EPG Ehrhardt Partner Group

EPG ColorCards™

FOR SUPPLY CHAIN EXECUTION CAPABILITIES



N° 1 – 2024



INTRODUCTION

THE SUPPLY CHAIN ENVIRONMENT IS CHANGING.

Of course, this is nothing new. The supply chain industry is constantly evolving, as it always has. It reacts to shifting global market forces, to geopolitical shocks, and — perhaps most impactful of all — to changing customer habits and demands.

It is an industry that must keep reinventing itself while still operating at full speed. It must respond faster to disruptions to make smarter decisions and create a more accurate plan. It must demonstrate deft agility and unbreakable resilience to meet the challenges of conflicts, new transport models, global pandemics and climate emergencies. And, it must do everything faster and more accurately than it did yesterday.

That is what "capable" looks like in today's supply chain. Anything less is likely to lead to failure. To harness the agility and resilience essential to today's supply chain planning and execution needs, an organization must rely on three key ingredients:

1. **The ingenuity and strategic application of its human resources.**
2. **Effective collaboration with its supply chain partners.**
3. **Technology, which enables the first two.**

Each ingredient in isolation will not be enough to make an organization "capable" — it needs all three, working together, to achieve shared objectives.

In short, all human and machine capital within the supply chain ecosystem must be fully connected with, and fully visible to, each other.

"Four of the top reasons cited as driving investments in emerging technologies are companies' needs to support new business models, improve process efficiency/ productivity, enhance decision making and improve supply chain resiliency/agility."[1]

Only one tool can generate the interconnectivity required to achieve such goals: software. Cutting-edge software technologies plan, predict, coordinate and manage workflows and processes throughout the entire supply chain journey. From source of manufacture across air, ocean and continent, to warehouses and distribution centers and assembly facilities. And then across rail or road networks to local hubs, and finally on to domestic and/or business addresses.

The software must do all this quickly, accurately and — crucially — with a customer-

[1]Dwight Klappich, Carly West, Simon Tunstall, Brian Schultz, Jose Reyes (October 2023): Predicts 2024: Supply Chain Technology

centric focus. Since the start of the 21st century, this necessity has given rise to an extensive global industry of software-based digital technologies and applications. These solutions have empowered the supply chain sector to step up to the enormous challenges posed by globalization, economic uncertainty, climate emergency — including sustainability and environmental, social and governance (ESG) reporting needs — and consumer demands driven by the e-commerce revolution.

Supply chain execution (SCE) is a discipline in itself, with assorted software solutions addressing multiple aspects of that discipline. They include warehouse management systems (WMS), transportation management systems (TMS), vehicle routing and scheduling (VRS), workforce management (WFM), contract and billing management systems (CnB), global trade management (GTM) and distributed order management (DOM). Utilizing these solutions makes supply chain organizations more agile, more automated and more connected. The fast-growing number and variety of applications available each year has accelerated their interest in seeking customized solutions that most closely match their specific requirements — both current and emerging.

In response to this interest in customized, enterprise-matched SCE solutions, Ehrhardt Partner Group (EPG) has developed the ColorCards concept. EPG ColorCards provide a comprehensive, holistic overview of the multifaceted capabilities of an SCE system, illustrating its inherent complexity in a clear, easy-to-understand format. It also serves as a guide, highlighting the diverse range of capabilities essential to today's SCE software suites. We are excited to introduce you to this comprehensive approach to categorizing and defining SCE capabilities.

Marco Ehrhardt *(Chairman EPG)*
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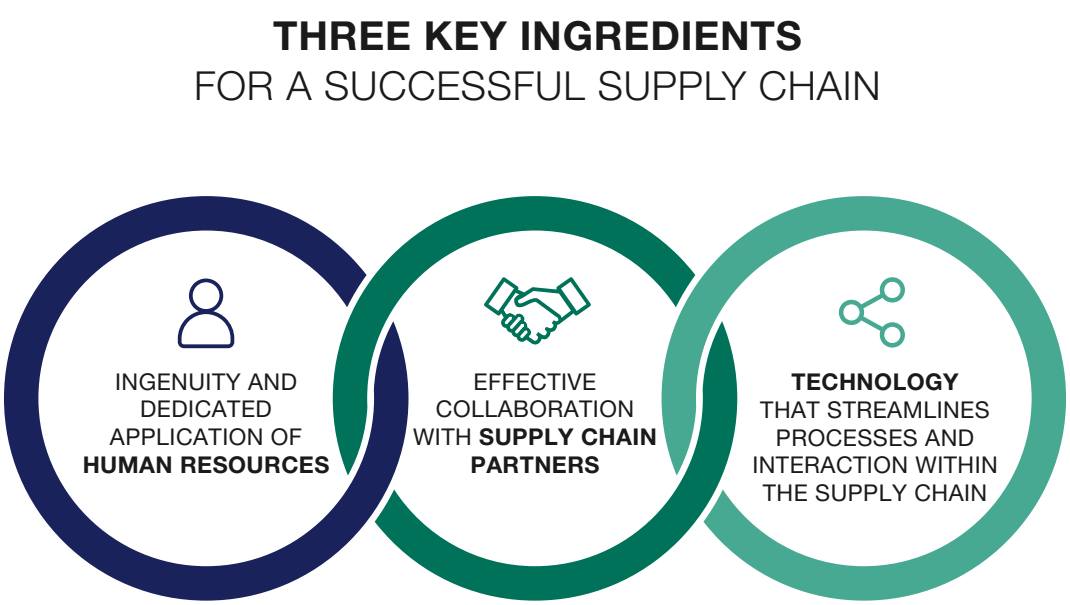


