DIGITAL INDUSTRIES SOFTWARE

Digital and sustainable Consumer Products and Retail supply chain

IT solutions for environmentally friendly logistics

Executive summary

As consumer demand for environmentally friendly products grows, Consumer Products and Retail (CP&R) companies must focus on ensuring the sustainability of their products and processes. To do this, they must harness the vast amount of data available to provide the infrastructure for lean processes and supply chains. These additional processes will, in turn, enable companies to boost transparency in processes and ultimately improve the efficiency and sustainability of their operations.

As part of the Siemens Xcelerator open digital business platform, Siemens Digital Logistics developed an incremental approach to smart, integrated supply chain and logistics management. By implementing advanced technologies, CP&R companies can obtain real-time data directly from the source to boost end-to-end visibility and digitalize their processes and supply chain. A smart control tower solution, used in conjunction with a comprehensive digital twin can be used to simulate functions to optimize operations and meet environmental targets. Moreover, continuous synchronization with external partners helps companies have full transparency and control over their operations and across their entire supply chain. That's what makes it possible to measure achievements against sustainability goals end to end and become a partner of choice for future generations.

This white paper is intended to help you on your journey to more sustainable operations, through digitalization.

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Consumer Products and Retail supply chains need resilience against disruptions

As consumer loyalties shift, and customers demand more merchandise options and bespoke goods, it is vital for manufacturers to understand how their products perform in the market and keep accurate data, including information on the raw materials and the manufacturing equipment used to produce the final product. Furthermore, should there be an issue with any product, like contamination or failure, that leads to recall, brands need to know every product's journey in detail — the key to gaining this knowledge to accelerate digital transformation.

More sustainability through digitalization
In this world, data provides the infrastructure for smart supply chains and the collaboration between human beings and machines. Such infrastructures are smart only when they go beyond satisfying customer needs to meet increasingly strict environmental goals. Lawmakers are not the only ones demanding stricter sustainability requirements. Port authorities are charging higher demurrage for ships that darken the skies with the emissions from the heavy fuel oils they burn. Consumers are punishing businesses that act irresponsibly. Stock prices erode when environmental scandals come to light.

Logistics strategies that prevent unnecessary trips and enable smart forms of collaboration in global production and shipping processes play a major role in protecting the world against environmental hazards. And manufacturers and retailers increasingly expect this from their logistics service providers. The Green Deal sets a clear goal: to cut net greenhouse gas emissions in the European Union to zero by 2050, making the continent climate neutral.

Whether it's about measuring environmental impact or optimizing transport networks: Many shippers are already demand that their logistics service providers adopt verifiable climate-friendly strategies to reduce CO_2 emissions. They also expect the more efficient use of resources to yield cost savings.

All this depends on digitally integrated operations and supply chains, which make it possible to consolidate and share cross-enterprise data for an entirely new level of transparency across ordering and shipping processes. Making better use of transport capacities, achieving just the right interplay of the various modes of transport, using human and financial resources efficiently, automating workflows: all this works like a charm if the supply chain is interlinked digitally with data.

The introduction of the Internet of Things (IoT) and other modern IT tools of the digital era makes it much easier to achieve the essential task of logistics: delivering the right volume of goods of the right quality at the right time to the right place.

The trend of "green logistics" as a successful business model is no longer in question. Many CP&R companies are investing in sustainability initiatives. Alliance Shippers, for example, has significantly reduced its carbon footprint by adding EverGreen refrigeration units to its fleet that are California Air Resources Board (CARB) compliant for the lifecycle of the unit. Another example is CT Logistics that has invested in software that helps shippers drive energy efficiency through supply chain routing analysis technologies to facilitate greener transportation mode selections for shipping.[1]

In a nutshell, a digital logistics network offers many opportunities for green logistics, by running fewer empty trucks, making warehouses more energy efficient and finding reusable solutions. So, let's take the first step.

Digital transformation of **logistics and strategies for sustainability**

The digital revolution has made IT omnipresent and it provides the solution to the long-held problem for most CP&R companies of gaining the required visibility into the performance of products, production and the entire supply chain. It offers companies the visibility and intelligence that keep the business running smoothly and enable new opportunities and business models.

