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Supply Chain Analytics,

Emerging Trends in SCM and Logistics,

Achieving Supply Chain Integration

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SUPPLY
CHAIN


Manufacturing 3
4 Distribution
Supplier 2
5 Retail location
Raw materials 1
6 Customer

- **So what is supply chain in simple words?**

A supply chain is a network of companies and people that are involved in the production and delivery of a product or service. The components of a supply chain include producers, vendors, warehouses, transportation companies, distribution centre's, and retailers.

Mckinsey defines supply chain as

The supply chain is the interconnected journey that raw materials, components, and goods take before their assembly and sale to customers.

- **A supply chain** is made up of interconnected parts of a whole, all of which add up to finished products bought by customers. Take automobiles, for example. Before a consumer buys a car, iron ore is extracted from the earth. The ore is transported to a plant, where it's turned into steel, which is made into the chassis of the automobile. To make the car, various components—from engines to batteries, electrical components, rubber tires, a metal body, and paint—are assembled. Once the car is made, it's sold in a retail setting to the end consumer.
- That's a good illustration of several types of supply chain stakeholders:
- producers, which make or grow the raw materials for goods
- vendors, which buy and sell materials
- manufacturers, which make materials into goods
- transporters, or logistics providers, which move those goods around the world
- supply chain managers, which ensure that operations run smoothly in everything from planning to sourcing raw materials, manufacturing, delivery, and returns
- retailers, which sell goods either online or in physical stores
- consumers, who buy and use those goods and services

The Importance of Supply Chain Management

- It is well known that supply chain management is an integral part of most businesses and is essential to company success and customer satisfaction.

Boost Customer Service

- Customers expect the correct product assortment and quantity to be delivered.
- Customers expect products to be available at the right location. (i.e., customer satisfaction diminishes if an auto repair shop does not have the necessary parts in stock and can't fix your car for an extra day or two).
- Right Delivery Time – Customers expect products to be delivered on time (i.e., customer satisfaction diminishes if pizza delivery is two hours late or Christmas presents are delivered on December 26).
- Right After Sale Support – Customers expect products to be serviced quickly. (i.e., customer satisfaction diminishes when a home furnace stops operating in the winter and repairs can't be made for days)

- Reduce Operating Costs
- **Decreases Purchasing Cost** – Retailers depend on supply chains to quickly deliver expensive products to avoid holding costly inventories in stores any longer than necessary. For example, electronics stores require fast delivery of 60" flat-panel plasma HDTV's to avoid high inventory costs.
- **Decreases Production Cost** – Manufacturers depend on supply chains to reliably deliver materials to assembly plants to avoid material shortages that would shutdown production. For example, an unexpected parts shipment delay that causes an auto assembly plant shutdown can cost $20,000 per minute and millions of dollars per day in lost wages.
- **Decreases Total Supply Chain Cost** – Manufacturers and retailers depend on supply chain managers to design networks that meet customer service goals at the least total cost. Efficient supply chains enable a firm to be more competitive in the market place. For example, Dell's revolutionary computer supply chain approach involved making each computer based on a specific customer order, then shipping the computer directly to the customer. As a result, Dell was able to avoid having large computer inventories sitting in warehouses and retail stores which saved millions of dollars. Also, Dell avoided carrying computer inventories that could become technologically obsolete as computer technology changed rapidly.

How does supply chain management work?

- According to CIO, there are five components of traditional supply chain management systems:
- **Planning**
- Plan and manage all resources required to meet customer demand for a company's product or service. When the supply chain is established, determine metrics to measure whether the supply chain is efficient, effective, delivers value to customers and meets company goals.
- **Sourcing**
- Choose suppliers to provide the goods and services needed to create the product. Then, establish processes to monitor and manage supplier relationships. Key processes include: ordering, receiving, managing inventory and authorizing supplier payments.
- **Manufacturing**
- Organize the activities required to accept raw materials, manufacture the product, test for quality, package for shipping and schedule for delivery.
- **Delivery and Logistics**
- Coordinate customer orders, schedule deliveries, dispatch loads, invoice customers and receive payments.
- **Returning**
- Create a network or process to take back defective, excess or unwanted products.