Figure 1: Key ingredients for a successful supply chain

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EPG COLORCARDS FOR SUPPLY CHAIN EXECUTION CAPABILITIES

Global supply chain execution (SCE) is by definition a sector crisscrossing all cultures, time zones and languages. It also increases the many potential ways in which miscommunication, misidentification or even very slight changes of emphasis can make a difference to the success or failure of a project.

In a global environment, companies — regardless of their location — might wish to harmonize processes and data by speaking an identical, standardized technical language both to and within the market.

Therefore, EPG ColorCards has two main objectives:

FIRST: It aims to establish a uniform standard for supply chain execution (SCE) capabilities, providing a standardized definition of each capability. This approach allows companies to communicate more effectively and streamline supply chain processes, and ensures that global companies can "speak" the same supply chain execution language, enhancing efficiency and collaboration.

SECOND: While SCE solution providers often focus on their product-based offerings, capability-based thinking with ColorCards emphasizes understanding these capabilities independently of the associated

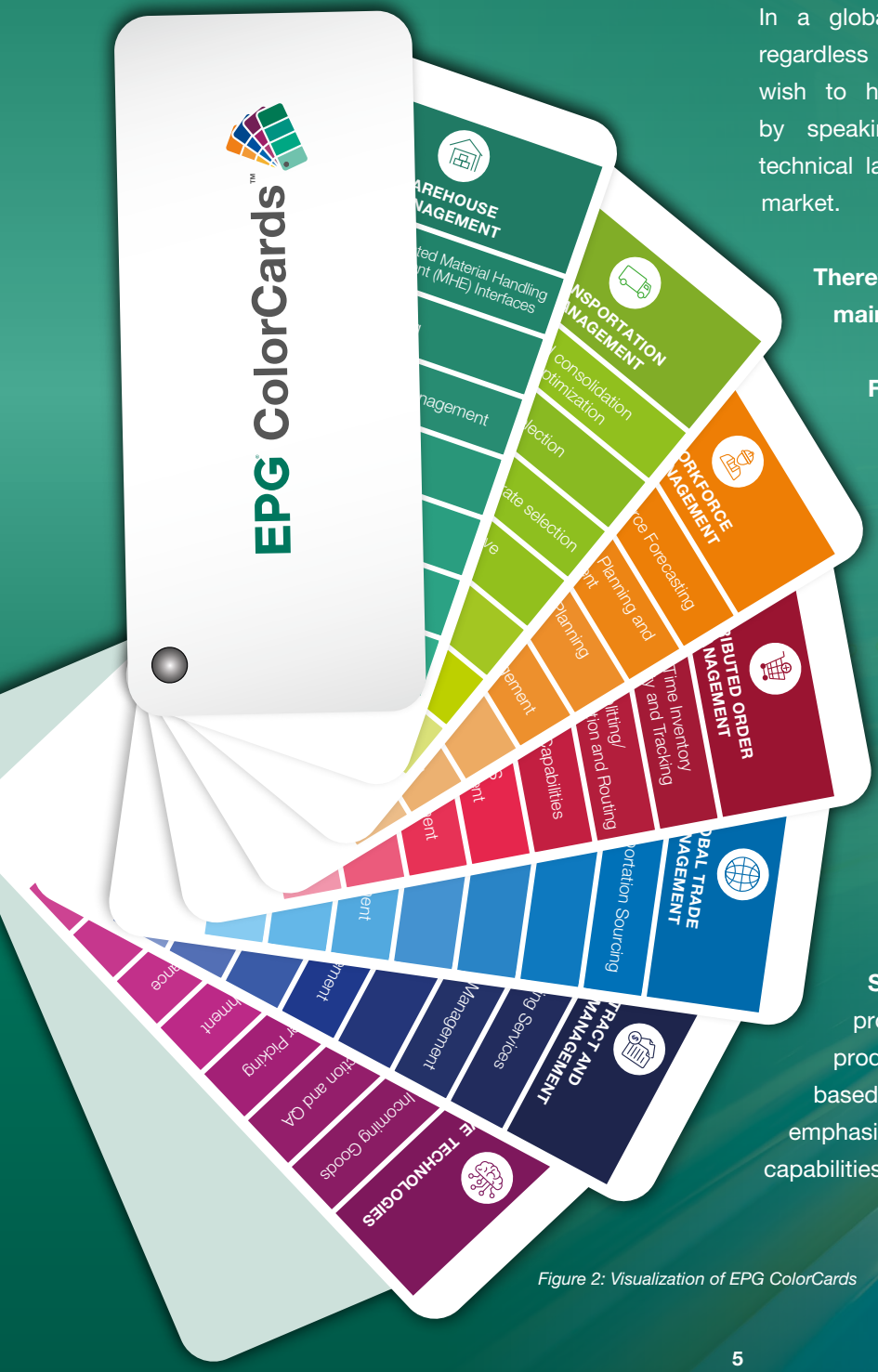


Figure 2: Visualization of EPG ColorCards

products, promoting a more holistic view. This approach provides the flexibility to combine different capabilities and create tailored solutions, moving away from the rigid product-focused mindset.

