

# Role of Artificial Intelligence (AI) in Supply Chain Management



Artificial intelligence (AI) is a technology that can improve supply chain management (SCM) by increasing efficiency, reducing costs, enhancing quality, and planning better. AI can be used throughout supply chains, from manufacturing to delivery, to extract information, analyse data, predict demand and inventory, optimize capacity, and manage autonomous vehicles and warehouses. AI can also help supply chain professionals cope with worker shortages, supply chain disruptions, and safer working conditions

AI has several applications in the supply chain, including extracting information (web scraping), data analysis, supply and demand planning, autonomous vehicles, and warehouse management. AI can accurately predict future demand by interpolating data, allowing companies to optimize inventory levels, streamline supply chain processes, and reduce the risk of stockouts or overstocking. AI-based tools are being used throughout supply chains to increase efficiency, reduce the impact of a worldwide worker shortage, and discover better, safer ways to move goods from one point to another.

Artificial Intelligence (AI) is already powerful and continues to grow. Everything from social media to self-driven cars is now being defined by how fast machines can be trained to mimic human behaviour or even exceed human beings in their capabilities. In the logistics and supply chain industry, these technologies are proving to be a game changer. According to Gartner, supply chain organizations expect the utility of machine automation in their supply chain processes to double in the next five years. Also, the Annual Industrial IoT (IIOT) spending by growing organizations is estimated to reach \$500 billion by 2020.



## Why AI ?

The main reason why AI is being implemented in the supply chain and logistics industry is because organizations have realized that AI has the potential to solve the problems of running a global logistics network. On being implemented in the right manner, AI enables organizations to be smarter, take more agile decisions, and anticipate problems.

## What are some Examples of AI ?

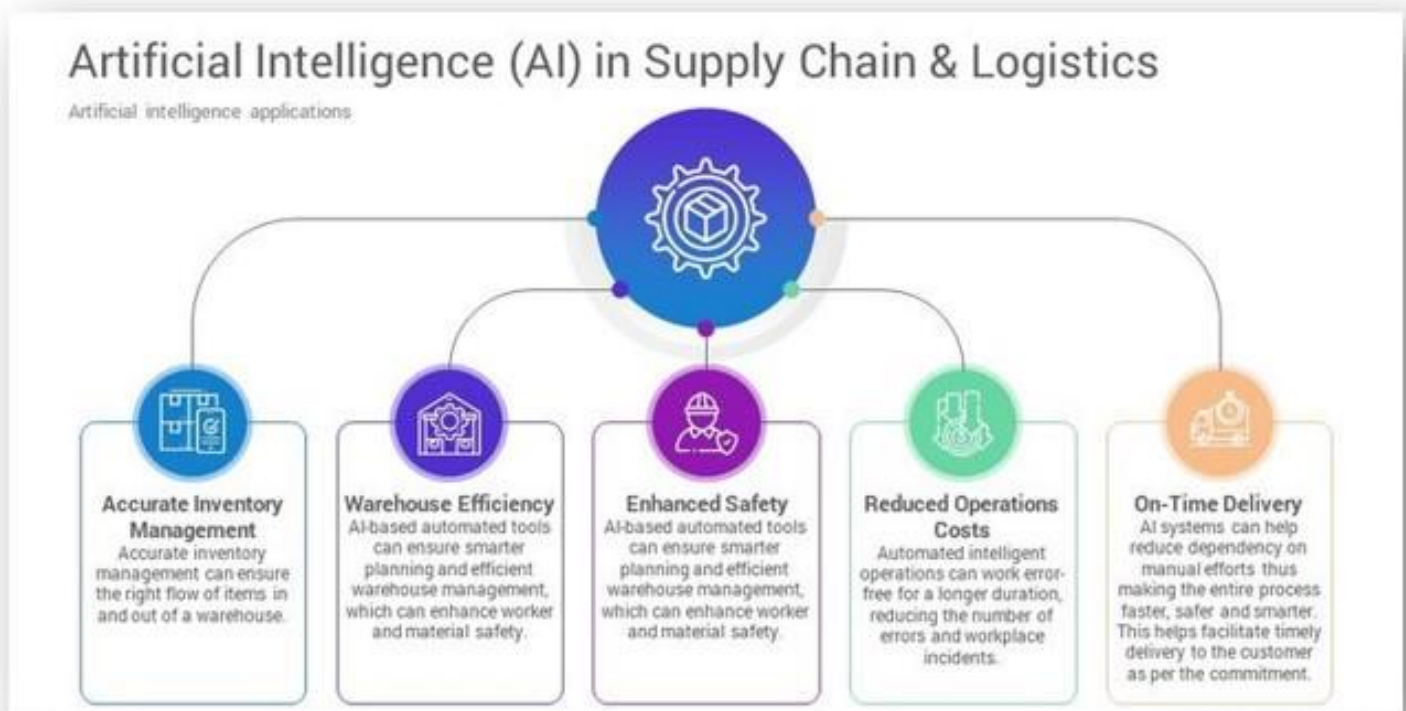
AI is a rapidly growing field with numerous applications in various industries. Here are some examples of AI:

1. **Chatbots:** AI-powered chatbots can help automate customer service, sales, and marketing processes, providing 24/7 support to customers.
2. **Virtual assistants:** AI-based virtual assistants like Siri, Alexa, and Google Assistant can help users perform tasks such as setting reminders, making phone calls, and sending messages.
3. **Image recognition:** AI can be used to recognize objects, faces, and other visual elements in images and videos. This technology is used in security systems, self-driving cars, and social media platforms.
4. **Speech recognition:** AI-based speech recognition technology is used in virtual assistants, dictation software, and customer service applications.
5. **Recommendation systems:** AI-based recommendation systems are used by e-commerce platforms, streaming services, and social media platforms to suggest products, movies, and content to users.
6. **Autonomous vehicles:** AI is used in self-driving cars to help them navigate roads, avoid obstacles, and make decisions.
7. **Predictive analytics:** AI-based predictive analytics can help businesses forecast future trends, identify patterns, and make data-driven decisions.
8. **Fraud detection:** AI can be used to detect fraudulent activities in financial transactions, insurance claims, and other areas.

These are just a few examples of how AI is being used today. As AI continues to evolve, we can expect to see more innovative applications in the future.

## ✚ AI has several applications in the supply chain

1. **Operational procurement using intelligent data and chatbots:** AI-based chatbots can help automate procurement processes, such as purchase order creation, invoice processing, and supplier management.
2. **Supply chain planning to forecast demand and supply:** AI-based solutions can analyse large volumes of data, understand relationships, and provide visibility into operations, allowing companies to optimize inventory levels, streamline supply chain processes, and reduce the risk of stockouts or overstocking.
3. **Warehouse management to optimize stock:** AI-based tools can help warehouse managers optimize inventory placement, reduce the time required to locate products, and improve the accuracy of order fulfilment.
4. **Quicker and more accurate shipping to reduce lead times and transportation expenses:** AI-based solutions can help logistics companies optimize routes, reduce fuel consumption, and improve delivery times.
5. **Optimal supplier selection through the use of real-time data:** AI-based solutions can help companies identify the best suppliers based on factors such as price, quality, and delivery times.



## + Benefits of using AI in Spares Warehouse Operations

AI has several benefits in the warehouse. Here are some of the key benefits of using AI in the warehouse:

1. **Accurate Inventory Tracking:** AI can track inventory more accurately, efficiently, and quickly than humans. This helps ensure that all of your products are accounted for at all times and that you know exactly what's in stock at any given time. This makes it easier for employees to find whatever they need when they need it, which can lead to increased employee efficiency and happier customers.
2. **Improved On-Time Shipment Rates:** AI can help improve on-time shipment rates by helping predict and prevent delays, identifying and solving problems before they occur, optimizing warehouse operations, and reducing labour costs. AI can also help companies make better use of their resources by providing access to up-to-date reports on inventory levels that are updated in real-time.
3. **Accurately Predict Future Demand:** AI can predict future trends and increase sales by helping managers make better decisions about inventory levels, capacity planning, production planning, and other aspects of supply chain management.
4. **Greater Productivity and Efficiency:** AI systems can improve productivity and efficiency in many ways, from increased accuracy of picking to the ability to quickly adapt to changing demands. For example, AI is able to analyse past data, calculate the most efficient route for a worker to take, and then suggest changes based on real-time conditions such as a shift change or equipment failure. This process creates greater efficiencies that result in greater throughput time, which translates into cost savings .
5. **Increased Operational Efficiencies:** Implementing AI into your warehouse operations can help you find new ways to improve your operational efficiency. By reducing the need for manual processes and enabling more accurate inventory management, AI can help you more efficiently use employees by automating mundane tasks so they can focus on higher-value work or customer service requests.

These are just a few examples of how AI can benefit warehouse operations. As AI technology continues to evolve, we can expect to see even more innovative applications in the future.

## + Challenges of implementing AI in warehouse

Implementing AI in the warehouse can be challenging. Here are some of the key challenges:

1. **Data Management:** One of the most important challenges in using AI in a warehouse is the proper management of data. AI-based systems generate large amounts of data, and it is crucial to manage this data effectively to improve operations. This requires a technological solution that can manage the data and make sense of it .
2. **Connectivity Issues:** Lack of proper network connectivity is another major challenge that companies face when implementing AI in their warehouses. As warehouses are often located outside urban areas, networks tend to be low-quality. This can affect the proper functioning of AI applications, which rely on real-time data processing .
3. **Convergence of Manual and Automated Operations:** Although AI is making many warehouse operations automated, there are still some areas where manual processing is necessary. Ensuring that both people and technology are able to work well together is essential for best results.
4. **Costs:** Implementing AI in the warehouse can be expensive, and companies need to consider the costs of hardware, software, and training. Additionally, companies need to ensure that the benefits of implementing AI outweigh the costs .
5. **Resistance to Change:** Resistance to change is another challenge that companies face when implementing AI in their warehouses. Employees may be resistant to new technologies, and it is important to provide adequate training and support to help them adapt to the changes .



## ✚ How Artificial Intelligence Is Revolutionizing Supply Chain Management

To remain competitive and succeed in today's global marketplace, companies need to run their organizations like a fine-tuned engine to sustain growth. With that in mind, businesses that use transformative artificial intelligence (AI) technologies are well-positioned to conquer challenges and better manage their supply chains while improving costs and enhancing efficiency, operations, performance, and the customer experience. One of the most critical ways AI revolutionizes supply chain management is through predictive analytics. AI can accurately predict future demand by analyzing data, allowing companies to optimize inventory levels, streamline supply chain processes, and reduce the risk of stockouts or overstocking. This type of supply chain automation is only possible with AI.

## ✚ How artificial intelligence can improve supply chain management?

Artificial intelligence (AI) can help organizations tackle the challenges of supply chain management by providing potent instruments to address the opportunities and constraints of all business functions, from procurement to sales. An integrated end-to-end approach can enable companies to balance trade-offs across functions and optimize earnings before interest, taxes, depreciation, and amortization (EBITDA) for the organization as a whole .

AI's ability to analyse huge volumes of data, understand relationships, provide visibility into operations, and support better decision making makes AI a potential game changer . AI can provide businesses with the tools they need to manage and optimize their logistics network operations. It can help companies to forecast demand, predict outcomes, optimize routes, manage inventory, automate tasks, and monitor security and compliance .

When applied to supply chain risk management, AI algorithms can identify patterns and trends that are otherwise difficult to spot, then incorporate personalized guidelines and feedback, and immediately adjust plans to mitigate any potential risks identified. AI-enhanced tools are being used throughout supply chains to increase efficiency, reduce the impact of a worldwide worker shortage, and discover better, safer ways to move goods from one point to another

## Benefits of using AI in supply chain management

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Effective supply chain management (SCM) is essential to optimizing the flow of products and services and streamlining business operations. From procuring raw goods to managing reliable suppliers to automating various warehouse processes to optimizing shipping routes and delivery times, every point in the supply chain must work efficiently to improve a company's bottom line and ensure a competitive advantage.