- **Why is supply chain management important**?
- Effective supply chain management systems minimize cost, waste and time in the production cycle. The industry standard has become a just-in-time supply chain where retail sales automatically signal replenishment orders to manufacturers. Retail shelves can then be restocked almost as quickly as product is sold. One way to further improve on this process is to analyse the data from supply chain partners to see where further improvements can be made.
- By analysing partner data, the CIO.com post identifies three scenarios where effective supply chain management increases value to the supply chain cycle:
- **Identifying potential problems.** When a customer orders more product than the manufacturer can deliver, the buyer can complain of poor service. Through data analysis, manufacturers may be able to anticipate the shortage before the buyer is disappointed.

- **Optimizing price dynamically.** Seasonal products have a limited shelf life. At the end of the season, these products are typically scrapped or sold at deep discounts. Airlines, hotels and others with perishable “products” typically adjust prices dynamically to meet demand. By using analytic software, similar forecasting techniques can improve margins, even for hard goods.

- **Improving the allocation of “available to promise” inventory.** Analytical software tools help to dynamically allocate resources and schedule work based on the sales forecast, actual orders and promised delivery of raw materials. Manufacturers can confirm a product delivery date when the order is placed — significantly reducing incorrectly-filled orders.

Key features of effective supply chain management

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- The supply chain is the most obvious “face” of the business for customers and consumers. The better and more effective a company’s supply chain management is, the better it protects its business reputation and long-term sustainability.
- IDC’s Simon Ellis in The Path to a Thinking Supply Chain[1] defines what is supply chain management by identifying the five “Cs” of the effective supply chain management of the future:
- **Connected:** Being able to access unstructured data from social media, structured data from the Internet of Things (IoT) and more traditional data sets available through traditional ERP and B2B integration tools.
- **Collaborative:** Improving collaboration with suppliers increasingly means the use of cloud-based commerce networks to enable multi-enterprise collaboration and engagement.
- **Cyber-aware:** The supply chain must harden its systems and protect them from cyber-intrusions and hacks, which should be an enterprise-wide concern.
- **Cognitively enabled:** The AI platform becomes the modern supply chain's control tower by collating, coordinating and conducting decisions and actions across the chain. Most of the supply chain is automated and self-learning.
- **Comprehensive:** Analytics capabilities must be scaled with data in real time. Insights will be comprehensive and fast. Latency is unacceptable in the supply chain of the future.
- Many supply chains have begun this process, with participation in cloud-based commerce networks at an all-time high and major efforts underway to bolster analytics capabilities.

How do great supply chain organizations work?

- Supply chain management (and operations, more broadly) is now a CEO-level concern. Some of the strategic operational questions that CEOs have on their agenda include the following:
- Can we meet customer demand both today and tomorrow?
- Should we boost capacity to prepare for prolonged, rapid growth or reduce it to prepare for a slowdown?
- Where will we find workers who are skilled and digitally savvy?
- How do we decarbonize, minimize regulatory risk, and stay in business?
- Incremental efforts aren't enough to capture the full potential, and drilling down in the right supply chain structure and physical footprints is a critical starting point. While it will take time to adapt supply or value chains (given challenges related to finding and qualifying alternative suppliers and to building new plants), taking a fresh look at networks and supply chain structures can help companies move forward.
- Here's an example from the automotive industry. McKinsey research uncovered that midsize supplier plants with 1,000 to 1,500 employees were nearly twice as likely as bigger or smaller counterparts to score in the top quartile on productivity. So having production divided among several plants rather than in a single megafactory could help a company move closer to customers and reduce location risks (for example, weather-induced closures).

- Choices about supply chain design won't work miracles. There's no correlation, in McKinsey research, between supply chain organizational archetypes and bottom-line performance. But a variety of organizational mechanisms can supplement structure and help lead to successful outcomes. A survey found six markers of great supply chain terms , all of which were correlated with improved EBITDA:
- end-to-end coordination
- decision rights
- performance metrics
- social cohesion
- career mobility
- capability growth

- **What about digital supply chains?**

- Few established companies have fully digitized their end-to-end operations. But digitization can be a feasible solution to operational challenges seen across many companies and industries. Industry 4.0, or the Fourth Industrial Revolution (4IR), describes the impact that increased connectivity, automation, and more have had on technology, industry, and society. In a survey of more than 400 global manufacturers, more than 90 percent of respondents said Industry 4.0 has helped them sustain their operations during the COVID-19 crisis; over half said their digital transformations have been crucial to their pandemic responses.
- Digitization, including advanced analytics, automation, and machine learning, can help operations become more productive, flexible, and geared for speed. Such approaches have yielded real results for some leading organizations—for example, reducing inventory and cost of goods sold by 30 percent, lowering cost of quality by 50 percent, and improving cash and productivity by 30 percent. Surveys also suggest that digitization and an embrace of Industry 4.0 technologies can boost eco-efficiency in supply chains.