Currently, there is no simplified and comprehensive overview of the supply chain execution capabilities available on the market. This gap highlights the need for a consolidated resource that presents SCE capabilities in an easy-to-understand format to support informed and strategic decision-making in supply chain management. This flexibility fosters innovation and adaptability in designing solutions that precisely meet the unique needs of a supply chain.

EPG ColorCards takes its inspiration from the color-matching systems used in industries and decorative applications around the world, such as Pantone or in the paint section of a typical home improvement store. EPG ColorCards replicates such systems. By standardizing and defining SCE capabilities — and assigning a specific color to each — businesses and their partners can fully visualize, understand and articulate the scope of each capability and its relationship to the others within the supply chain ecosystem.

Utilizing this approach will improve communication and collaboration between different regions and locations, leading to increased efficiency and better supply chain outcomes.

By highlighting the supply chain as a whole — rather than focusing on each area separately — the interconnectivity of each individual area can be better understood. From order management to warehouse management to transportation management, this will allow companies to optimize their supply chain processes and further maximize their efficiency.

CAPABILITY-BASED THINKING

Today's supply chain execution (SCE) solutions have become much more modular. This structure allows supply chain managers (SCMs), information technology (IT) directors and chief information officers (CIOs) to customize their own applications based on their operations' unique needs.

Customization has therefore become a key requirement for the customers of SCE software vendors. It is no longer viable for providers to offer a monolothic product. Instead, individual versioning — paying only for the required capabilities and enabling more financial flexibility at the same time — has become the optimal means to ensuring greater agility and resilience, while bolstering the balance sheet and bottom line.

Capability-based thinking encourages companies to think forensically about their business needs, rather than in terms of available off-the-shelf products. EPG ColorCards facilitates that thinking because it acts as a template, enabling an organization to directly identify and configure available capabilities to match identified needs.

THE EPG COLORCARDS **CATEGORIES**

Within the comprehensive supply chain execution (SCE) landscape, six primary categories emerge. They form the structure of the EPG ColorCards, and include:

- **WAREHOUSE MANAGEMENT**
- **GLOBAL TRADE MANAGEMENT**
- **TRANSPORTATION MANAGEMENT**
- **WORKFORCE MANAGEMENT**
- **DISTRIBUTED ORDER MANAGEMENT**
- **CONTRACT AND BILLING MANAGEMENT**

Traditionally, workforce management and contract and billing management have been relegated to supporting roles, often integrated as modules within larger systems such as warehouse management systems (WMS) or transportation management systems (TMS), respectively.

However, practical experience reveals that domains like human resources (HR) and finance extend significantly beyond their conventional roles. Both permeate the entire supply chain as opposed to just specific logistics segments. The complexity across the supply chain sectors, coupled with escalating demands in areas such as workforce management, necessitates more comprehensive and sophisticated systems and capabilities.

Today's challenges include not only efficient employee scheduling, but also employee retention, engagement and involvement. These evolving demands highlight the necessity for HR to be on a par with systems like WMS or TMS. HR should not be seen merely as an adjunct to these systems but as an equal and integral component in the broader supply chain framework. This paradigm shift is essential to address increasing complexity and ensure a holistic, integrated approach to supply chain management.

In the finance sector within SCE, the scope of billing procedures and contractual agreements is extensive. These processes impact every segment of the supply chain, encompassing road, rail, sea and air transportation. Recognizing the interconnected nature of these financial operations is crucial. By adopting comprehensive finance systems that offer an overarching view of billing and contractual processes, organizations can better manage the supply chain as a unified entity.

Contract and billing systems provide distinct advantages over segmented solutions. They ensure integrated and efficient financial management across the entire supply chain. This combined approach not only brings consistency and reduces complexity but also boosts overall operational efficiency.

Moreover, practical experience has demonstrated that traditional finance and HR functionalities — when confined within the framework of an enterprise resource planning (ERP) system — often lack the necessary

focus on logistics and the broader scope of the supply chain.

This misalignment has led many companies to seek additional capabilities outside of their ERP systems. In an effort to bridge these gaps, organizations frequently resort to extensive custom modifications of their software or rely on auxiliary tools such as Excel.

This workaround approach, however, is not only inefficient but also underscores the need for more specialized and integrated systems. These systems should be designed with a deep understanding of the unique demands of supply chain and logistics management. This ensures that all aspects, including finance and HR, align seamlessly with the core objectives of the supply chain. The adoption of such tailored solutions is key to overcoming the limitations of traditional ERP systems, ensuring more streamlined, effective and cohesive management of the supply chain.



