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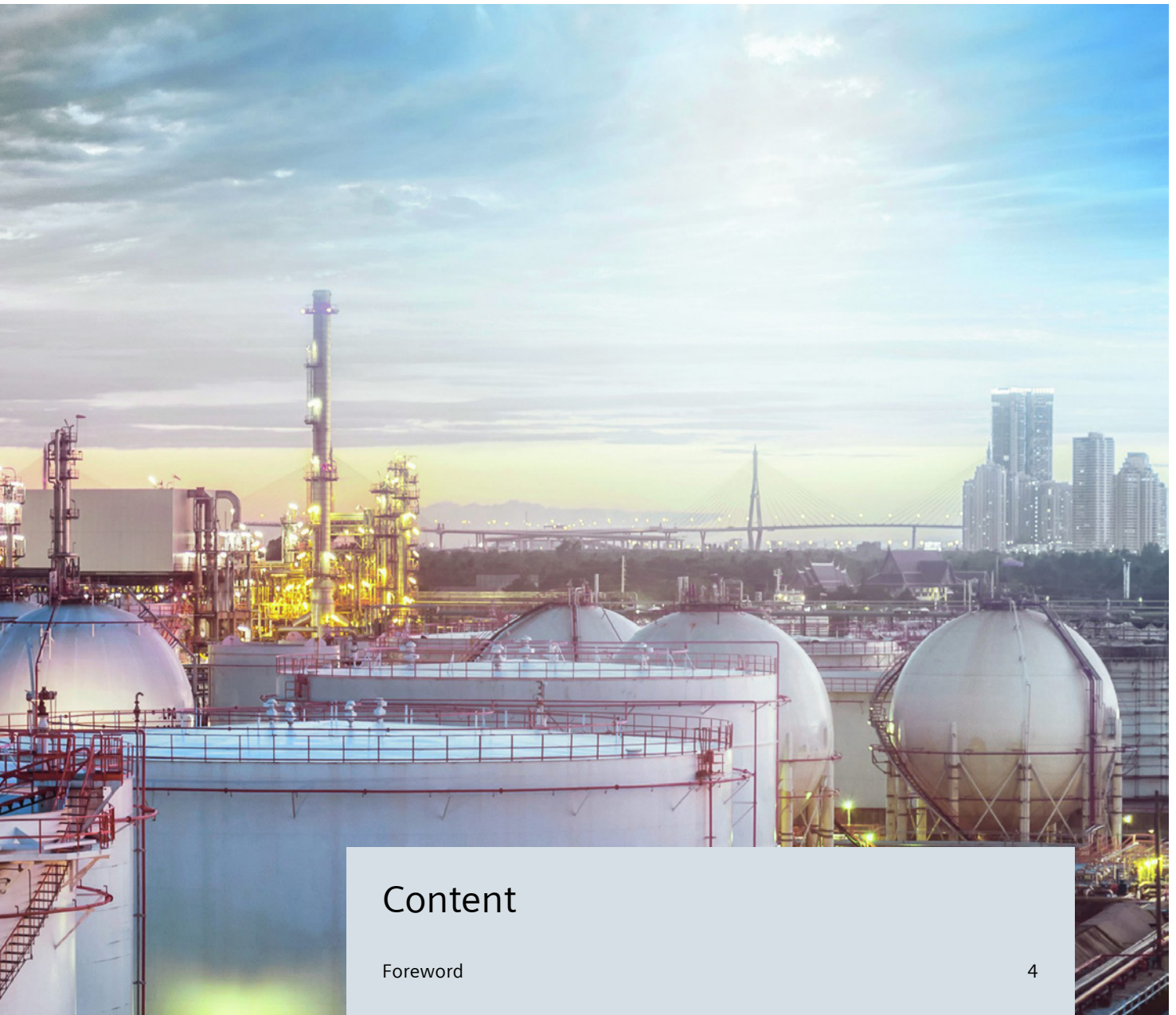


Chemical Logistics

Digital connections and
positive reactions

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Foreword

Digitalization opens the door to a new age for the chemical industry. It paves the way for companies in the industry from material suppliers to solution and service providers. It is the driving force behind development that creates a new level of efficiency and transparency for the industry's sensitive supply chains.

What does it take to ensure a highly effective combination of logistics services and solutions in Chemistry 4.0? How can the complex elements of the supply chain and the associated management tasks be put into a simple formula? Which digital applications and functions can be used to optimize logistics and intralogistics in supply processes?

The time to take advantage of the opportunities and possibilities of digitalization has never been more favorable. IT instruments such as the Digital Twin create a new quality of planning security. Cloud-based IT platforms enable fast and easy networking. Control Towers provide the optimal overview. Comprehensive software and consulting services provide answers to every application.

Our white paper shows you a wide range of possibilities that arise from the combination of efficient logistics and modern IT in the chemical industry.



Requirements for digital supply chain management

Digitalization connects worlds. It enables the planning, management and control of production and supply flows in global networks across company and system boundaries. The cost reduction potential in the supply chain is enormous with logistics networked in this way. This is because digitalization creates standards by means of modern IT solutions, which improve communication between the parties involved and allow delivery processes to be documented and automated from the order call-off from the supplier to delivery to the customer.

