomation
Advanced analytics	Advanced analytics	Digital supply chain twin
Internet of Things	Internet of Things	Continuous intelligence
Intelligent things	Robotic process automation	Supply chain governance/security
Conversational systems	Autonomous things	Edge computing and analytics
Robotic process automation	Digital supply chain twin	Artificial intelligence
Immersive technologies	Immersive experience	5G networks
Blockchain	Blockchain in supply chain	Immersive experience

Source: Gartner (May 2021)

Notes

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The 2020 Strategic Supply Chain Technology Trends - 8 May 2020

The 2019 Top Supply Chain Technology Trends You Can't Ignore - 11 March 2019

The 2018 Top 8 Supply Chain Technology Trends You Can't Ignore - 9 January 2018

Recommended by the Authors

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

Top Strategic Technology Trends for 2021

Top 5 Technology Trends in Retail Merchandising for the 2020s

Key Technology Trends and Considerations for Transportation Mobility Solutions

The 2020 Top Strategic Technology Trends for Manufacturing Operations

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Conversational systems	Autonomous things	Edge computing and analytics
Robotic process automation	Digital supply chain twin	Artificial intelligence
Immersive technologies	Immersive experience	5G networks
Blockchain	Blockchain in supply chain	Immersive experience

Source: Gartner (May 2021)