WAREHOUSE MANAGEMENT

Designed for a wide range of industries, a warehouse management system (WMS) is software designed to optimize warehouse operations, managing inventory, picking processes and tracking goods in real-time. It also automatically manages the use of all warehouse assets, including employees, warehouse technologies and materials handling solutions.



TRANSPORTATION MANAGEMENT

Transportation management is the planning, execution and optimization of the transportation process to ensure efficient shipment and delivery throughout the supply chain. It encompasses all modes of transport: road, rail, sea and air.



WORKFORCE MANAGEMENT

Workforce management ensures demand-oriented and efficient personnel planning across the supply chain (warehouse, road, rail, sea and air). With this software, companies can optimally allocate the employees and resources at their disposal.



DISTRIBUTED ORDER MANAGEMENT

Distributed order management (DOM) uses configurable, rules-based procedures to coordinate the fulfillment of customer orders. A DOM system helps companies optimize costs and efficiencies within their order fulfillment processes, while ensuring customer needs and priorities are met.[2]



GLOBAL TRADE MANAGEMENT

Global trade management supports the complex and unique logistical, regulatory and financial aspects of the import and export processes associated with international trade (for example, cross-border trade), often along multiple modes of transportation.[3]



CONTRACT AND BILLING MANAGEMENT

Contract and billing management controls supply chain finances while enhancing both sales and transparency. It enables services to be recorded along the supply chain, while simultaneously digitalizing and automating contract and billing management from node to node. Through smart contract management, these solutions transparently account for all relevant contractual terms, including invoicing and processing steps.



SUPPORTIVE TECHNOLOGIES

Beyond the core and extended capabilities of supply chain software applications, an increasing range of supportive technologies are enhancing the opportunity to make supply chain processes and operations more efficient. Notably, these innovations include AI-driven capabilities that augment existing functions or, for example, voice-enabled functions such as voice picking technologies in warehouses.

[2] Gartner Peer Insights (2023): Retail DOM Systems Reviews and Ratings: https://www.gartner.com/reviews/market/retail-distributed-order-management-systems
[3] Gartner Peer Insights (2023): Global Trade Management Software Reviews and Ratings: https://www.gartner.com/reviews/market/global-trade-management

WHAT ARE **CORE** AND **EXTENDED** SOFTWARE CAPABILITIES?

The list of capabilities across the supply chain is necessarily lengthy, given the breadth and depth of questions customers ask their logistics and transportation solution providers.

Where a capability exists, it is almost certainly in response to a past question asked by a customer, if not already identified by a software vendor as a future important need. Proactive awareness and anticipation of developing and future customer needs remain key drivers for the dizzying speed of technological innovation in supply chain software.

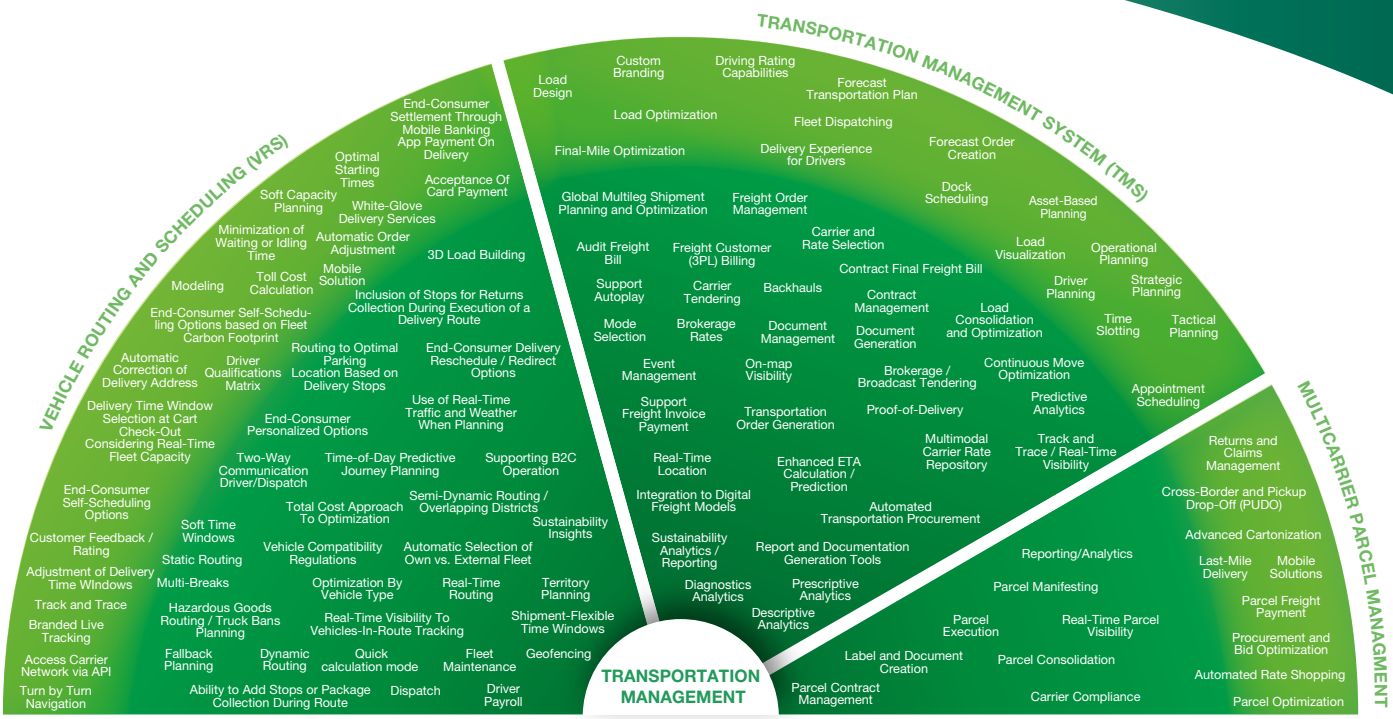
To enable potential users to better understand and filter the scope of each EPG ColorCards capabilities category, it makes sense to divide them between two separate but related groups: core and extended.

