

Industry 4.0 Digital Networks Promise to Transform Your Supply Chain

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Key Takeaways:

- Global supply chains are poised to benefit significantly from the Fourth Industrial Revolution—also known as Industry 4.0—and digital 'networks of networks.'
- Industry 4.0 transformation requires a central network platform where organizations can create digital twins of their networks without changing their internal architecture. The network platform links systems, processes, people, and enterprises into a collective information network and enables intelligent business execution.
- Benefits of Industry 4.0 transformation include greater agility in the face of volatile demand, increased protection from counterfeiting and diversion, and improved sustainability and social responsibility.

Global supply chains will soon get a major boost from advances in machine-to-machine communications, the internet of things (IoT), artificial intelligence (AI), and immersive networks, which are all part of what is referred to as the Fourth Industrial Revolution, or Industry 4.0.

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The concept of a Fourth Industrial Revolution was popularized by the founder of the World Economic Forum, Klaus Schwab, in 2015. The impact on global supply chains and manufacturing should be substantial as self-monitoring systems, intelligent machine-to-machine communications, and a network of networks open a new world of deep and broad process visibility and cross-functional, cross-enterprise communications.

To better appreciate the **promise of Industry 4.0**, it is helpful to look back at the first three waves of the Industrial Revolution:

- **First Industrial Revolution:** Generally delineated as spanning 1760 to 1840, this revolution was powered by steam and advances in manufacturing technologies that reduced the physical labor and time required to create products.
- **Second Industrial Revolution:** Spanning 1871 to 1914, this revolution was powered by the building of railroads, creation of telegraph networks, the increasing use of electrification, and development of factory production lines.
- **Third Industrial Revolution:** Sometimes called the Digital Revolution, this era began after World War II, and extends to the present day. This revolution has been powered by the growth of computer technology and all that our ever-more powerful computers have brought to the world.

An Industry 4.0 network of networks connects people, processes, data, and systems and breaks down the barriers to digital supply chain transformation.

Without a doubt, Industry 3.0, the Digital Revolution, has carried us to amazing heights. The revolution began with room-filling mainframes, progressed through supercomputers, and along the way gave us what used to be supercomputer capabilities on the smartphones we carry in our pockets.

Industry 4.0 will transform your supply chain

How do we know that the Fourth Industrial Revolution, Industry 4.0, has arrived?

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Because we are now creating networks of networks—with machine learning, expansive communications, and precision process visibility baked in—that will transform how businesses communicate and interoperate.

A prime use case for Industry 4.0 is supply chain management. An organization can have dozens to hundreds to thousands of supply chain partners. Additionally, each of those organizations has its own partners and suppliers. An Industry 4.0 network of networks securely connects all of these participants, with each participant permitted to see the data relative to their own needs. We call this the Internet of Supply Chains (IoSC) and it is the key to driving the end-to-end digitalization of your supplier network.

This brings extreme visibility to all supply chain participants. With such a network of networks, one could see an overview of not just their own supply chain needs, but dive deeper to ensure their partner supply chains were also flowing properly. Add to this, machine-to-machine communication, AI, and you can understand how significantly supply chain operations can be enhanced by the network of networks of Industry 4.0.

TraceLink traceability and compliance solutions for the pharmaceutical industry are a prime example of Industry 4.0 connectivity. Our network of networks links more than 286,000 members to supply chain partners and manages 31.3 billion serial numbers, providing a digital twin for the life science industry.

How to build a digital network of networks

The challenge, of course, is to actually create a network of networks, especially when unifying communications across multiple companies, each with their own enterprise resource planning and supply chain management systems, custom applications, and business processes. How do we integrate these disparate entities into a network of networks that lets us access information in a manner that enables us to develop intelligence, share execution, and work as an integrated organism?

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The answer is to create a central network platform on which organizations can create a digital twin of their networks without changing their internal architecture. Such a **network platform** would enable the creation and running of multi-enterprise applications with business objects and business processes as a harmonizing layer—essentially translating between disparate applications to allow seamless communications and processes across and between organizations.

- Basic elements of such a network of networks would include:
- Creating a standardized digital representation of a firm's own processes that can be extended to partners.
- Sharing processes and applications across the network, including appropriate security and access controls among partners.
- Supporting cross-functional and cross-company execution with a shared, but customized, application that enables the company and its partners to participate based on their own workflow and data requirements.
- Providing a common data model for information in the network, with a system that auto-translates each other's data into a common language.
- Generating collective intelligence from across the network to predict shortages, anticipate supply disruptions, and identify shifts in demand.

Benefits range from security to sustainability

An Industry 4.0 network of networks connects people, processes, data, and systems and breaks down the barriers to digital supply chain transformation. The results could help us meet some of the major challenges supply chains face, including:

Counterfeiting and diversion: A network of networks will enhance traceability and provenance to defend against counterfeiting and diversion in pharmaceuticals and a spectrum of other industries.

Demand and supply fluctuations: Recent supply chain disruptions underscore the need to adapt and adjust to fluctuations at a very rapid rate, made possible by

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the visibility and communications inherent in a network of networks.

Sustainability: Environmental concerns require traceability. For example, the US Environmental Protection Agency's Scope 3 on carbon emissions basically says that you need to not only be able to certify that your own products meet certain sustainability requirements, but that all the raw materials that your suppliers are using also meet the requirements.

Social responsibility: A network of networks provides the transparency companies require to work in a more orchestrated manner and to ensure accountability to each other in order to achieve goals—and mandates—for social responsibility.

These are exciting days. We are witnessing the dawn of the Fourth Industrial Revolution, and because of the network of networks that is forming such a foundational element of this revolution, supply chain management will be one of the earliest beneficiaries of Industry 4.0. This capability is no longer theoretical, but in action today and providing immeasurable value to global supply chains. The TraceLink network, for example, is able to successfully predict product shortages 90 days in advance with over 80% accuracy. This is the kind of revolutionary impact interoperability and end-to-end digitalization can have on society.

A version of this article was originally published on Pharmaceutical Commerce.

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