- While some leading organizations have already realized value from digitization, others are lagging behind. Modernizing supply chain IT—for instance, to improve demand forecasting and planning systems—can have a powerful effect. For organizations looking to step up on IT for supply chain planning, three steps can help:
- Redesign processes.
- Select vendors.
- Create an implementation road map.
- Cumulatively, these changes can have a significant impact, especially when they support a successful rollout of integrated business planning (IBP). Compared with organizations that lack a well-functioning IBP process, the average mature IBP practitioner realizes one or two additional percentage points in EBIT. Service levels are five to 20 percentage points higher. Freight costs and capital intensity are 10 to 15 percent lower, and customer delivery penalties and missed sales are 40 to 50 percent lower. IBP technology and process discipline can also make planners 10 to 20 percent more productive.
- An interview with Kimberly-Clark chief supply chain officer Shane Azzi underscores the importance of digital tools in supply chains. “Like many companies, we don’t always have the full picture,” Azzi said. “That’s why digital becomes such an important part of the solution—because you’ve got to have that end-to-end picture. We must be able to see emerging risks further upstream and downstream than ever before.” To get there, the company has explored demand sensing, looked at suppliers’ production schedules and logistics plans, and used digital platforms to monitor in-transit shipments.

Best Practices in Procurement

Elevating Procurement in your Organization

- Among the countless insights to emerge in this era of sudden and accelerating digital transformation, your enterprise may have experienced the fragility of a supplier ecosystem that's easily disrupted by unpredictable events.
- With your critical suppliers so fully integrated into your operations, rethinking your procurement and spend management practices and adopting cloud-based technology can help bring business advantages to your organization.
- If your enterprise tends to view procurement as a matter of logistics and cost containment, this practice is overdue for greater consideration. According to Shashi Mandapaty, chief procurement officer for the corporate tier at Johnson & Johnson, "Cost management still matters, but progressive procurement organizations have evolved to address nonfinancial aspects as well—priorities like innovation, risk management, resilience, and corporate citizenship."
- High-performing procurement organizations are driving enterprise growth and resilience by facilitating internal collaboration with stakeholders, identifying new sourcing opportunities, strengthening organizational agility and efficiency, and reducing risks and costs.

Key Steps to Take

- To help your organization achieve the full potential of a high-performing procurement organization, adopting a start-up mentality toward changing your spend management processes and tools may be a rich opportunity for growth.
- Regardless of where you are on your journey to high-performing procurement, it's a good time to consider implementing six procurement best practices:

1. **Establish a unified core for data.** Making the right decisions, based on shared knowledge and common data and analysis, requires all information to exist with a shared viewpoint, language, and methodology—ideally, on a cloud-based platform.
2. **Create a dynamic information flow.** When your information moves in a continuous flow among finance and planning, internal customers, and suppliers, your organization can manage its procurement planning with greater confidence, collaboration, accuracy, and flexibility.
3. **Automate manual processes.** Adopting digital acceleration tools can help your organization eliminate manual transactional processes, providing easier access to procurement services by seamlessly routing work between procurement and finance systems, simplifying onboarding, and automating risk assessment and governance.
4. **Improve collaboration with critical suppliers.** With emerging business opportunities, growing risk management and regulation, and an increasing awareness of corporate responsibility, your relations with your supply network call for continual maintenance and communication of evolving operations.
5. **Adopt an automated, consumer-like model.** While sourcing and procurement have traditionally been reactive practices, dependent on incoming requests, your organization can take a more proactive approach that lets internal stakeholders access applications to initiate early engagement with procurement.
6. **Enrich planning capabilities.** By using a cloud-based platform, your procurement practice can provide internal stakeholders and partners timely, forward-looking analysis that empowers them to make better decisions, explore more scenarios, and support a continuous, agile planning model.

