DIGITAL INDUSTRIES SOFTWARE

Integrated. Agile. Transparent.

How to perfectly sync your production and supply chains

Executive summary

Gaining visibility into the performance of products, production and the entire supply chain has always been a complicated task for Consumer Products and Retail (CP&R) companies. However, as consumer expectations grow, the need to offer more environmentally friendly products, more merchandise options and bespoke products has companies searching for more visibility and traceability in their processes. In such a competitive environment, and with consumers increasingly disloyal to brands, volatility, uncertainty, complexity and ambiguity (VUCA) is the reality today for CP&R manufacturers, meaning they need new processes to make their supply chain more resilient.

By simulating and analyzing new strategies via a comprehensive digital twin, you can find the perfect balance between transport, inventory and process costs to make the best possible use of capacities and maximize throughput. Siemens Digital Logistics, part of the Siemens Xcelerator open digital business platform, delivers software solutions to improve internal and external logistics, procurement and material flow. This enables companies to optimize processes flawlessly as they break down silos and gain end-to-end trusted traceability throughout the supply chain.

To ensure truly effective logistics management you require an integrated strategy. This white paper is intended to help you begin that journey and thrive in a VUCA world.

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Contents

The world of production is anything but predictable

VUCA is the name of the game in production and supply chains, throwing planning figures out the window and forcing market players to adopt agile new strategies and approaches. Volatility from such factors as shortened product lifecycles, changing trends, and scarce resources make it challenging to plan supply processes. Uncertainty in business operations is fueled by macroeconomic developments such as rising energy prices, strikes, and higher labor costs. Complexity in logistics operations stems from more significant production variability, rising numbers of product variants, and growing volumes of data. Ambiguity is the final element since situations and information are often interpreted differently.

Volatility
- Fluctuations in needs and demand
- Acceleration of product life cycles
- Scarcity of resources
- Flexibility and speed

Uncertainty
- Factor cost increase e.g. labor, energy, toll
- Changes in product assortment due to innovation
- Trade barriers, regulations

Complexity
- Growing availability of real-time information and mass data
- Increasing number of variants
- Digitalization

Ambiguity
- Blurred root cause-effect relationship
  Could be a
  - Performance and/or
  - Productivity and/or
  - Cost pressure

So how do we reach a goal that keeps shifting as the process progresses? How do we ensure a reliable production supply chain when procurement markets are in flux, suppliers don't deliver, and shipping volumes fluctuate?

The way to manage this VUCA-verse muddle is to sync production and logistics. Synchronization means coordinating the various tools used to plan and control process flows. Physical and digital processes become one, and data models are linked with real-time data to reveal insights about products, manufacturing processes, and the manufacturing environment. Even as companies cope with natural or theoretical problems and threat scenarios, they gain reasonable solutions that help them shore up supply processes through strategic, tactical, and operational measures.

These aspects make supply chains much more resilient. And that, in turn, yields greater agility and transparency in logistics networks. VUCA is wrangled into a predictable variable.

Current challenges for consumer products and retail manufacturers and their logistics

When production stalls, it gets expensive. Assembly lines come to a standstill. Resources remain unused, and delivery deadlines slip. The chain of adverse events often has far-reaching and unpredictable consequences for Consumer Products and Retail manufacturers and their customers.

A shortage of semiconductor chips or raw materials such as grains, plastics, and minerals can quickly escalate into an existential crisis for many businesses. Industry associations are decrying this catastrophic situation and demanding that clients offer reliable production and workflow planning.

Challenges aplenty

The business community is frantically searching for strategies to minimize plant downtime as much as feasible. Local sourcing as opposed to global sourcing, realigning supplier networks, and increasing inventory: The purpose of supply chain management is to defend against unforeseen events and safeguard production. **The problem:** Most solutions focus exclusively on limited aspects of a crisis that is constantly evolving. They remain static and limited in their effectiveness.

Extreme weather, pandemics, trade barriers, economic wars strikes, and, more recently, inflation: The list of factors that can quickly put the squeeze on manufacturers is long and never-ending. Volatile, uncertain, complex, ambiguous: VUCA describes the difficulty of the prevailing conditions under which today's businesses must generate profits. And it's not just the crises that define the new reality.

Another key challenge for businesses lies in managing the kind of complexity needed to analyze and leverage huge volumes of data. Varying sources of data, organizational silos and IT systems often make it difficult to keep an eye on the big picture, offer reliable information, and gain end-to-end visibility into the performance of products, production, and the entire supply chain. This process is further complicated by the shift in customers' buying behaviors and the need to maintain increasing amounts of data. Despite advances in digital technology, the results often lag behind expectations. The consequences for business operations are tangible: Slipping deadlines are not identified in time, the susceptibility to errors increases, and administrative overhead grows.

