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## ***Digital Supply Chain***

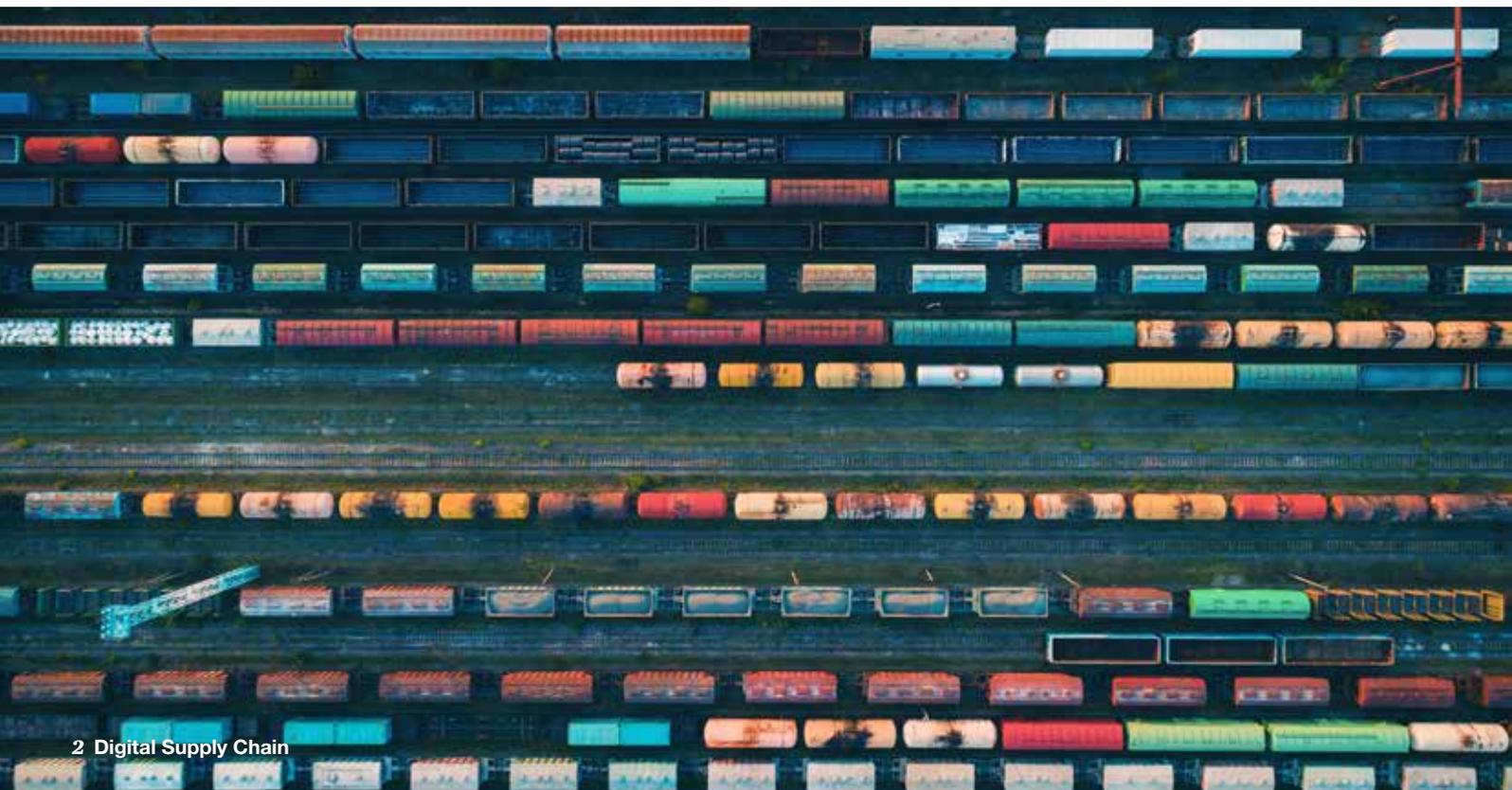
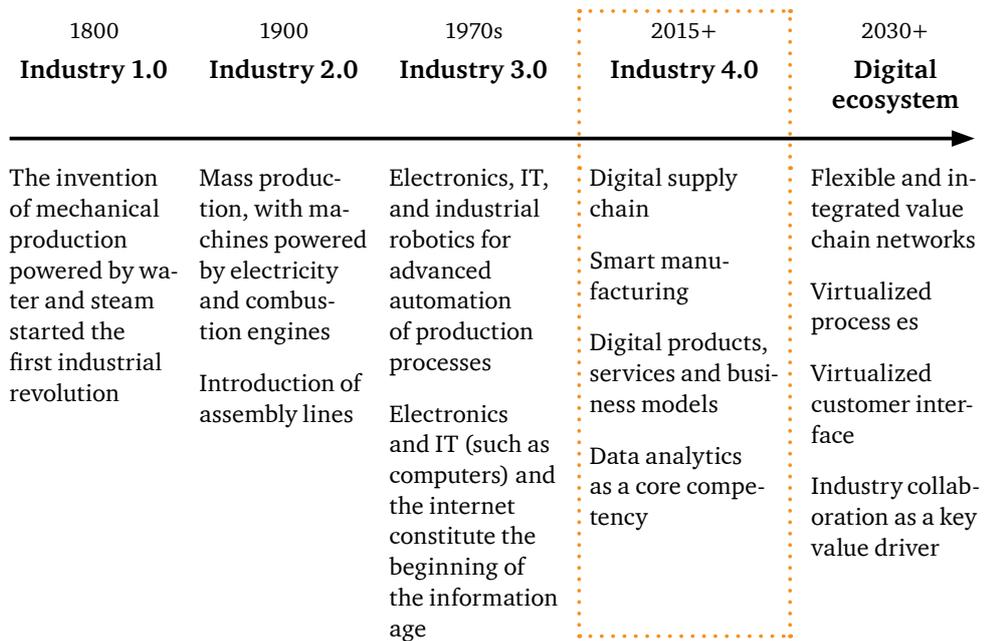
Making the supply chains more efficient, agile, and customer-focused



