IT SOLUTIONS FOR ENVIRONMENTALLY FRIENDLY LOGISTICS

Digital and Sustainable

SIEMENS

Content

Foreword

An email doesn't make any noise. It doesn't take up any space or cause any congestion. And yet it transports something that, in our analog prehistory, required us to cut down trees, fire up paper mills, operate machinery, and employ postal workers: information. We are sending and receiving some 306.4 billion emails per day in 2020, according to estimates by Statista, an online statistics portal.

The ability to send electronic mail with the click of a mouse presumably did more than just lighten the carbon footprint of our information transmission network. Today, we can communicate with the entire world – with as many recipients as we like – at the speed of light. Email has become essential, and not just in the day-to-day business of logistics.

Looking back, it's hard to believe the tempo with which the electrification of mail changed how we communicate. And email is just a small part of the digital revolution. The consequences for workflows and business processes in the world of logistics are much more profound.

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 who expect polluters to pay. 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 demanding 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 a digitally integrated supply chain. That's what makes 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 of this works like a charm if the supply chain is interlinked digitally with data.

The result, almost inevitably, is greener logistics. The modern IT tools of the digital era make 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. Corporate giants such as Daimler and Bosch are investing in fuel cell trucks powered by hydrogen. Liquefied natural gas offers a clean alternative for ocean freight. And even cargo bikes are making a comeback in urban mobility strategies.

In a nutshell, a digital logistics network offers many opportunities for green logistics: By running fewer empty trucks. By making warehouses more energy-efficient. By finding reusable solutions. So let's take the first step. Today, it's nearly as simple as sending an email.

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

The digital revolution has made IT omnipresent. Many aspects of our lives are becoming digital almost as a matter of course. Booking flights and hotels, taking photos, listening to music, hailing a cab: Tapping into this new world of service and convenience usually requires nothing more than a smartphone and an app – which is usually free. What matters is the access to innovative applications and solutions. A platform that can tap into existing data and be customized to the individual: It's no different in logistics.

Intelligent logistics

Sensors will eventually form the docking stations where data can be shared between man and machine or between people and load carriers. In a digitized process, the machine 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.

Automated workflows like this will play a key role in the internet of things. They'll make it possible for logistics professionals to obtain data directly from the source and in real time. Plugging this data directly into the logistical process will automatically produce a higher quality of data. Algorithms make it easier to optimize existing capacities, plan proactively, and respond flexibly.

The communication of systems with one another and integration of sensors and their data enables the detailed monitoring, control, and optimization of the supply chain and its processes. In the future, mobile apps will also help ensure that data is captured and processed at the point of origin. A process that once spanned several days can now be reduced to a few minutes or even seconds using a mobile app.

What does this mean for the carbon footprint of 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 visibility: Visibility of the flow of goods and inventory levels facilitates planning and minimizes risks. But the focus needs to extend beyond the partner immediately before and after you in the supply chain. The broader the view of the supply chain, the greater the transparency. And the greater the certainty with which management makes operational and strategic decisions. When information is made available early on and planning and simulation tools are deployed, it becomes possible to optimize supplier capacities. It's also easier to identify and make use of the potential for consolidation and bundling.

Role of digital platform solutions in
sustainable logistics

Today's digital logistics platforms provide all the tools and features needed to digitize the 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 on the basis of validated data. An omnipresent IT solution paves the way perfectly for the implementation of leaner and greener logistics concepts.

Green and secure

This 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 own servers. This not only cuts down on standalone in-house solutions, it also enhances the security of the electronic processes: Data centers have multiple layers of security, so even if one server crashes, the systems themselves do not. Almost no private company would be able to 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 supply chain players into partners. Seamless, end-to-end 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 logistics across the board. Were environmental targets achieved? Were processes streamlined? 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 logistics professionals an intelligent simulation and consulting model that runs through possible scenarios from start to finish using real data. As the virtual clone of the real network and its component processes, the digital twin combines the operational and strategic decision-making levels. This provides the foundation for the development and ongoing optimization of green logistics strategies.

Green Logistics:
transparency is key

Creating transport synergies

A critical factor in the efficiency of transports 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.

In a 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.

Platform solutions deliver this kind of transparency. The logistics company assigned with pickup, for example, 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 one by one. 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 in the process.

If you know 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 another trip to the same supplier the next day.

Daily "milk runs" to a customer are not always necessary, for example. A change in the supplier's batch size may make it possible to replace daily pickups with runs every other day. Consolidating consignments creates synergies and lessens environmental impact without any risk of underserving the customer or delaying shipments.

Optimization opportunities such as this can also be applied to how shipping container capacities are utilized: A logistics provider involved in the procurement process who is 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 detailed knowledge of the available cargo capacities on board a truck together with 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 can be avoided. Businesses report that merely shining a light on special transports already leads to significant savings. This kind of transparency moves decision-makers to become more aware of costs – both financial and environmental.

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 the transport.

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, traffic jams can be avoided.

Real-time visibility and the continuous synchronization of all shipment-related data parameters also takes the sting out of unforeseen events: It's even possible to identify and respond early to potential supply chain risk factors such as (extreme) weather, traffic impediments, strikes, and (trade) 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 taken into account.

Supporting combined transport

Combined transport is good for the environment on many levels, because anytime you can remove goods from the road for part of their journey and put them on rail, you significantly reduce both the burden on traffic infrastructure and your own 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.

Moving toward paperless logistics

Today's platform solutions digitize 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.

Whether you're calling in or identifying shipping containers, issuing driving orders to transport vehicles, or generating waybills or loading lists: Everything is initiated, displayed, and documented digitally. And all the companies involved can access, share, and add to this data and documentation. No paper, no faxes, no phone calls. The platform also provides electronic versions of all the documents previously available in hard copy, such as freight and customs documents.

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. This is generally true regardless of the solution provider. 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.