- **Adopting the Right Procurement Tools**

- Forty-five percent of respondents to a recent Harvard Business Review Analytic Services study report that the pandemic is accelerating the automation of the procurement process. In fact, enterprises that responded to the pandemic by accelerating the digitization of once-disjointed and risk-prone procurement processes may be starting to see the advantages of incorporating real-time insights into sourcing projects and performance.
- Connecting procurement, stakeholders, finance, and suppliers with easy-to-use cloud-native spend-management technology can drive several immediate business results:
- **Expedited workflows:** Cloud-based sourcing and supplier management tools can enhance collaboration, streamline processes, and provide anytime accessibility, aggregating information quickly and increasing efficiency.
- **Agility to support business continuity:** More agile spending and supplier management can improve your organization's cash flow, minimize risk, and ensure business continuity—all critical capabilities, particularly in a downturn.
- **Overall spend optimization:** Enterprise leaders must ensure that their spend delivers returns on investment. Automating spend-management processes, including sourcing and procurement, through collaborative and easy-to-use technology can support alignment across the enterprise to meet business objectives and improve margins.
- **Intelligent supplier insights:** With strong supplier relationships and a better understanding of their suppliers' financials and criticality to the business, procurement professionals can act as scouts in the global marketplace to help identify new revenue opportunities, ensure business continuity, reduce risk, and support cost savings.

Logistics

- **What is Logistics?**
- Logistics refers to the process of planning, implementing, and controlling the efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption. It involves the coordination of various activities such as procurement, production, inventory management, transportation, warehousing, and distribution to ensure that products or services reach the right place, at the right time, and in the right condition.
- Importance of logistics in various industries

Logistics plays a crucial role in the success of businesses across different industries. Here are some key reasons why logistics is important:

- Customer Satisfaction
- Cost Efficiency
- Supply Chain Optimization
- Competitive Advantage
- Risk Management

- Overview of different types of logistics
- There are several types of logistics that cater to specific aspects of the supply chain. These include:
- Inbound Logistics
- Outbound Logistics
- Reverse Logistics
- International Logistics
- Third-Party Logistics (3PL)
- E-commerce Logistics
- Green Logistics
- Cold Chain Logistics