Robust supply chains emerging as a key competitive factor in the Consumer Products and Retail industry

More than ever, success depends on logistics. Storage and transport were historically the focus of the analog world, but today, logistics is seen as a driver of innovative business models and a guarantor of efficiency, cost-effectiveness, excellent service, and the ability to deliver at short notice. The reason for these changed expectations is the growing importance of IT and the industrial Internet of Things (IIoT) in the CP&R industry.

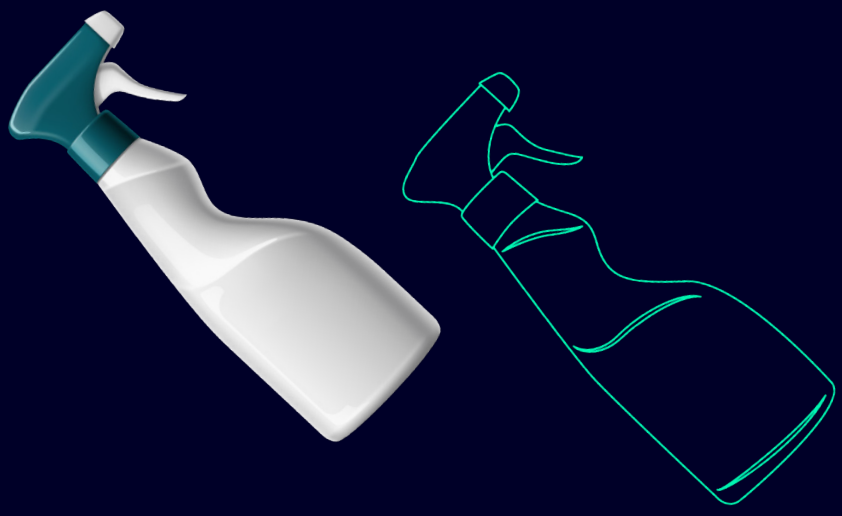
Synchronize with a digital twin

In the digital age, data is the super fuel that helps achieve production and logistics goals with greater speed, efficiency, and reliability. Cloud-based IT platforms serve as hubs for procuring, consolidating, and distributing order-related data. IT solutions such as the digital twin are driving the evolution of supply chains into value chains. The critical competitive factor here is not the product; it's a value chain in which performance, costs, and service are delicately balanced.

By leveraging the IoT and connected devices to collect data, companies can understand more about their product use and performance; insights from real-time customer feedback can be invaluable to generating unique consumer experiences that increase brand loyalty.

The better the synchronization of production and logistics – of internal and external supply processes – the better the supply chain will perform. A simple example illustrates this link: If there is exact information on all production figures, including any changes, then it is possible for logistics to plan container capacities precisely. This accurate data helps to pinpoint delivery intervals while determining the appropriate transport channel (direct delivery, parcel, etc.). The result is an exact alignment of technical and logistical resources to volume flow.

The larger goal in syncing production and logistics is to find the perfect balance between transport, inventory, and process costs; to make the best possible use of capacities; and to make the supply chain more resilient to disruptions.



Visibility as the antidote to supply chain disruptions in the Consumer Products and Retail industry

The supply chain does not end at your factory gate. That's just where it transforms from an external to an internal chain of events. Looking at these processes in isolation means missing key pieces of the puzzle needed to optimize efficient production logistics.

Visibility means having a clear view of the horizon across the entire supply chain process - from inbound logistics to intralogistics to the production line. A silo mindset limits the perception of what is feasible. What's the point of optimizing your in-house material flow if it fails when a supplier underperforms? Or if low-quality data or manual processes lead to skyrocketing administrative costs?

The control tower

Success comes to those who break down silos, broaden their fields of action, and generate transparency by consolidating, analyzing, and sharing data. In logistics, this kind of success is achieved by cloud-based IT platforms and functionalities like those of a control tower – a sort of command center and consolidation hub all in one. The control tower serves as a nerve center with a single source of up-to-date information for all supply chain partners and connects all processes with a single source of up-to-date information. It shares all the necessary information along the supply chain, enabling end-to-end monitoring of the supply chain inside and outside the factory gate.