Intelligent logistics

Sensors will eventually form docking stations, creating an environment for data sharing between humans and machines or between people and load carriers. In a digitalized process, the device tells the forwarder when the product will be manufactured and ready for pickup. The pallet calls in its location. The container reports how full it is, and the truck lets you know how much cargo space it has.

Such automated workflows will play a crucial role in the Internet of Things. They will allow CP&R professionals to obtain data directly from the source to eliminate manufacturing delays. Incorporating this information into the logistical procedure will produce inherently higher-quality data. Algorithms facilitate the optimization of extant capacities, the anticipation of change, and response flexibility.

Integrating sensors and their data with intercommunicating systems enables the detailed monitoring, control, and optimization of the supply chain and its processes. Companies can also leverage connected devices to gain real-time consumer feedback to understand product performance better. Future mobile applications will also aid in capturing and processing data at the point of origin. Using a mobile application, a procedure that once required several days are completable in mere minutes or even seconds.

What does this mean for the carbon footprint of CP&R manufacturers and their supply chains? Distances are shrinking as unnecessary deadheading is eliminated across the board. The capacity of existing logistics systems is better utilized. Green modes of transport like trains and barges can be more easily integrated into the supply chain.

End-to-end visibility

What this requires is supply chain transparency: insights into the origin and the flow of goods and inventory levels facilitate planning and minimize risks. But this is only advantageous if the focus extends beyond the partner immediately before and after you in the supply chain, the broader the view of operations and supply chain, the greater the transparency. In turn, this provides greater certainty for management when making operational and strategic decisions.

When companies can connect all enterprise systems to the IoT, information is made available early on and planning and simulation tools are deployed, it becomes possible to make decisions faster and to optimize supplier capacities. It's also easier to identify and make use of the potential for consolidation and bundling.

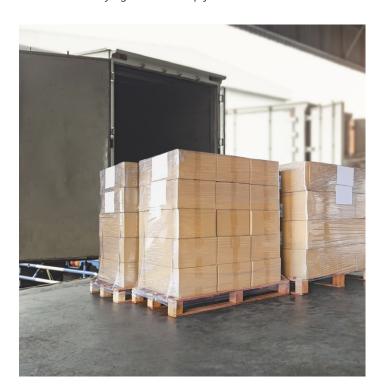# The role of digital platform solutions in sustainable logistics

Today's digital logistics platforms provide all the tools and features needed to digitalize the CP&R supply chain. They integrate sites, suppliers, and service providers. They function as control towers, keeping an eye on each step of the process and enabling precision planning, simulation, and optimization of supply chains based on validated data. An omnipresent cloud-based IT solution paves the way perfectly to collect, analyze and show data across all systems and implement leaner and greener logistics concepts. By centralizing data, CP&R companies can offer their customers a clear view of a product's journey, and green credentials, to give them more faith in the supply chain and increase brand loyalty.

Green and secure

An end-to-end IT solution yields many benefits. The centralized server structure of the cloud-based logistics platform replaces countless local servers, for example. Under this model, customers share infrastructure rather than maintaining their servers. This procedure cuts down on standalone in-house solutions. It enhances the security of the electronic processes: Data centers have multiple layers of protection, so even if one server crashes, the systems themselves do not. Private companies could only go to such lengths to protect servers and data from outside influences. Today's green IT is simply more secure.

Smart control tower solutions also turn CP&R supply chain players into partners. Seamless, end-to-end collaboration can be achieved by connecting all disciplines and processes to a single source of up-to-date information. Such collaboration in networks creates synergies that can be used to lower transport and inventory costs and reduce safety stocks. Customizable software modules and simulation functions help to optimize operations across the board. Were environmental targets achieved? Were processes streamlined? How are the current market trends changing? Data-driven supply chain analytics yields immediate results.

