



# Future of Logistics In Industry 4.0

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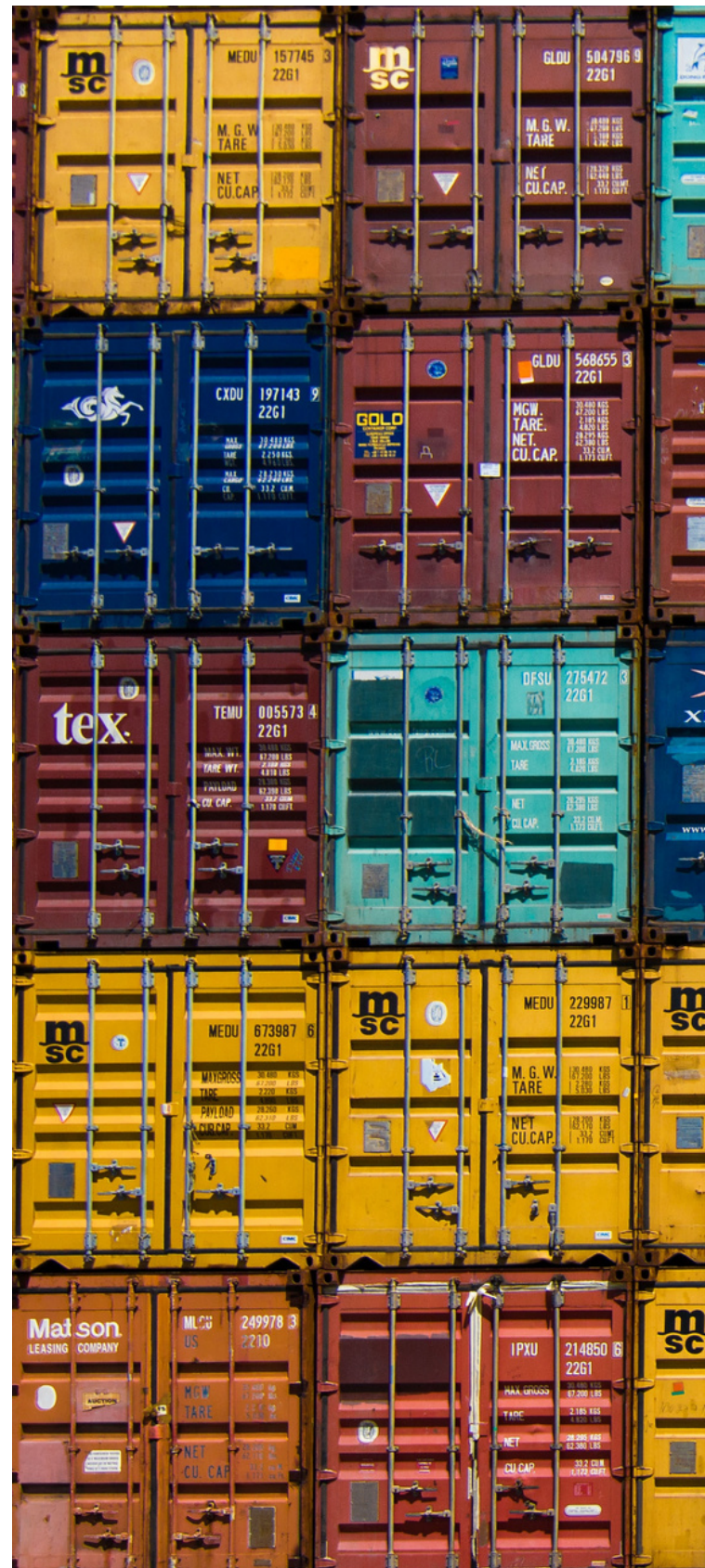




# Introduction

The logistics industry was largely revolutionized with the invention of steam power. Henry Ford's assembly line did, too. These revolutions ushered in radical new approaches to development and manufacturing, resulting in unparalleled capacity. Since then, we've moved into the era of automation and robotics, which many analysts regard as the third industrial revolution.

The next phase of manufacturing is an evolution rather than a revolution; Industry 4.0, as it has been dubbed, is a truly modern vision for an industrial economy that is both seamlessly digital and self-aware.





# The Most Important Events in the History of Industry

Industry 4.0 has been dubbed the "Fourth Industrial Revolution" by others. The previous industrial revolutions occurred as a result of revolutionary technologies that drastically altered manufacturing capabilities and processes:

## 1784

Water and steam power were used to mechanize manufacturing, cutting production time in half.

## 1870

Henry Ford introduces the assembly line as a result of the advent of electricity, resulting in labor divisions and more productive production.