Using warehouse management and transportation management as examples within the supply chain spectrum, the radar graphic on the next page illustrates how core and extended capabilities might fit together to satisfy the specific needs of the supply chain organization. The capabilities within the darkest shades are core; the extended capabilities fall within the lighter shades.



CORE CAPABILITIES are those defined as essential aspects of the application. To gain full benefit from the application, a customer is likely to want all of these core capabilities included in their package of modules. They may reasonably expect all vendors to provide all such capabilities as part of their portfolio.

EXTENDED CAPABILITIES should be regarded as adjacent to core offerings but should not be seen as any less important. They may not be part of the core of a suite of modules, but for some customers more than others they will make a demonstrable, cost-effective difference to business efficiency. This depends upon the specific needs and priorities of each customer and their bespoke set of modules will reflect those needs.



EXTENDED — CORE — CORE — EXTENDED

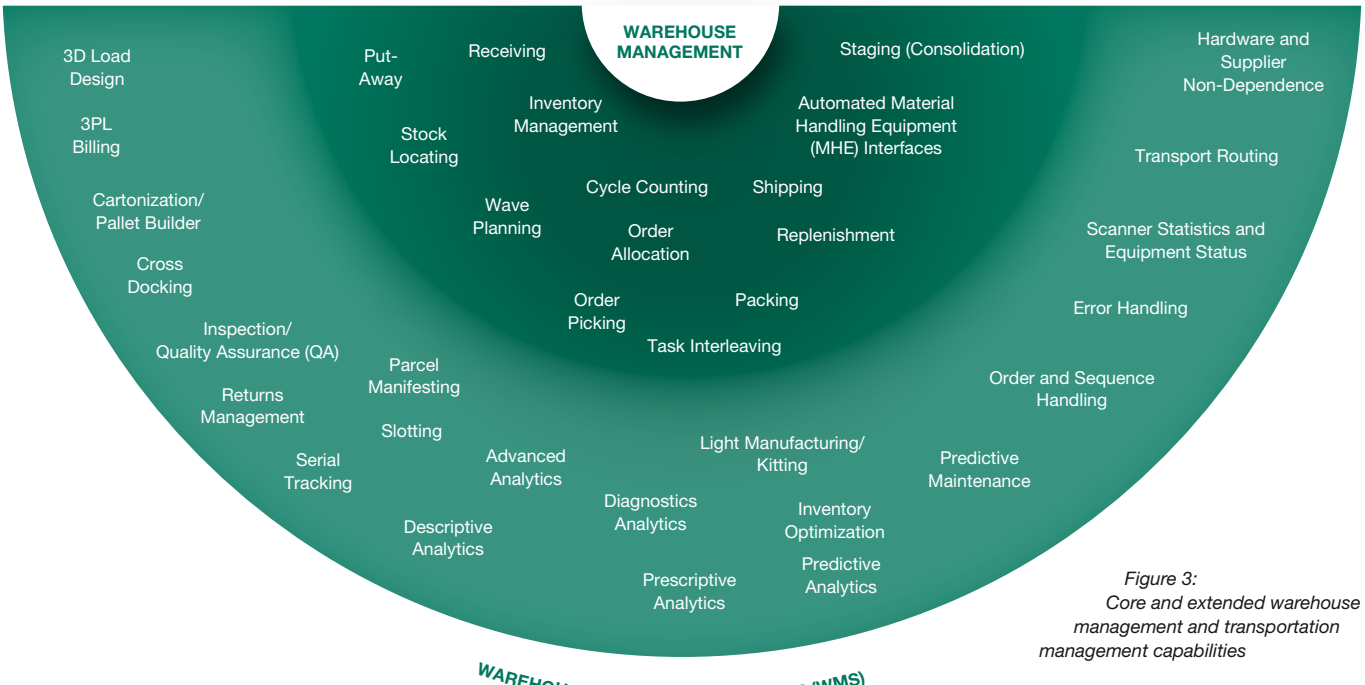


Figure 3:
Core and extended warehouse management and transportation management capabilities

USING **EPG COLORCARDS**

The capabilities under CORE / EXTENDED and those within a sub-category are sorted alphabetically, with each SCE capability assigned a unique EPG Color Code. Organizing them in this way enables every available capability in the market to be comprehensively listed and defined. Each capability is defined separately, with subcategories also added where a series of associated capabilities may serve an overall business need: For example, sub-categories like Analytics and Reporting are further segmented into distinct capabilities, each tailored to address specific business opportunities.