# Introduction

*Behind the great potential of the Digital Supply Chain (DSC) lies the fourth industrial revolution, Industry 4.0, a transformation in both production and automation. While Industry 3.0 focused on the automation of individual machines and processes, Industry 4.0 focuses on the end-to-end digitization of the supply chain. Powered by data and connectivity, it will drive digitization in all aspects of the supply chain, leading us on the path towards a digital ecosystem with more flexibility, virtualization, and integrated collaboration both internally and with value chain partners.*

In 2018, PwC conducted a worldwide Global Digital Operations survey with over 1,000 participants from 6 major industrial sectors and 26 countries. It revealed that by digitizing, companies, over the next five years, expect to generate 12.3% in cost reductions whilst increase revenues by 14.7%.



### New digital technology

IoT platforms  
 Cloud solutions  
 Additive Manufacturing/  
 3D printing  
 Big data solutions and analytics  
 Industry 4.0 and sensors  
 UX / eCommerce / omnichannel

Push



### Changing consumer expectations

Digital lifestyle drive proliferation of interaction models and willingness to share information  
 Consumers expect seamless experience across channels  
 Demand for personalized products and services  
 Customers expect order and delivery visibility  
 Increased consumer expectation for “instant” order fulfilment

Driving the transformation are two tightly intertwined, but opposite acting (push-pull), trends:

- **New technology:** pushing new capabilities and solutions to market by the use of big data analytics, the cloud, and the Internet of Things, 3D printing, augmented reality, etc.; and,
- **Expectations:** More exacting expectations from consumers, employees, and business partners, drive companies (pulling them) to develop more reliable and responsive supply chains.

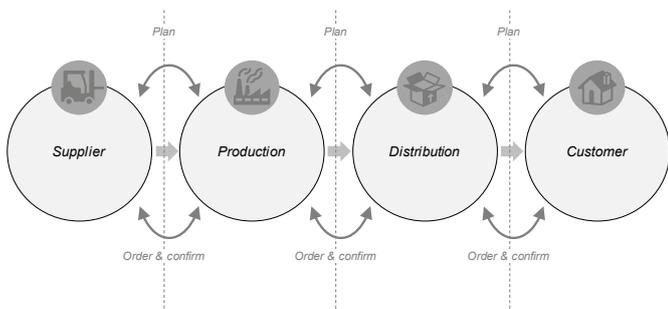
The Digital Supply Chain ecosystem will be based on full implementation of a wide range of new digital technologies.

Together, these technologies will enable new business models, the digitization of products and services, and the digitization and integration of every link in a company’s value chain (i.e. the digital workplace, product development and innovation, engineering and manufacturing, distribution, and digital sales channels and customer relationship management).