When the supply chain is fully optimized with successful SCM, companies are likely to experience these benefits:

- **Decreased operating costs.** Companies can lower operational costs by reducing purchasing and production expenses. For example, suppose a grocery store owner buys fresh vegetables directly from the farmer. Eliminating the expense of using a third party to purchase products can save money and vegetables are available in the store faster. Additionally, AI provides data transparency for better supply chain visibility and cost savings.

- **Better productivity and reduced labour costs.** Leveraging AI enables manual work to be done more efficiently by automating manual tasks. It's estimated that 40 percent of the workload during the sales process can be automated through AI solutions. This decrease in human labour reduces operating costs.
- **Improved relationships with suppliers, manufacturers, and distributors.** When relationship management works well and all parties, including suppliers, manufacturers, retailers, and planners, work collaboratively, companies can avoid overstock or out-of-stock scenarios.
- **Shorter delivery times and on-time delivery.** AI can track shipments and facilitate the on-time delivery of goods by analyzing data and identifying patterns, helping managers make better decisions. Walmart uses AI to analyze sales patterns and optimize inventory levels, reducing product stockouts and getting fresh food to shoppers faster. This leads to enhanced customer satisfaction.
- **Improved transportation network and routes.** AI finds the most efficient and cost-effective way to transport goods by analyzing the number of trucks needed, the fuel consumed, and the time it takes to get from point A to point B. For example, UPS integrated AI into its logistics operations to optimize route planning and package delivery. AI also analyses weather conditions and traffic patterns, helping reduce fuel consumption and enhance delivery automation and accuracy.
- **Reduced risks.** AI provides data on warehouse management systems and identifies weaknesses, gaps, and risks. Businesses create a safer work environment and a more efficient supply chain by identifying potential risks and taking proactive steps to correct them.
- **Enhanced decision-making capabilities.** AI's ability to analyse mass data in minutes facilitates critical decision-making. Yet, AI doesn't replace humans. Instead, it provides increased data visibility and insights that facilitate faster, more accurate, and more precise decisions.

## 📌 Future Trend of AI in Supply Chain Management

The future of AI in supply chain management is promising. AI is revolutionizing the supply chain, from predictive analysis to real-time delivery tracking. Here are some of the ways AI is making a difference in supply chain management:

1. **Real-time delivery tracking and route optimization:** AI-powered systems enable real-time tracking and monitoring of deliveries. By integrating data from various sources such as GPS and sensors,
2. **Supply chain forecasting and planning:** AI algorithms and location technology tools can analyse vast amounts of historical data, market trends, and customer behavior to provide a more accurate outlook of current and future demand. This enables companies to optimize inventory levels, reduce stockouts, and improve customer satisfaction.
3. **Efficient warehouse management:** AI is streamlining warehouse operations and reducing inefficiencies. Through the use of AI-powered systems, warehouses can automate tasks such as inventory tracking, picking, and packing. AI algorithms can optimize warehouse layouts, improve routing efficiency, and minimize errors, leading to improved productivity and cost savings.
4. **Real-time supply chain visibility:** AI-powered technologies enable real-time monitoring and tracking of supply chain activities. By integrating data from various sources such as sensors, GPS, and IoT devices, AI systems can provide comprehensive visibility into the supply chain. This allows businesses to identify bottlenecks, proactively manage disruptions, and make data-driven decisions to optimize the supply chain.
5. **Autonomous robots:** Autonomous robots are becoming more ubiquitous in the supply chain of the future as advancements make them operate with more human-like abilities. The supply chain of the future is likely to see continued growth of autonomous robots in areas such as warehouse management, delivery, and logistics, allowing people to shift to more strategic, less dangerous, and higher value work.

## Conclusion

In the near future, **Artificial Intelligence** is all set to define a new standard of efficiency across logistics and supply chain processes. The game is changing at a fast pace, and creating a “new normal” in how global logistics companies handle data, serve customers and run operations, in a manner that is intelligent, automated, and more efficient.

**Source : Google**