Use of AI In Supply Chains

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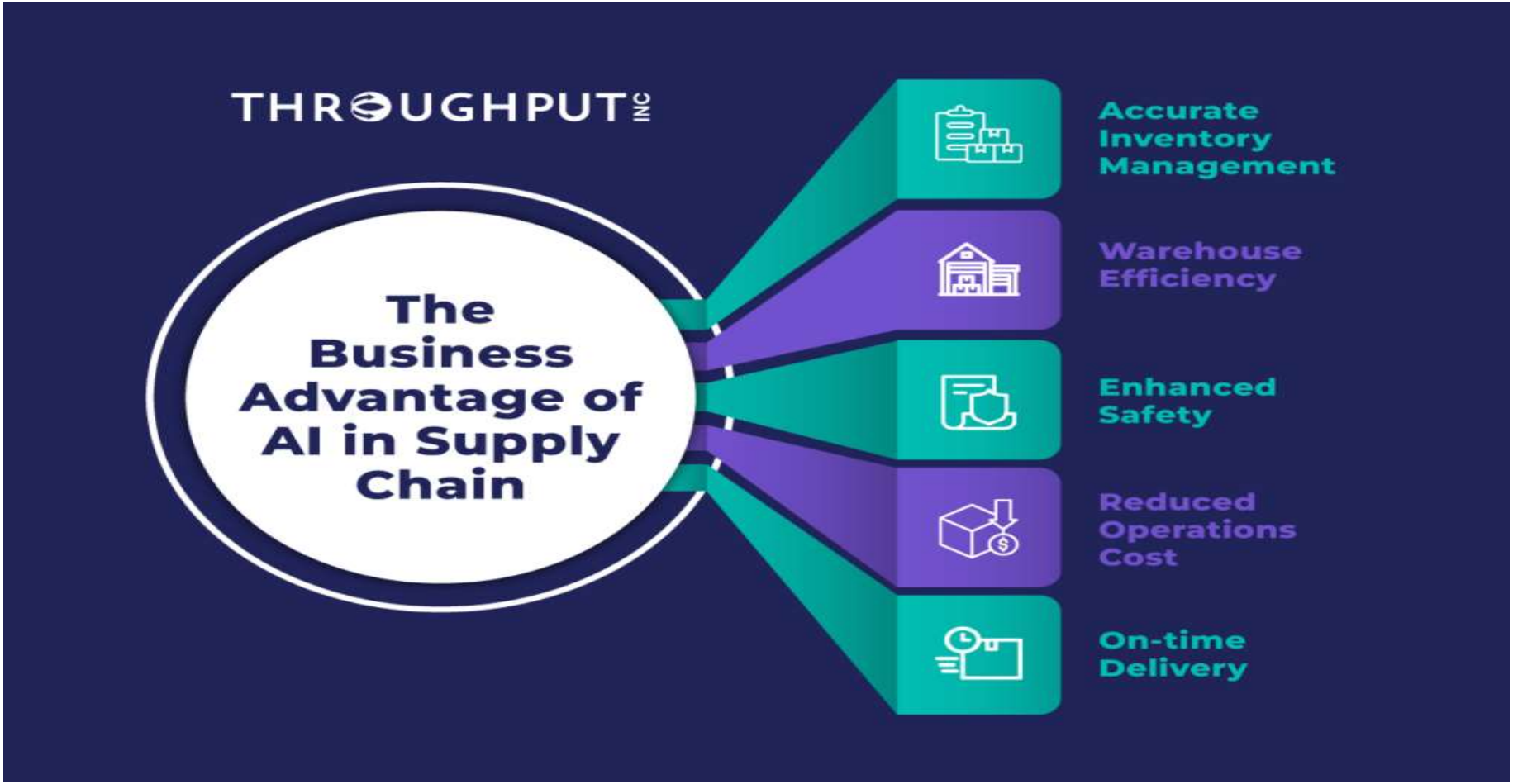
- Speed in decision-making. Speed in reducing cycle-times. Speed in operations. And, speed in continuous improvement. The use of Artificial Intelligence in the supply chain is here to stay and will make huge waves in the years to come.
- According to Gartner, supply chain organizations expect the level of machine automation in their supply chain processes to double in the next five years. At the same time, **global spending on IIoT Platforms** is predicted to grow from $1.67B in 2018 to $12.44B in 2024, attaining a 40% compound annual growth rate (CAGR) in seven years.
- In today's connected digital world, maximizing productivity by reducing uncertainties is the top priority across industries. Plus, mounting expectations of supersonic speed and operational efficiencies further underscore the need to leverage the prowess of Artificial Intelligence (AI) in supply chains and logistics.

- AI in supply chains can deliver the powerful optimization capabilities required for more accurate **capacity planning**, improved demand forecasting, enhanced productivity, lower supply chain costs, and greater output, all while fostering safer working conditions.
- The pandemic and the subsequent disruptions has demonstrated the dramatic impact of uncertainties on supply chains and has established the need for smart contingency plans to help companies deal with these uncertainties in the right way.
- But is AI the answer? What can AI mean for companies as they struggle to get their supply chain and logistics back on track? Let’s find out.

AI in supply chains- The Business Advantage



• Accurate Inventory Management

- Accurate inventory management can ensure the right flow of items in and out of a warehouse. Simply put, it can help prevent overstocking, inadequate stocking and unexpected stock-outs. But the inventory management process involves multiple inventory related variables (order processing, picking and packing) that can make the process both, time consuming and highly prone to errors.
- Here's where AI driven **supply chain planning tools**, with their ability to handle mass data, can prove to be highly effective. These intelligent systems can analyze and interpret huge datasets quickly, providing timely guidance on forecasting supply and demand. Some of the **AI systems** are so advanced that they can even predict and discover new consumer habits and forecast seasonal demand. This level of AI application can help anticipate future customer demand trends while minimizing the costs of overstocking unwanted inventory.

• Enhanced Safety

- AI-based automated tools can ensure smarter planning and efficient warehouse management, which can, in turn, enhance worker and material safety. AI can analyze workplace safety data and inform manufacturers about any possible risks. It can record stocking parameters and update operations along with necessary feedback loops and proactive maintenance. This helps companies react swiftly and decisively to keep warehouses secure and compliant with safety standards.
- Reduced Operations Costs:
- Here's one benefit of AI systems for the supply chain that one simply can't ignore. From customer service to the warehouse, automated intelligent operations can work error-free for a longer duration, reducing the number of human oversight-led errors and workplace incidents. Additionally, warehouse robots can provide greater speed and accuracy, achieving higher levels of productivity – all of which will reflect in reduced operations costs.