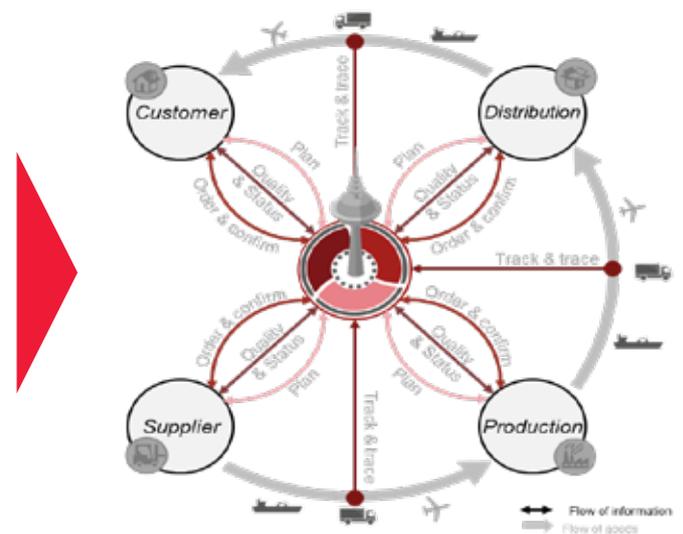
At the heart of all this activity sits the Digital Supply Chain ecosystem, and it is key to the operations of every company that manufactures or distributes anything. Indeed, for many companies the supply chain is the business.

Traditionally communication has been sequential within the supply chain, in the direction of goods/services, with limited interaction between the different steps. Industry 4.0 extends the vertical integration of all corporate functions to the horizontal dimension, knitting together relevant players — the suppliers of raw materials and parts, the production process itself, warehouse and distributors of finished products, and finally the customer — through a network of sensors and social technologies, overseen via a central control hub, and managed through an overarching data analytics engine.

Traditional supply chain model



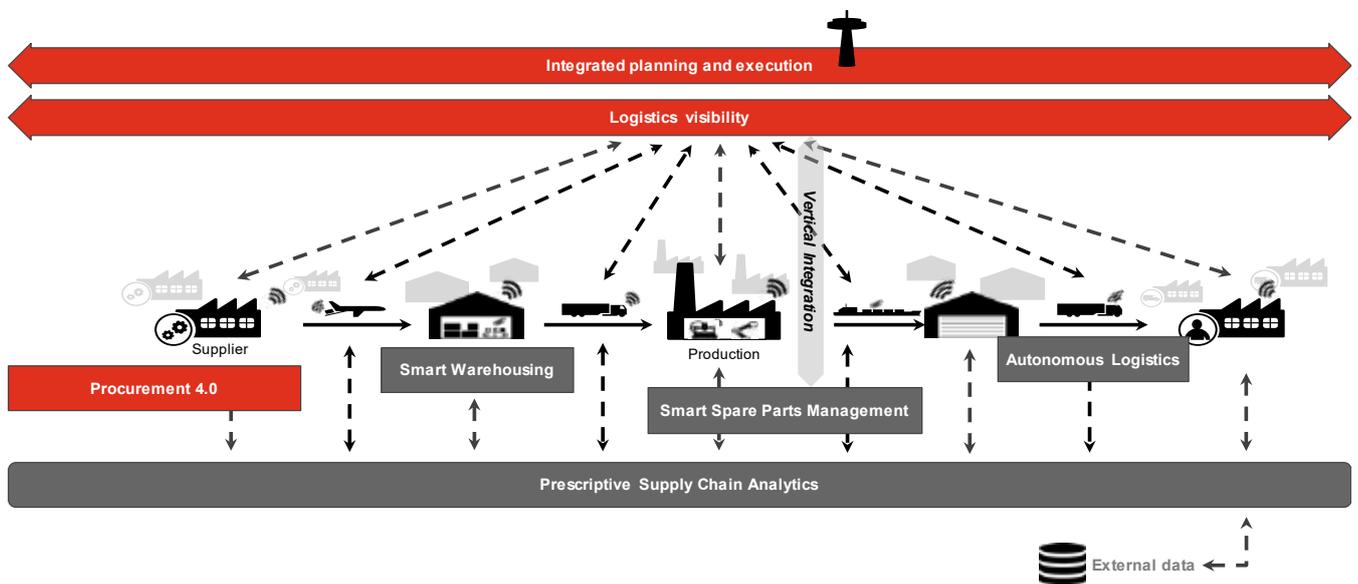
Integrated supply chain ecosystem



# Core elements and new technologies of the Digital Supply Chain

Today most supply chains operate along traditional standardized processes such as plan, source, make, deliver, return, and enable. Every one of these elements is rapidly being revitalized through technological innovation. The technologies disrupting the traditional processes affect seven key areas of the supply chain: integrated planning and execution, logistics visibility, Procurement 4.0, smart

warehousing, efficient spare parts management, autonomous and B2C logistics, and prescriptive supply chain analytics (illustrated below). All of these elements are interrelated, and build on each other. Consequently, a digital supply chain strategy needs to consider all of them to leverage the full benefits of digitization. Let's look more deeply at what these critical elements mean.