This makes it possible for CP&R companies to keep accurate product data, including information on raw materials and the manufacturing equipment employed. This product data can be shared with customers to offer them a clear view of a product's journey from raw material to finished product. This type of openness gives consumers more faith in the supply chain as they can visualize that products have traveled safely throughout the whole product lifecycle.

Features such as track and trace and an automatic alarm system ensure a spectrum of possible uses that leaves almost nothing to be desired. The control tower helps identify procurement bottlenecks early on, such as when a supplier fails to deliver. It provides a compass and shines a light on every link in the supply chain to keep the business running smoothly in real-time. If something goes wrong in the supply chain, the factory can adjust and vice versa.

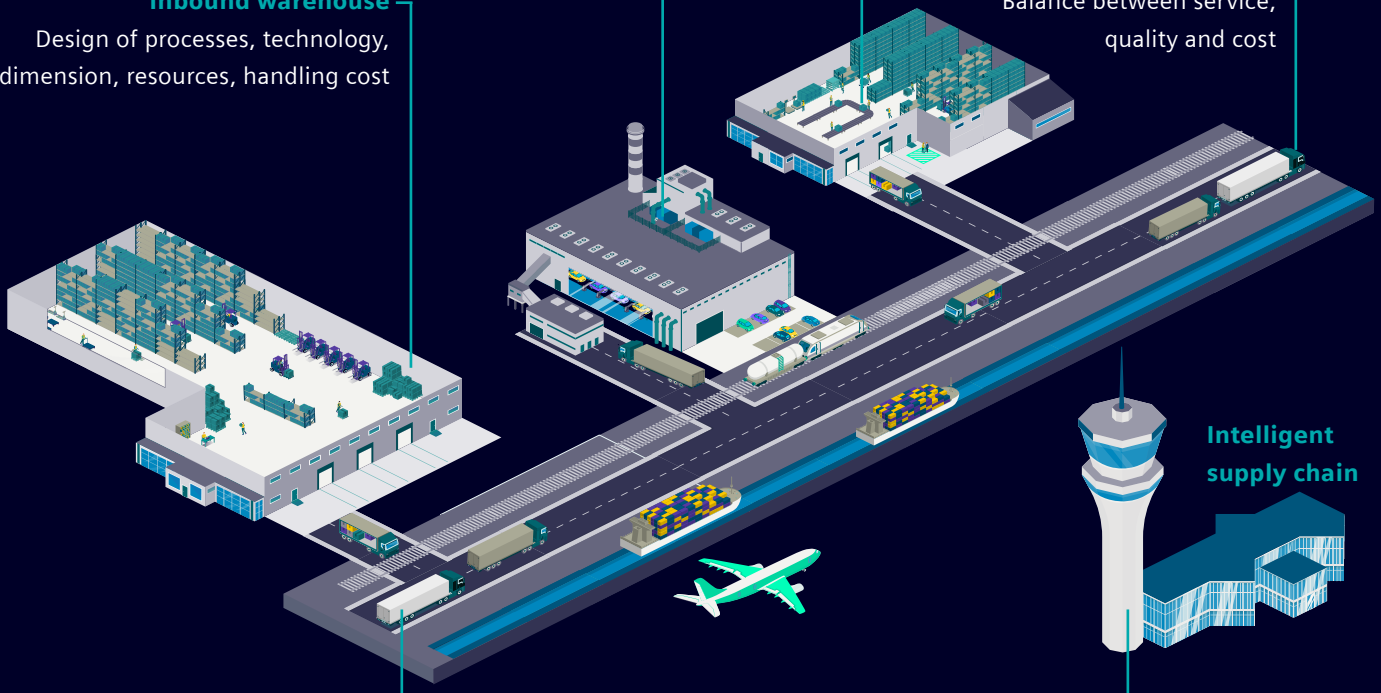
Big picture of digital logistics planning suite

Production supply
Design of material flow depending on demand, throughput and resources

Outbound warehouse
Design of processes, technology, dimension, resources, handling cost

Outbound design
Balance between service, quality and cost

Inbound warehouse
Design of processes, technology, dimension, resources, handling cost