The associated requirements for an IT system are comprehensive:

- **The company's central logistics** requires central overviews, continuous transparency across all locations and clear measurability of performance as well as meaningful reports. In addition, standardized processes across locations are desirable over many individual solutions.

- **The purchasing department** needs solutions that can be rolled out to new freight forwarders quickly and easily, as well as an up-to-date database that provides all the necessary information on shipment structures for tenders at the push of a button.
- **The individual locations** require simple and automated communication and order processing with the carriers, i.e. fast and cost-effective integration of new freight forwarders, automatic exchange of all necessary data, quick information in case of problems and transparency about the course of the shipment. It is also a system that can flexibly map special requirements of the locations.
- **Production** needs information about the delivery of raw materials and the respective containers at an early stage.
- **The customer service center** needs easily accessible and timely information on shipment status and proactive information in case of problems.
- **IT** requires a system that can be implemented cost-effectively, be easily integrated into the existing system landscape and is easy to maintain.

In addition, external partners also place their demands on companies:

- **The company's customers** expect transparency and an easy way to retrieve their shipment information. You want a modern, innovative range of functions.
- **Freight forwarders** need early information about planned shipments and an easy way for drivers to report back status information.
- **Suppliers** need an early order or demand notification from the chemical producer in order to be able to plan their own capacities in production and, if necessary, dispatch.

This means: In order to successfully meet the complex, extremely diverse demands on IT, data and information must be bundled centrally. On the other hand, users must also have access to different options for managing and controlling the supply chain in different application areas.



Whether park or factory: Efficient supply control for chemical sites

Chemical parks and large production sites are often logistic hot spots close to the city and have their own infrastructure. The volume of transport at these locations is high, which is a particular burden on road traffic: Traffic jams can occur around the chemical site, which can have a significant impact on supply processes in the plants. However, the traffic situation within the site is also complex: Trucks must be parked in the right place, routed to the right unloading or loading stations or weighed.

It is therefore important for chemical sites to be able to coordinate all transport and logistics processes at the site. On the one hand, this requires a high degree of transparency and, on the other hand, a cross-site IT solution that avoids traffic jams and at the same time enables the best possible supply and disposal of the companies in a chemical park.

Only a central IT solution that comprehensively maps the processes can fulfil this management task. It creates the possibility of continuous transport control – inbound and outbound.

Collect transport data centrally and make it available

Such a central IT solution is used to transmit transport data in the inflow from the shippers and freight forwarders. These data already contain all the important information for the chemical site, including details of the type of shipment, volume and weight, material and batch, and the expected arrival date. Optionally, prioritization indicators for particularly urgent materials can be added.

To expedite the transfer of data for the parties involved, the IT solution offers flexible connection options: Access is easy and uncomplicated via web or individual interface. For chemical sites, the platform offers a central view of all incoming transports – across all freight forwarders and allows access with just one click.

Receiving tracking information at any time

In the same way, freight forwarders can transmit their tracking data for their shipments. Previously roughly calculated arrival dates are becoming more and more precise as time goes on. The logistics managers at the chemical site call up the transport status at any time at the push of a button and plan the arrival precisely and reliably. Traffic jams due to unscheduled deliveries are avoided.

The integration of telematics data also allows making more precise statements about the current position of a truck. In combination with current regional traffic data and potential disruptions, alternative routes can be calculated and arrival dates more accurately predicted. The result: The chemical

park, production plant, freight forwarder and driver know at a glance whether planned and estimated arrival times match or delays are to be expected. The system monitors, checks and documents previously calculated deadlines at runtime and automatically sounds an alarm in case of deviations. Intelligent truck access control thus increases the efficiency of chemical parks and production sites, as capacities on the site can be used efficiently and traffic jams are avoided.

Optimal use of resources and capacities

An efficient time window control system is necessary to ensure that arriving at the chemical site and driving to the appropriate loading points does not become a bottleneck. Thus, transports can be controlled already in the inflow in such a way that congestion and unnecessary waiting times can be avoided. By linking time windows, information on the current transport progress and details of the shipment, it is possible to dynamically determine the duration of occupancy of a loading point.

On arrival at the chemical site, the driver can carry out a self-check-in based on the information provided by the transport notification and will be routed to the loading point designated for him. This means that all transport processes on the factory premises are also optimized with IT support. Modern solutions include all traffic movements in the control process and provide a precise overview of the entrance and exit locks, the driveways and parking zones as well as the loading and unloading zones.

Precise time window control ensures better coordination and enables smooth handling of processes and goods at the loading point and improved utilization of resources. In addition, the operator of the chemical park or production facility can deploy his employees in the incoming goods department more efficiently. Freight forwarders gain the advantage of not having to wait. Even order peaks are easier to manage thanks to greater transparency and the joint exchange of information.