## 1. Integrated planning and execution

In a world with more customized manufacturing and more demanding customers, delivering the right product to customers as quickly as possible — responsively, reliably and efficiently — is a huge competitive advantage and is quickly becoming the new norm. By integrating data across the entire supply chain, in real time and often without human intervention, delivery lead times can be significantly reduced and freight and inventory management optimized. The rapid exchange of information also boosts the agility of the entire supply chain, while enabling much closer integration with customers.

## 2. Logistics visibility

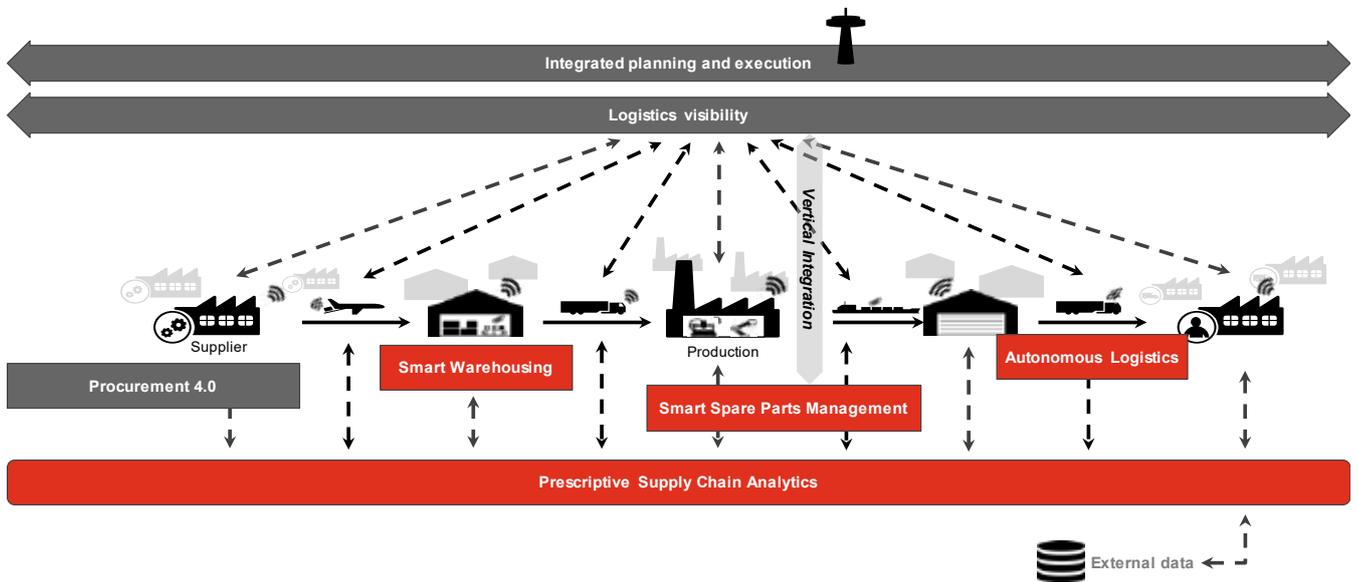
The key to success for any supply chain is efficient exchange of information, making it visible across the entire chain. And customers, both in the B2C and B2B markets, are pushing companies to provide this level of visibility across the supply chain, demanding more information about shipment arrivals with real-time updates.

Gathering data from across the supply chain and consolidating it, enriched with cross-referenced information such as supply chain events impacting supply shipments (e.g. weather and traffic), will let companies increase their efficiency by optimizing their choices under different conditions, using the information to alert factories, warehouses, and

customers of endangered arrival times and engage in mitigation actions early. Visibility on transport status, expected external impacts on lead time, and the ability to change plans accordingly, will be instrumental for companies.

## 3. Procurement 4.0

Adopting the digital supply chain ecosystem will require a much closer relationship between the different parties across the supply chain. Digitization tools will help companies connect more closely with suppliers and distributors to aid the planning process, improve sourcing, actively manage risk, and boost collaboration. Resulting in lower costs and faster delivery throughout the entire supply chain.



Digitizing procurement will also transform the tools and skills that companies will require. This includes companies whose supply chain needs have solely been limited to physical goods, which will now have to become equally adept at buying digital supplies and services such as sensors, software, digital platform solutions, etc.