Those seeking even greater long-term sustainability in logistics can go one step further. The digital twin gives today's CP&R professionals an intelligent simulation and consulting model that runs through possible scenarios from start to finish accurate data. The digital twin combines the operational and strategic decision-making levels as the virtual replication of the actual network and its component processes. Using data from simulations and analyses can help companies predict problems and solve them before they happen to minimize disruptions and for the development and ongoing optimization of green logistics strategies.

Costumer success:
Global supply chain management at
Leder & Schuh

As Leder & Schuh expanded internationally, the company realized the need to simplify communication and link all service provider partners to a single network with a supply chain management system. The company needed to be able to exchange order data with suppliers and enable company growth without additional logistics costs. They were able to create a global supply chain by implementing AX4 to optimize its order and transport processes, while meeting sustainability commitments.

The cloud-based logistics platform enables Leder & Schuh to integrate their logistics service providers into the data flow early. This technology makes planning pickups, improving transport consolidation efforts, and reducing carbon footprint possible. AX4 connects to Leder & Schuh's SAP system to transmit and receive order data. This data is then forwarded to the supplier, who confirms orders and creates delivery notes. AX4's control tower feature means that the issue can be easily identified and fixed should there be any discrepancy in the supply chain.

Success
AX4 manages hundreds of thousands of transactions per year. Through the platform Leder & Schuh has improved visibility and communication across its 500 suppliers, 10 logistics service providers, 300 retails sites and 8 distribution centers. The company can now supply its retail stores faster and reduce transport costs and environmental impact by consolidating container capacity.

Siemens Digital Logistics empowers smart value chains.

Learn more about this success story here.

Green logistics:
Transparency is key in the Consumer Products and Retail industry

A critical factor in the efficiency of transport is the utilization of capacities. Every bit of empty air in the cargo space costs money, and every kilometer that a truck runs empty harms the environment doubly. That's why the goal of efficient logistics is to consolidate shipments. But for this to work, you need a 360-degree view of sites, orders, shipping volumes, and routes.

Creating transport synergies

In a CP&R supply chain, which links various providers into a single powerful chain of processes, this requires utmost transparency. That alone makes it possible to proactively plan and execute transports.

Transparency is essential in a CP&R supply chain, which connects multiple providers into a single robust chain of processes. That alone allows for proactive transportation planning and execution. Platform solutions deliver this kind of transparency. For example, the logistics company assigned to pickup can see transport requests early on and consolidate them into orders. The platform gives carriers advance information on the volumes awaiting pickup, so they can combine individual trips into a single run instead of transporting the orders individually. This is a big win for the environment. This also makes it possible to immediately identify partial loads from two nearby locations and consolidate them into a single shipment, avoiding the need for deadhead runs. In a nutshell: greater visibility of transport needs makes it possible to optimize planning as much as possible, cutting emissions and saving transport costs.

Knowing that a supplier's shipment will be available one day earlier than the planned pickup date, you can organize the transport more efficiently. It might be possible to combine an additional stop at the supplier in question with another run, for example, eliminating the need for a further trip to the same supplier the next day.

Daily deliveries to a customer are only sometimes necessary, for example. Changing the supplier's batch size may replace daily pickups with runs every other day. Consolidating consignments creates synergies and lessens environmental impact without the risk of underserving the customer or delaying shipments.

Optimization opportunities such as this apply to shipping container capacities: A logistics provider involved in the procurement process integrated into the data flow early on can plan pickups better and leverage container consolidation effects. This significantly increases container fill levels and eliminates less-than-container loads.

Data and the insights it yields can help you better utilize capacities in all areas of transport. Having a detailed knowledge of the available cargo capacities on board a truck and awareness of the pending shipments creates new opportunities for the smart, environmentally friendly consolidation of partial loads.

Reducing special transports

Special transports generate additional costs and CO_2 emissions. In most cases, both are avoidable. Businesses report that merely focusing on a particular vehicle leads to significant savings. This kind of transparency moves decision-makers to become more aware of financial and environmental costs.

Features such as supply chain event management let you recognize early on whether shipments are expected to deviate from their normal flow. Cloud-based control tower solutions are constantly checking the scheduled shipping process against circumstances on the ground, so you can respond in time if things start to go astray. This eliminates the need for costly, carbon-intensive special transports.