Inbound design
Balance between inbound/inhouse costs and carbon footprint

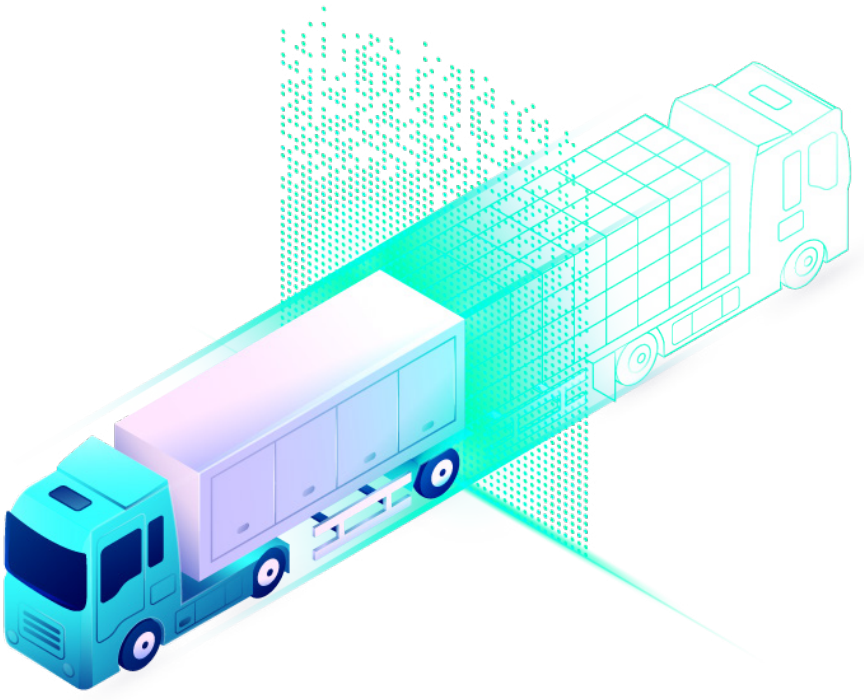
Control tower
Real-time data for transparent processes and collaboration of all partners in the supply chain

What if?
Reliability manufactured

Often, new ideas seem convincing when first pitched but fall short of expectations or fail when applied to real life. Perhaps minor details were overlooked, or the SWOT analysis did not take into account all the opportunities and threat scenarios. And so the feasibility study crumples like a paper tiger.

Then, as customer needs change and markets evolve, there's little opportunity to adapt one's logistics to new tasks – see VUCA. In a nutshell: There is no silver bullet for optimizing logistics processes.

What works well for a Consumer Products and Retail manufacturer can be a dead end in another industry. Every need, every requirement is different, depending on the customer context, supplier structure, warehouse layout, degree of automation, production process – and the status quo.



Simulation drives optimization

This is where a consultant comes in – someone who has already made a splash in mechanical engineering at Siemens: the digital twin. The digital twin delivers everything you need to plan confidently and optimize your processes in complex network ecosystems. That's because it provides a virtual image of reality. The digital twin uses existing data and network structures to precisely and systematically simulate supply chain optimization scenarios, including all contingencies. Using simulations and analyses from the digital twin can help companies predict and solve problems before they happen.

"What if ...?" Plan, simulate, optimize, digitalize: With the digital twin at your side, new ideas and strategies can be initiated, tested, and scrutinized without risk. How does the system react to fluctuations in capacities and order volumes? Where might bottlenecks occur? What is the manufacturing throughput time for different production programs?

The simulation leaves no questions unanswered since the digital twin links internal and external networks. Different levels of detail make it possible to model future scenarios with varying degrees of focus and depth. What is the desired result? Is it better to use static models that do not take elapsed time into account, or are dynamic models with a time dimension preferred? Anything is possible – with a simulation model that precisely matches reality.

From planning to monitoring: Turning use cases into success stories

What effect does a new supply chain management strategy, a new production process, a supply bottleneck, or the opening of an automated high-rack storage facility have on operations? What tactical measures are needed to boost productivity in a specific use case or to prevent an impending production shutdown? Linking internal and external networks brings together all key parameters needed to simulate a material flow.

Comparisons to the status quo are the benchmark for assessing the effects of a new supply network design. The use case simulation can address any question: What throughput can be ensured? What resources are needed? How high are logistics and process costs?

The value of a holistic view

This integrated view and analysis of internal and external logistics and production processes, right down to pinpointing where a given needed resource in production, yields better insights into how the system works. But that's not all. This holistic view of the interconnecting processes also reveals where it is possible to add even more value. The accurate simulation of a network design also lets you validate investment decisions. You can see, for example, whether it makes financial sense to automate certain areas of production or production supply. Or how the bottom line is affected by the digitalization of analog processes. Monitoring data and processes adds visibility and intelligence to every supply chain step to help you make decisions faster and find new opportunities and business models.