WAREHOUSE MANAGEMENT

Designed for a wide range of industries, a warehouse management system (WMS) is software designed to optimize warehouse operations, managing inventory, picking processes and tracking goods in real-time. It also automatically manages the use of all warehouse assets, including employees, warehouse technologies and materials handling solutions.

WAREHOUSE MANAGEMENT

CORE

ColorCode EPG 1101 | #268068



Automated Material Handling Equipment (MHE) Interfaces

Warehouse Management > Core

In a warehouse setting, automation is a very broad term. It refers to software-reliant nonmanual technologies available to support and collaborate with humans. They carry out tasks formerly done by people, thus releasing them to work elsewhere in the warehouse. Automation can be implemented at many levels of investment, usually with the objective of faster (possibly continuous) and more reliable cycles as well as more efficient processes.

ColorCode EPG 1102 | #29876e



Cycle Counting

Warehouse Management > Core

The regular scheduling of continuous stock/inventory counts managed/coordinated by the inventory team in the frequency (cycles) desired. It is a more efficient way of ensuring accurate inventory without stopping all other activities in the way year-end, month-end and quarter-end full stock counts do.

ColorCode EPG 1103 | #2e9074



Inventory Management

Warehouse Management > Core

The base from which today's WMS have evolved. In its simplest form, it is the system of record used to accurately capture and report receipts, allocations, reservations, status, product attributes, storage locations and shipments of the products on site.

ColorCode EPG 1104 | #2d967a



Order Allocation

Warehouse Management > Core

Related to staging, this process automatically arranges and, where appropriate, aligns orders to optimize their progress through the warehouse environment.

ColorCode EPG 1105 | #f9e81



Order Picking

Warehouse Management > Core

All activities involved in removing selected items from their locations to fill orders. There are at least ten possible picking types and 20 picking systems. Their suitability for a specific warehouse process should be decided by warehouse environment, order profiles, other equipment used and a range of other factors.

ColorCode EPG 1106 | #32a687



Packing

Warehouse Management > Core

The activities required to prepare picked items for shipping. This includes placing items in the appropriate cartons, nesting container and/or into other containers. It also includes adding the appropriate packing materials and documentation. Also important are labeling and compliance controls in preparation for shipping.

WAREHOUSE MANAGEMENT

CORE

ColorCode EPG 1107 | #27826a



Put-Away

Warehouse Management > Core

Removal of items from receiving work areas, movement to storage or staging areas, and final put-away of items into a storage location, such as racking or shelving. Items may be systemically confirmed to those locations or there is automatic time-lapse-based confirmation of the activity and location. Alternatively, the items are loaded into automated equipment that will conduct the final put-away locating function.

ColorCode EPG 1108 | #298a70



Receiving

Warehouse Management > Core

Also known as goods-in, this includes the physical receipt of goods and materials and the identification/ verification of goods/equipment and drivers. Activities also include checks for conformity with advanced shipping notices (ASNs), delivery notes and/or purchase orders, and consolidation and movement of the items to the next work area.

ColorCode EPG 1109 | #2c9176



Replenishment

Warehouse Management > Core

The process of relocating reserve stock from secondary storage locations to forward-pick locations (also known as the pick face). This is to support the organization and efficiency of picking processes. For a multisite environment, replenishment can also refer to the movement of product between sites or from suppliers to help satisfy demand.

ColorCode EPG 1110 | #2e997c



Shipping

Warehouse Management > Core

Provides complete and efficient parcel management, including returns handling. This is particularly important for e-commerce warehouses sending high volumes of packages directly to individual customer addresses. Note: This does not include bulk shipping in which unpackaged goods are loaded directly onto a vessel (e.g., grains or iron ore).

ColorCode EPG 1111 | #30a183



Staging (Consolidation)

Warehouse Management > Core

Simply, activities at a specific type of inventory location where the picked product is dropped off and prepared for shipment/arranged in lanes or grouped by destination/customer, ready for onward processing, such as loading/shipment. In more complex models, it can also form part of a multistep picking process, receiving area collection, sophisticated cross-dock and a series of other activities, such as the flow between warehouse and manufacturing operations.

ColorCode EPG 1112 | #32a889



Stock Locating

Warehouse Management > Core

How and where items are — and should be — stored based on capacity, available space, location types, units of measure and product attributes. Additional determiners include current and expected supply and demand, and movements to and from the warehouse operation.