## 1969

Industry starts to introduce automated manufacturing following the advent of the machine.

This also opens up opportunities in the areas of information technology and robotics.

As a result, Industry 4.0 is more of an evolution than a revolution. Industry 4.0 takes current technology and expands it in new ways, resulting in improved power, interdependence, and reliability, and eventually, higher productivity.



## Industry 4.0's Beginnings

Industry 4.0 is a deliberate system introduced in 2011 in anticipation of emerging technologies, unlike prior revolutions, which were based on the introduction of a single innovation. The German federal government finalized the idea in 2013 to draw on Germany's engineering, logistics, and IT capabilities.

Industry 4.0 serves as a road map for high-tech, industrial digitalization today. Its core is a digital integration of operations, in which processes and data can be shared through different supply chains and product life cycles. It is a guideline for bettering organizational and process efficiency, not a magic pill.

## The Advantages of Using the Industry 4.0 Framework

Manufacturing leaders all over the world are now adopting Industry 4.0 concepts to build more agile, reliable, and profitable supply chains. Supply chain managers would need to pay careful attention to important domains like demand forecasting and supply network architecture in the upcoming term. Facilitating the transition to the Industry 4.0 platform has a range of advantages:







## Direct Cost Savings

Better technological integration boosts performance, while predictive analytics reduces supply chain disturbances.

## Increased Speed

Industry 4.0 enables quicker response times and greater versatility in production processes, both of which are important as consumer demand satisfaction demands grow and multichannel delivery channels become more widespread.

## Profitability

Industry 4.0 systems allow you to sell more personalized goods, which typically result in a higher profit margin.

## Global Business Competitiveness

Because of the global economy's interdependence, Industry 4.0 would inevitably become the standard rather than the exception.

## Enhanced Employee Productivity

Improved operating system user interface decreases training time and speeds up operations.



# Industry 4.0's Main Components

The German government issued a call to action to the global manufacturing sector with the launch of Industry 4.0, which pushes the industry to expand beyond traditional boundaries of technology, connectivity, and capacity. The following are the features of a true Industry 4.0 business.

## Additive Manufacturing Allows for More Customization

Additive manufacturing, also known as 3D printing, is the process of making an item by depositing materials in several layers. While additive manufacturing has become fashionable, it has yet to realize its full potential.

Industry 4.0 provides the technical framework for manufacturing firms to use 3D printing at scale, enabling them to manufacture smaller amounts of more personalized items. Additionally, since additive manufacturing can be used on-demand, the time it takes to produce these personalized goods is greatly reduced.

The extensive incorporation of additive manufacturing in the supply chain, not only to produce goods for end consumers but also to manufacture customized machine parts throughout the supply chain, is thus a hallmark of a true Industry 4.0 enterprise.





## Advanced Analytics is Fully Integrated

To advise and maximize demand, almost all supply chain leaders now rely on analytics. Indeed, advanced analytics implementation consistently results in higher output efficiency, decreased downtime, and enhanced customer service – all of which lead to a better bottom line.

However, these analytics are often disjointed or orphaned, with no coherent relation to a larger structure. Analytics technologies are developing at the same time as the industrial world shifts toward Industry 4.0. End-to-end (E2E) visibility is informed by advanced analytics and Big Data in the Industry 4.0 supply chain. Data is available in real-time to help real-time decision-making and add insight to the entire supply chain, both within and outside of individual organizations.

## All Stakeholders Have Visibility

Leaders in the supply chain have long needed more exposure, and Industry 4.0 offers it. For their particular roles, all stakeholder groups have access to real-time data.

Furthermore, businesses can be managed from the individual machine level up to global corporate controls thanks to aggregation schemes. All of this is achieved by a single "single point of fact" that is enhanced by the business laws. This method not only removes the need for duplicative and potentially flawed manual data aggregation but also speeds up the process and encourages continuous improvement.



Moreover, a company's E2E visibility within the enterprise places the company for E2E visibility through the entire supply chain, from the raw materials supplier to the end consumer.



## A Turn Away from Postmodern ERP

The manufacturing industry's enterprise resource planning (ERP) strategy has evolved in tandem with technological advancements. Modern ERP's "best of breed" strategy is attracting the attention of forward-thinking supply chain executives. Instead, they're implementing ERPs that promote strategic cooperation between business and IT leaders and put businesses on the road to success in the Industry 4.0 era.

Even if the supply chain industry has only recently started to embrace this Postmodern ERP mentality, Industry 4.0 tests the limits of even this cutting-edge approach. Industry 4.0 necessitates a supply chain that is fully flexible and combines IT processes both vertically and horizontally.