Intralogistics and production

Logistics does not start with goods issue. For supply chains to work, internal processes in the plant must also be optimally timed and have a minimum level of information quality. The challenges for intralogistics in the chemical industry are high: The transport of raw materials and intermediate products to individual production plants, the control of big packs, tank trucks and drums – in many cases, materials and operating resources are neither managed in the IT system nor stored according to the system. Today, the control is still largely done on paper, manually, partly via barcode recording. Similarly, sampling is still done manually.

Chemistry 4.0? To what extent do everyday production and the goal of extensive networking and automation of logistics processes diverge? Who can provide customers with ad hoc information on whether production can deliver the required quantities in the right quality at the desired time? What is already running automatically perfectly today?

The orchestration of supply chain management, intralogistics processes and production control is the key to a continuous chemical value chain. The Internet of Things (IoT) makes this possible.

Networked by modern IoT platforms, which collect, analyse and visualize machine data, all procurement and transport-related data and processes are mapped. By linking production and transport data, the entire supply and process chain becomes digital. Every material in delivery can be immediately assigned to individual production orders and associated bills of material on a batch basis. This ensures reliable documentation and clear traceability. This is particularly important if, for example, there are short-term changes in the source of supply of a raw material due to deviations in the supply chain.

The physical transport of the materials is also networked. Containers and means of transport equipped with intelligent sensors or tags report their position and status to the central IoT platform, which controls the entire logistics network. The search for stored materials is no longer necessary. Quality inspection takes place automatically. The path of individual batches is documented completely, defective batches can be traced back exactly at the push of a button, and all obligations of proof are fulfilled.

Digitalization creates what chemistry can do: Making connections – and eliciting a positive reaction from customers.



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Planning and simulation of the logistics network



Digitalization allows logistics processes to be simulated on the basis of existing data and information. Digital Twin, which is well known from the production of industrial parts and systems, is also finding its way into logistics. With the help of this consulting model, supply chains can be virtually simulated and evaluated in terms of function and efficiency well in advance of the operational network implementation.

Real planning scenarios can include, for example, the networking of locations within a production network in the context of multi-level production. How can the transport of raw materials and intermediate products between the individual sites be optimized? Are the suppliers optimally assigned to the plants? Is the delivery frequency correct?

Inventories in continental or regional distribution warehouses can also be perfectly planned. What quantities and

products must be kept in stock at individual plants in order to reliably ensure supplies to customers worldwide? What is the ideal location for a new distribution warehouse, both strategically and tactically? How can the distribution of ready-to-sell goods to retail partners be optimized?

Digitalization makes it possible to test the performance of delivery and site networks. This works down to the last detail. The conditions for the transport of hazardous substances or temperature-sensitive goods can also be included in the simulation of the logistics process.

From shipment creation to delivery

The cloud is the center of modern logistics. A marketplace for digital services and solutions, where all data and information relevant to supply chain management come together. Cloud-based logistics platforms are now the linchpin of highly efficient transport networks. This is because they provide the chemical producer with a central solution for communication with various forwarders and transport service providers. The information flow in shipping management is mapped consistently and the solution can be flexibly adapted to the various requirements of the locations. It replaces countless individual solutions with a single standard.

Necessary documents such as loading lists, consignment documents or barcode labels can be generated and printed at the push of a button via central platforms. Dangerous goods information on the shipping order or loading list can also be taken into account. The shipments are finally forwarded to the various freight forwarders via stored routing specifications.

But cloud-based logistics platforms can do much more: They are a kind of consolidation center for data; they make data readable for different forwarding programs and provide the best possible information for the next partner in the process chain. Whether automatic calculation of volume, loading meter or freight-obligatory weight based on stored material master data: With each service the cooperation between chemical producer and freight forwarders is optimally supported.

For logistics chains in the chemical industry, the Control Tower's wide range of functions plays an important role. Tracking, monitoring, documenting, evaluating: Sensor data for monitoring temperature, viscosity and aggregate states can be fed into the information process via the IT platform, as can data from innovative trackers that record vibrations, for example.



End-to-end visibility ex works – a conclusion

Digitalization creates a new level of efficiency and security for supply chains in the chemical industry. It makes cooperation in logistics networks easier. It integrates site and production requirements into the supply chain. It creates an end-to-end visibility ex works.

Cloud solutions form the framework for innovative control and monitoring functions in the digital world. For example, with simulation tools that enable a detailed assessment and testing of changed network constellations or production requirements. Or with Control Tower functions that ensure continuous tracking and documentation of the supply and service chain across continents and company boundaries.

The question is: How and where to start? How much digitalization makes sense in a concrete application? Can modern cloud solutions and software tools be integrated with existing in-house systems? At what point in the modernization process does digitalization start? Strategic advice and analysis are indispensable in this phase of decision making. After all, it is important to find the perfect solution from the wide range of options and applications.

As a result, digitalization leads to a significant increase in process and information quality in the logistics chain. The central availability of transport-relevant data makes it easier to make decisions. Transports can be optimized and better utilized over the entire route. Expensive wrong decisions are avoided, the administrative effort is reduced, and savings can be achieved at many points of the value chain.



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