WAREHOUSE MANAGEMENT

CORE

ColorCode
EPG 1113 | #28856c



Task Interleaving

Warehouse Management > Core

Relates to methods to improve the coordination/optimization of work activities via the interleaving of various tasks and activities. A simplified example would be if a forklift truck is dropping off/putting away a pallet to one location, the system would “know” that there is a pallet to collect/pick from another nearby location. This reduces the amount of empty running (or deadheading) of equipment or human beings, reducing wasted travel time.

ColorCode
EPG 1114 | #2a8c72



Wave Planning

Warehouse Management > Core

A series of tools to plan, group and optimize warehouse activities and improve efficiency within a time-bound period (a wave or series of waves), typically tied to customers, product groups or destination and shipping window.

WAREHOUSE MANAGEMENT

EXTENDED

ColorCode EPG 1201 | #3dccc6



3D Load Design

Warehouse Management > Extended

Software solutions that enable companies to build plans for mixed pallets, optimized pallet patterns and trailer loads that maximize vehicle capacity.

ColorCode EPG 1202 | #42dbb2



3PL Billing

Warehouse Management > Extended

In a warehouse environment, these are functions typically used by a 3PL provider. These features allow the providers to capture and report incidents and bill their customers (often multiple customers on a site) for chargeable activities and storage. Sometimes these features are adapted in non-3PL organizations for cross-departmental activity capture and cross-charging of departments/divisions in large organizations or for activity-based costing purposes.

ColorCode EPG 1203 | #46ebbf



Cartonization/ Pallet Builder

Warehouse Management > Extended

Optimizes loads of cartons and pallets for transport and sustainability efficiency by assigning pick lists and pallet layouts automatically.

ColorCode EPG 1204 | #4bfacb



Cross-Docking

Warehouse Management > Extended

Cuts out unnecessary steps — for instance, put-away of products to racking and shelving locations and the picking/retrieval of products from those locations — if there is a current demand upon receipt of the products at the warehouse. In its simplest and ideal form, received products are quickly moved across the docks from an inbound vehicle to an outbound vehicle. There are, however, a number of activities that can be categorized under the cross-dock umbrella, and some can become very complex. These can include drop-and-hook/drop-and-swap, full pallet cross-docking, full parcel/tote cross-docking, case and item cross-docking/flow through, cross-docking and kitting from storage through to forced order reallocation cross-docking based on over-/undersupply. Put-to-store is also available.

ColorCode EPG 1205 | #61ffd5



Inspection/ Quality Assurance (QA)

Warehouse Management > Extended

A series of activities that can take place at many stages in the life cycle of products within the warehouse environment. Often conducted on or after receipt, during or after the picking process, or in a targeted or randomized fashion when goods are in storage. Examples include item quality/quality checking, 100% checks, product and packaging, and label safety/compliance through to functional checks.

ColorCode EPG 1206 | #80ffdd



Parcel Manifesting

Warehouse Management > Extended

A typical manifesting process may involve the validation of the shipment against the rules defined by the carrier, taking into account the service used, destination and physical limitations. It may involve routing and a tracking number is generated based on a repository for that carrier/customer. From there, a label and relevant documentation is generated. Once the shipment is ready to depart, that is communicated to the carrier.

WAREHOUSE MANAGEMENT

EXTENDED

ColorCode EPG 1207 | #3ecfa8



Returns Management

Warehouse Management > Extended

Particularly important for warehouses operating multi-channel and e-commerce retail facilities, returns management describes the increasingly important process of cost-efficiently receiving, processing and, if necessary, repackaging goods returned as unwanted or unsuitable from customers. Repair and refurbishment of goods may also be covered.

ColorCode EPG 1208 | #43deb4



Serial Tracking

Warehouse Management > Extended

Records and tracks individual items and separates them from identical products in the same stock keeping unit (SKU) category. Also useful in tracking the individual components of an assembled item.

ColorCode EPG 1209 | #47edc1



Slotting

Warehouse Management > Extended

Inventory slotting (also called pick face slotting or slotting optimization) refers to tools that provide a set of methods and algorithms used to determine the most efficient locations for each item in a distribution center. They do this by taking into consideration a facility's unique product, demand, movement and storage characteristics. The optimal profile increases productivity by minimizing travel time and allowing workers to put-away and pick items more efficiently.

ColorCode EPG 1210 | #4cfccd



Advanced Analytics

Warehouse Management > Extended > Analytics and Reporting

Analysis of all kinds of data using sophisticated quantitative methods to produce insights that traditional approaches to business intelligence (BI) — such as query and reporting — are unlikely to discover. Advanced analytics span predictive, prescriptive and artificial intelligence (AI) techniques.

ColorCode EPG 1211 | #66ffd6



Descriptive Analytics

Warehouse Management > Extended > Analytics and Reporting

Uses business intelligence (BI) tools, data visualization and dashboards to answer the questions "What happened?" or "What is happening?"

ColorCode EPG 1212 | #85ffde



Diagnostics Analytics

Warehouse Management > Extended > Analytics and Reporting

Uses techniques such as drill-down and data mining to answer the question "Why did it happen?"