The Industry 4.0 organization is now more cohesive thanks to robust data-integration networks that cover normally isolated divisions like engineering and customer service. These data structures also have unparalleled convergence, resulting in a much more flexible supply chain, since they can interact outside the company's borders.

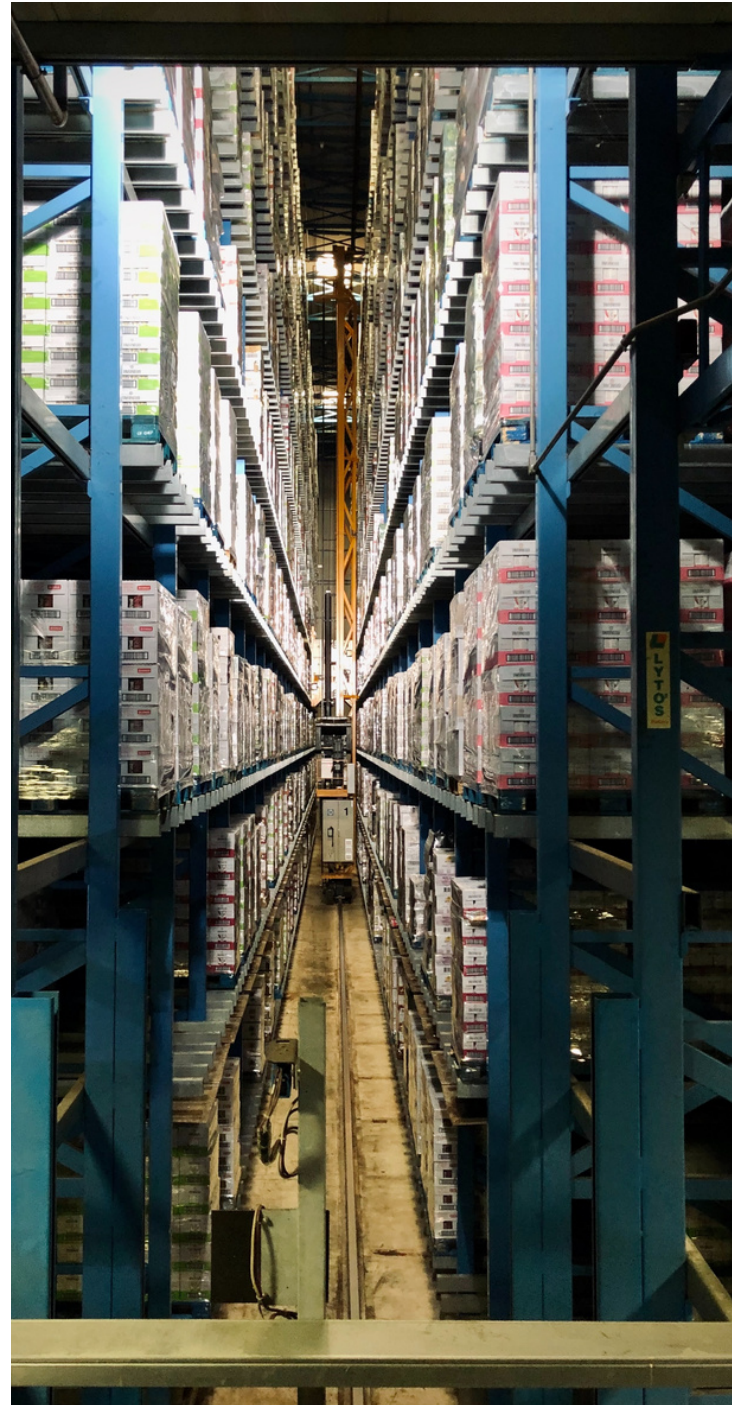


## Internet of Things (IoT) Integration on a Large Scale

The use of networked devices and sensors in the supply chain is another part of the integration. The Internet of Things (IoT) is a term that describes computing technology that is embedded in devices that can communicate with other devices and people through the internet.

Currently, IoT is most often used vertically within an organization; for example, devices and sensors in the supply chain interact with one another, providing valuable but minimal information to the manufacturing control system. However, in the next step, the IoT will be used to communicate through departments as well.

Modules, sensors, and people, like IT system software, will be incorporated into the enterprise. The IoT is completely exploited in the Industry 4.0 supply chain for streamlined, agile processes with much greater visibility and accountability.