Customer success: dm-drogerie Generating capacities, managing growth

German drugstore giant dm-drogerie markt wanted to overhaul the way it supplies its retail locations with a unique approach to logistics infrastructure. The company had a growing need for greater flexibility in their stores that would improve sustainability in a highly complex retail network. They needed a digital twin of their supply chain to simulate and optimize scenarios and use cases as the company grew.

Siemens Digital Logistics was able to realize this vision by developing dm's logistics network architecture using Supply Chain Suite (SCS). Using the digital twin, dm was able to simulate growth scenarios, forecast capacity reserves and optimize how retail locations were supplied to maximize reliability and cost-effectiveness. Alternative strategies relating to the supply of stores were the first to be simulated. Following this, additional use cases were set up that focused on packaging, logistics cost at the product level and the ideal order to prepare items for storage.

Success

The project was so successful that it earned the company the German Award for Supply Chain Management 2020. Today, dm uses SCS to cover key processes and areas of tactical decision-making in order to optimize its supply chain management. The positive experiences in Germany led to some of the use cases being applied in various countries within dm's network. The joint strategy has helped dm cost-optimize how it uses site capacities and open a new distribution center on schedule.

Learn more about this success story here.

High throughputs, optimized inventories: The path to perfect procurement and material flow design

It's conceivable that, as various scenarios are weighed, you decide to replace direct deliveries with milk runs, reduce container stock, or switch from a person-to-goods picking strategy to goods-to-person. The digital twin generates a detailed analysis of how this affects the entire network ecosystem and material flow.

The rules-based validation of workflow design uses an evaluation model that draws upon data already available in enterprise resource planning (ERP) and warehouse management systems (WMS): sites, routes, costs, capacities, production volumes, and container data. This process ensures that the design and planning of the supply chain network are based on existing fixed points, aiming to maximize throughputs and optimize inventories.

In synchronizing production and logistics, the clients determine which tasks the digital twin will perform. Once the procurement and material flow design is optimized, the digital twin can also focus on energy efficiency, meeting sustainability targets, or ergonomics. Many paths lead to a perfectly coordinated performance, cost, and service trifecta.

After identifying the ideal solution, it can be reproduced and refined for other scenarios.

Made by Siemens: The whole world of digital logistics solutions for the Consumer Products and Retail industry

Those who wish to overcome the escalating global supply chain threat scenarios effectively require an integrated strategy. In the interconnected world of logistics, a discrete mentality provides ineffective assistance to supply chains. The optimal balance of performance, cost, and service for manufacturers requires the integration of internal and external logistics, procurement, and material flow.

The best way to avoid production bottlenecks or manage fluctuations is to sync internal and external logistics and to simultaneously coordinate production figures, technical resources, and transport and storage capacities. Perfectly synced logistics are not driven by bills of materials, they are about about the up-to-the-minute needs of production and suppliers.

Siemens Digital Logistics, part of the Siemens Xcelerator open digital platform, delivers solutions for linking internal and external logistics. Our solutions ensure the smooth collaboration of all players in supply chain networks. They also provide end-to-end visibility and empower businesses to plan, simulate, and optimize their logistics processes as well as their manufacturing operations and their product development. This is how a supply chain thrives in a VUCA world.

Traceability and Lifecycle Intelligence for Consumer Products and Retail

Siemens' Traceability and Lifecycle Intelligence is a digital approach to produce individual products as flexibly as possible, anywhere, anytime by improving:

- **Manufacturing intelligence** to solve production downtimes
- **Product performance intelligence** to transform the consumer experience
- **Trusted traceability** for increased brand loyalty

Siemens' Traceability and Lifecycle Intelligence provides Consumer Products and Retail companies the necessary visibility and connectivity into product lifecycle and manufacturing to deliver an intelligent foundation across the entire lifecycle, enabling companies to gain and maintain a competitive advantage within the Consumer Product and Retail industry.

CP&R Traceability and Lifecycle Intelligence is part of Siemens Xcelerator, an open digital business platform which enables customers to accelerate their digital transformation easier, faster and at scale and offers cloud-based SaaS solutions, powered by Amazon Web Services (AWS).

Learn more about CP&R Traceability and Lifecycle Intelligence here.

Start accelerating your business' digital transformation with Siemens Xcelerator here.

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Siemens Digital Industries Software helps organizations of all sizes digitally transform using software, hardware and services from the Siemens Xcelerator business platform. Siemens' software and the comprehensive digital twin enable companies to optimize their design, engineering and manufacturing processes to turn today's ideas into the sustainable products of the future. From chips to entire systems, from product to process, across all industries, Siemens Digital Industries Software – Accelerating transformation.

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