#### 4. Smart warehousing

New technology or new usage of existing technology (e.g. sensors, connectivity, etc.) is significantly improving warehousing operations, including inbound logistics and distribution. Managing the data by an intelligent warehouse management system and updating inventory status in real time, will enable an optimized flow through the warehouse. Embracing the technological advance will allow:

- Trucks on the way to a warehouse to communicate their position, load, and arrival time prior to arrival, allowing it to be optimally planned;
- RFID-GPS tags to update the entire supply chain on goods location and once they have been delivered;
- Guiding tools to significantly enhance the workforce efficiency and accuracy; and,
- Control the warehouse environment, (e.g. temperature, light and humidity), reducing energy consumption.

#### 5. Smart spare parts management

Spare parts have historically been kept in high volume inventories, often ordered as one-time requests from different suppliers with offshore production, and kept for long periods to manage long-living machines. With 3D printing the spare parts supply chain can be reduced to fewer suppliers, even enabling own production. Hence, spare part production can be done closer to customers, removing the need to follow cheap labor rates. Resulting in faster delivery and significantly reduced inventory levels.

#### 6. Autonomous logistics

Transportation of goods between B2B, within production facilities, and between B2C (the last mile) constitutes an integral part of the supply chain. Logistic fleets will include numerous driverless vehicles and other robotic innovations (e.g. drones), which will play an increasingly important role in moving goods around the world.

The virtues of such innovations include faster and more reliable delivery times, lower labor costs, the elimination of human error, and reduced emissions thanks to more efficient operations, such as routing and convoying of trucks. Additional benefits can include improved on-site employee safety and freeing up resources to conduct more value-adding tasks.

#### 7. Prescriptive supply chain analytics

With a more digitized supply chain, the number and quality of data sources will increase. This will enable companies to use prescriptive analytics, to in real time adjust and optimize the supply chain to any number of changing factors across the entire supply chain, E2E.

As analytics become increasingly advanced and sophisticated, it will be able to better support supply chain managers in decision-making. Additionally, with the help of self-learning algorithms, prescriptive analytics will be able to act autonomously on simple decisions, improving efficiency in the supply chain process.

PwC has seen examples where progress in analytics is being made within individual steps of the supply chain. The challenge companies are facing, is to connect and integrate these steps horizontally so that they can reach the supply chain eco-system that PwC predict is the future.

# Blueprint for Success

1

## ***Understand your starting point and map out your strategy***

Many businesses have already begun digitizing, but often in silos rather than via a holistic approach. Hence, it is important to understand the digital maturity and how to leverage the existing strengths. When developing the company vision, consider the supply chain design that best supports it, the road map and necessary implementation steps, and the champions who need to be engaged to achieve the vision.

2

## ***Deploy pilot projects***

Many applications that make up the digital supply chain represent a radical change for most organizations. Companies should first carry out smaller pilots that showcase benefits and help develop the right capabilities. These “lighthouse” projects should aim at testing the end-to-end flow for a specific supply chain (rather than implementing a limited set of technologies on a broader scale) and gain buy-in from the organization as well as funding for a larger roll-out.

3

## ***Define the capabilities needed***

Building on the lessons learned from the pilot projects, it is important to define what capabilities across the four dimensions: organization structure (e.g. incubator, idea labs, etc.), people (e.g. attract the right skills), process (e.g. processes to foster new collaboration), and technology (e.g. develop an agile IT function); that are required to make the roll-out of the pilot projects successful.

4

## ***Becoming a data virtuoso***

Key to successfully adopting Industry 4.0 will be to identify, gather, and use data correctly, as well as analyzing it efficiently. Developing an effective data analytics strategy, and how it will be implemented is essential. Considerations will include data platforms, development of a master data management procedure, and organizational structure (e.g. starting with a cross-functional expert team before fully embedding the capabilities in a standalone function).

5

## ***Transform into a digital enterprise***

Even for companies whose supply chain needs have solely been limited to physical goods, it will be essential to transform the company culture. A digital culture and mindset is highly collaborative and crosses company boundaries to include partners and customers. To successfully implement such a mindset change, it is important that there is a strong leadership commitment from top management.

6

## ***Actively plan an ecosystem approach***

Industry 4.0 needs to extend far wider than horizontal and vertical integration within an organization. Breakthrough performance is achieved when companies understand consumer behavior and offer a comprehensive digital ecosystem and orchestrate its role within an ecosystem of partners, suppliers and customers. The biggest challenge will be to set the right incentives and find suitable sharing models that compensates everyone fairly for their contribution.



*Want to learn more?  
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