## Growing Reliance on the Cloud

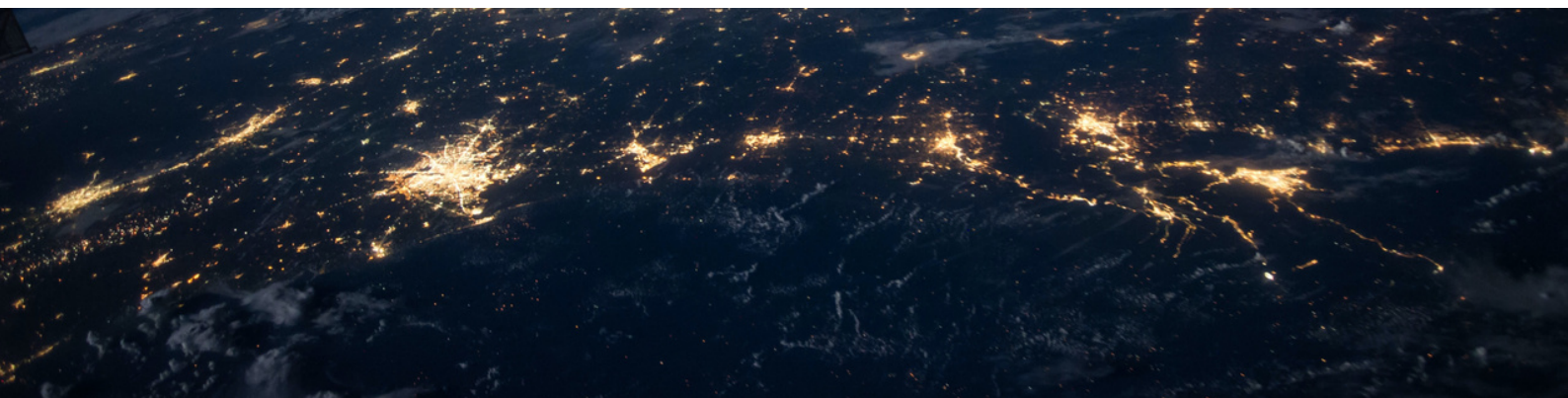
The data-generation machine is the Industry 4.0 supply chain. It is continuously delivering real-time insights, necessitating unprecedented speed and precision, as well as the ability to provide instant access and E2E visibility.

The Cloud is the perfect way to fulfill those needs. The Industry 4.0 company will gradually use Cloud technologies for data storage and accessibility as cloud technology develops. The Cloud, with its almost limitless storage space and ever-shortening reaction time, provides the agility needed for the next-generation supply chain.

## In-Memory Databases that are Stable

Supply chain leaders must rely on in-memory databases (IMDBs) to manage ad hoc optimization and analytics in addition to the Cloud's limitless storage space. The IMDB, also known as the main memory database (MMDB), stores data in the computer's main memory rather than on a disk.

Data stored on IMDB is more accessible than data stored in the Cloud because it does not require an online transaction, which may slow down the process. As a result, the IMDB improves data quality, workflows, and speed. To increase the organization's computing space and agility, the most effective supply chains use both the Cloud and IMDB.





# Industry 4.0 With New Partnership Definitions

Industry 4.0 is often correlated with the introduction of new technologies, cutting-edge devices, and machine learning. However, Industry 4.0 is more than just a technological problem. It's all about people and procedures. Future supply chain executives must recognize that as the manufacturing sector progresses, traditional understandings of supplier and producer systems may become obsolete.

A modern concept of collaboration is already taking shape, resulting in the creation of new value networks. Supply chain leaders must incorporate suppliers into their organizational structure to thrive in the age of Industry 4.0. They must be able to efficiently handle data support and production design from their suppliers, as well as their supply chain risks. This would also necessitate a new approach to buying decisions: rather than relying on commodity price-driven models, supply chain leaders will have to adopt relationship models that factor in risk figures and future product production optimization opportunities.

## Taking Steps Towards Industry 4.0

When the company transitions into Industry 4.0 readiness, you'll have to make a lot of choices on how to integrate emerging technology and upgrade existing systems and processes. When the company chooses new manufacturing logistics software, for example, these choices can be costly.