Improving transport control

On-time delivery depends on having the big picture of all the factors that must be controlled for reliable transport management. This requires a lot of information that can be accessed at any time. Digital logistics platforms enable collaboration by merging data from various sources.

Besides what users input manually through the web app or mobile devices, this data comes mostly from customer systems such as ERP or WMS linked to the platform via EDI. Added to the mix is valuable real-time data that can be drawn from third-party systems and data providers and used for supply chain management. This information makes it possible to continuously fine-tune the estimated time of arrival (ETA) and thereby optimize transportation.

Telematics systems provide another key source of data used in transport management to locate individual trucks, monitor traffic flows, and recommend the best routes. The information gained from this ensures greater resource efficiency. ETAs are permanently recalculated and traffic jams can be avoided.

Real-time visibility and the continuous synchronization of all shipment-related data parameters also take the sting out of unforeseen events: It's even possible to identify and respond early to potential supply chain risk factors and disruptions such as extreme weather, traffic impediments, strikes, and policy changes. Will there be any bottlenecks in either production or shipping? Have the goods gone missing? Any factor that might lead to delays or unnecessary transports, or even cause a complete breakdown, is considered.

Supporting combined transport

Combined transport is good for the environment on many levels. Anytime you can remove goods from the road for part of their journey and put them on the rail, you significantly reduce the burden on traffic infrastructure and your CO_2 emissions. But combining various modes of transport also presents a challenge.

That's because combined transport requires the integration of various players and transfer points into the supply chain, and this makes it complicated. Also, moving to another mode of transport used to disrupt supply chain visibility. This loss of control provided a disincentive to using more environmentally friendly modes such as rail.

Digital control tower solutions make combined transport more attractive by enabling easy, end-to-end integration of various modes of transport into a single process and maintaining an unbroken flow of information during transitions from one mode to the other. The customer benefits through end-to-end visibility from start to finish – the simple, successful way to combine road and rail.

Avoiding congestion at logistics hubs

Large logistics hubs such as ports, chemical plants, and other high-traffic transfer points or industrial facilities are prone to congestion, with entry points turning into bottlenecks at peak times. The more congested these points become, the more the traffic backs up. The problem often stems from the inability to plan inbound and outbound transports at these sensitive infrastructure nodes.

Delays are both the cause and symptom of this situation. That's because every truck that arrives late at the gate upsets the planning schedule, creating a ripple effect down the supply chain. The environment suffers as well, since every traffic jam is a source of noise, exhaust, and annoyance to nearby residents.

Modular software components such as an appointment manager help logistics platforms untangle this situation by organizing transport data and managing time slots for pickups and deliveries. Will a truck arrive on time, or will unforeseen events lead to delays? Visibility of a vehicle's current location, combined with data on the route and other factors, makes it possible to optimize inbound processes and avoid congestion both on the road and at the loading dock.

Such end-to-end visibility empowers CP&R businesses to plan, simulate and optimize their logistics processes. It is also the key to improving manufacturing operations while meeting ambitious sustainability goals.

Moving toward paperless logistics

Today's platform solutions digitalize logistics and supply chain management for a completely paperless process. From the initial input of shipping data to time slot management, to invoicing: tasks that used to consume valuable time and resources are now automated and largely standardized.

Calling in or identifying shipping containers, issuing driving orders to transport vehicles, and generating waybills and cargo lists are digitally initiated, displayed, and documented. There is no need for paper, faxes, or phone calls for the companies involved to access, share, and contribute to this data and documentation.

And one final benefit of the new world of digital logistics: software applications and modules on digital logistics platforms can be individually configured to accommodate the demand at any given time. Solutions like this are sustainable from day one: Since customer wishes can be converted directly into IT logic during the meeting, there's little need any more to print out functional specifications on paper.

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's digital transformation with Siemens Xcelerator here.

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For additional numbers, click here.

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.

1. Food Logistics: "2021 Top Green Providers: Sustainability Still Ranks Supreme During a Year of Disruptions"

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