- On Time Delivery:

- As we discussed above, AI systems help reduce dependency on manual efforts, thus making the entire process faster, safer and smarter. This helps facilitate timely delivery to the customer as per the commitment. Automated systems accelerate traditional warehouse procedures, removing operational bottlenecks along the value chain with minimal effort to achieve delivery targets.

• *Day-to-day Benefits of AI-Powered Supply Chains*

- Studies suggest that AI and Machine Learning (ML) technologies can deliver unprecedented value to supply chain and logistics operations. From cost savings, reduced operational redundancies, risk mitigation, to enhanced **supply chain forecasting**, speedy deliveries, more optimized routes and improved customer service, AI in the supply chain is being preferred by several top companies globally.
- According to McKinsey, 61% of manufacturing executives report decreased costs, and 53% report increased revenues as a direct result of introducing AI in the supply chain. Further, more than one-third suggested a total revenue bounce of more than 5%. Some of the **high impact areas in supply chain management** include planning and scheduling, forecasting, spend analytics, logistics network optimization and more, further discussed below.

- BOLSTERING PLANNING AND SCHEDULING ACTIVITIES
- INTELLIGENT DECISION-MAKING
- END-TO-END VISIBILITY
- ACTIONABLE ANALYTICAL INSIGHTS
- INVENTORY AND DEMAND MANAGEMENT
- BOOSTING OPERATIONAL EFFICIENCIES
- UNLOCKING FLEET MANAGEMENT EFFICIENCIES
- STREAMLINING ENTERPRISE RESOURCE PLANNING (ERP)

AI in Supply Chain: A Future Full of Promises

- Gartner predicts that “The rise of IIoT will allow supply chains to provide more differentiated services to customers, more efficiently”.
- As supply chain companies shift their focus from products to outcomes, traditional business models will become dated and then obsolete altogether, with the bodies and brands of the laggards and losers scattered along the way. With global supply chains strengthening their roots, competitive pressures will force firms to extract every possible ounce of cost from their respective operations. This is even more pronounced for local, regional, and national firms that are limited in their economies of scale, currency hedge capabilities, market concentration, with limited technology and operational budgets. In such cases, looking at and embracing the winning SaaS and cloud solutions is a strategy for keeping up, and getting ahead of, the international conglomerates with massive IT and OT budgets, and greater margins of error in the near-term for making poor and expensive **supply chain optimization** technology mistakes with expensive consultants.
- With all these influences coming to bear simultaneously, we are about to see a paradigm shift from simple reactive intelligence to predictive, adaptive and continuous learning systems that drive better decisions for continuous improvements using ML and AI in supply chain and ML on your existing data sources.
- **According to PwC**, AI applications have the power to transform the way business is done and contribute up to $15.7 trillion to the global economy by 2030. Today, AI can seed in the much needed agility and precision in supply chain optimization. It can also trigger a transformational increase in operational and **supply chain efficiencies** and a decrease in costs where repetitive manual tasks can be automated.

3 Steps To Ready Your Supply Chain for Artificial Intelligence

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• *What No one Tells You About Implementing AI Integration*

- Today's supply chain executives are short on time, and having multiple meetings to discuss solution implementation is a burden they can't afford. Integrated AI tools provide actionable insights that eliminate bottlenecks and unlock real-time value. That's important because supply chain companies need more execution — not more analysis.
- Implementing a full AI solution might seem daunting and cost-prohibitive, and it's true that costs can range from millions to tens of millions of dollars, depending on the size of the organization. Businesses must first undergo a full digitization process and then implement an analytics program before they can integrate AI tools. Oftentimes, companies waste significant resources in this process because they don't incorporate the end user feedback and end up having to backtrack to address unanticipated problems.
- But there is an alternative. An agile approach enables organizations to begin implementing AI in cost-effective ways. By integrating third-party vendors, they can start where they are, learn what works for their businesses, and scale up as needed. This tactic allows for much faster AI integration than building a new platform from the ground up or building on top of legacy solutions.


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