Focus on four main principles to ensure that your decisions will prepare you well for the transition to Industry 4.0:



## Transparency of Information

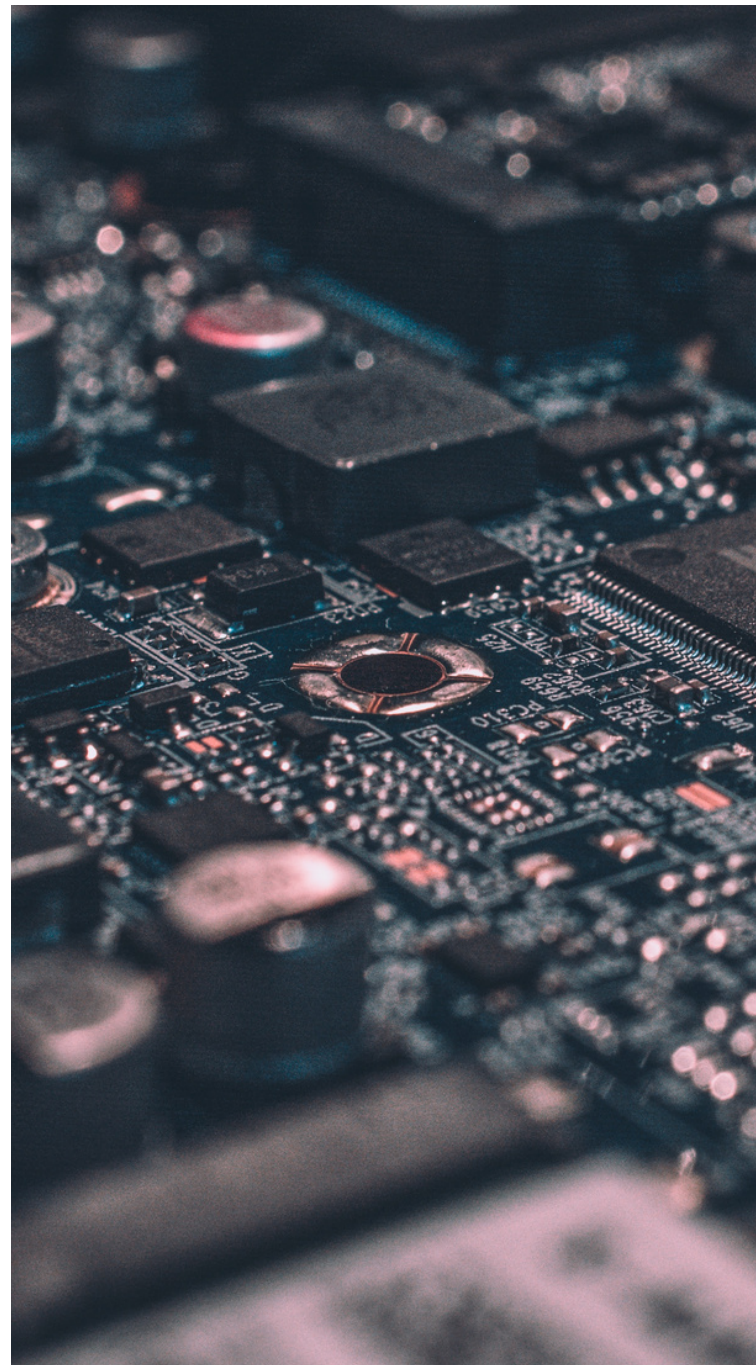
Industry 4.0 systems build a "cyber-physical environment," in which the physical world is quantified and made available through contextual data. As required, systems seamlessly and instantly exchange the data, ensuring that all systems work together using real-time data. Any new technology that your organization introduces should have this degree of accountability.

## Interoperability

Humans, computers, sensors, and devices can all link and communicate with one another in an Industry 4.0 environment. This aspect of Industry 4.0 necessitates supply chain managers to consider the compatibility criteria for software, computers, and other devices from a wider perspective.

## Decentralized Decision-Making

At the moment, the majority of supply chains depend on centralized decision-making. However, Industry 4.0 has implemented a new degree of autonomy, allowing systems to make basic decisions on their own. By that, the amount of time and money expended on centralized supervision has the potential to boost performance.







## Technical Assistance

Automation and robotics now provide critical assistance in hazardous situations where humans are unable to operate. The next step is to create a machine that can assist humans in making decisions and solving problems. Industry 4.0 emphasizes the interdependence between structures and humans.

Although the full effect of Industry 4.0 may not be apparent for another five to ten years, its impact on supply chain management is already evident. Industry 4.0 should serve as a foundation for supply chain managers as they look to the future.

## Corporate Integration from a Different Perception

Vertical convergence is a vital component of effective Industry 4.0 initiatives. Traditional businesses are organized in hierarchical structures that prevent interaction between layers. This also results in significant synchronization attempts, as well as wide discrepancies between organizational planning processes and execution.

Production schedules are not coordinated with logistics in these organizations. Since there is no organized back-loop of execution knowledge and no real-time re-planning mechanism in case of deviations, production planners conduct comprehensive planning activities that often vary significantly from actual outcomes.



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