WAREHOUSE MANAGEMENT

EXTENDED

ColorCode EPG 1213 | #3fd1aa



Inventory Optimization

Warehouse Management > Extended > Analytics and Reporting

Monitors, reports and uses data to ensure inventory is optimized according to specified rules. These might include prevention of overstocking, out-of-stock warnings and ordering inventory appropriate to logistics costs.

ColorCode EPG 1214 | #43e0b7



Predictive Analytics

Warehouse Management > Extended > Analytics and Reporting

A form of advanced analytics that examines data or content to predict what will or is likely to happen in a given set of circumstances. It is characterized by techniques such as regression analysis, multivariate statistics, pattern matching, predictive modeling and forecasting.

ColorCode EPG 1215 | #48f0c3



Prescriptive Analytics

Warehouse Management > Extended > Analytics and Reporting

A set of analytical capabilities that specifies a preferred course of action to meet a predefined objective. The most common examples are optimization methods. Prescriptive analytics differs from descriptive, diagnostic and predictive analytics in that the output is a recommended (and sometimes automated) action.

ColorCode EPG 1216 | #4dffcf



Hardware and Supplier Non-Dependence

Warehouse Management > Extended > Material Handling Automation

Fully functional with all hardware regardless of that system's manufacturer/supplier. Integrates seamlessly with other relevant systems.

ColorCode EPG 1217 | #6bffd8



Order and Sequence Handling

Warehouse Management > Extended > Material Handling Automation

Optimizes sequencing and compilation of orders to maximize capabilities and efficiencies of automated equipment. Enables smoother, more coordinated and more efficient warehouse processes.

ColorCode EPG 1218 | #8affe0



Predictive Maintenance

Warehouse Management > Extended > Material Handling Automation

Uses both real-time and historic data to advise about maintenance requirements for automated equipment. Promotes awareness of such needs before they occur, minimizing downtime and cutting service costs. Provides system performance messaging and service update requirements.

WAREHOUSE MANAGEMENT

EXTENDED

ColorCode EPG 1219 | #3fd4ac



Error Handling

Warehouse Management > Extended > Material Handling Automation > Real-time monitoring, controlling and diagnostic of automated equipment

Enables quick action on error reports from automated equipment.

ColorCode EPG 1220 | #44e3b9



Scanner Statistics and Equipment Status

Warehouse Management > Extended > Material Handling Automation > Real-time monitoring, controlling and diagnostic of automated equipment

Monitors performance and usability of fixed scanning devices, including tracking of incorrect readings.

ColorCode EPG 1221 | #49f2c5



Transport Routing

Warehouse Management > Extended > Material Handling Automation > Real-time monitoring, controlling and diagnostic of automated equipment

Controls and monitors appropriate movement, separation and speed of pallets and containers on warehouse conveyor systems.

ColorCode EPG 1222 | #52ffd1



Light Manufacturing/ Kitting

Warehouse Management > Extended > Value Added Services

The process of compiling a kit, comprising a kit head and one or several kit components. The kit head is the material ordered; the kit components are the individual parts that form a kit by assembly in the warehouse either during the order picking process or separately at a work station.



TRANSPORTATION MANAGEMENT

Transportation management is the planning, execution and optimization of the transportation process ensuring efficient shipment and delivery throughout the supply chain. It encompasses all modes of transport: road, rail, sea and air.

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | CORE

ColorCode EPG 2101 | #85b309



Audit Freight Bill

Transportation Management > Transportation Management System > Core > Accounting and Billing

Allows for cost allocation of carrier charges to specific legs, activities or events within the transportation journey.

ColorCode EPG 2102 | #91c20a



Contract Final Freight Bill

Transportation Management > Transportation Management System > Core > Accounting and Billing

Enables easier identification and problem solving as users can, at a glance, match expected charges against actual charges within the same platform.

ColorCode EPG 2103 | #9cd10a



Freight Customer (3PL) Billing

Transportation Management > Transportation Management System > Core > Accounting and Billing

Enables 3PLs to bill customers for transportation services recorded in the TMS.

ColorCode EPG 2104 | #a8e00b



Support Autopay

Transportation Management > Transportation Management System > Core > Accounting and Billing

Automatically allocates the cost of the invoice received and the bill payment to the service provider that matches the rate in the system.

ColorCode EPG 2105 | #b3f00c



Support Freight Invoice Payment

Transportation Management > Transportation Management System > Core > Accounting and Billing

Enables received invoices to be paid and settled directly from the TMS solution.

ColorCode EPG 2106 | #beff0d



Brokerage/ Broadcast Tendering

Transportation Management > Transportation Management System > Core > Execution

Supports the ability to match demand for transportation from shippers with real-time available supply for transportation from carriers. Some TMS platforms can interface directly to freight-matching platforms, providing the TMS with real-time demand, carrier prices and available capacity.

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | CORE

ColorCode EPG 2107 | #87b509



Carrier Tendering

Transportation Management > Transportation Management System > Core > Execution

Enables submission of tender requests to carriers and manages the submission, confirmation and award process.

ColorCode EPG 2108 | #93c40a



Document Generation

Transportation Management > Transportation Management System > Core > Execution

Generates documentation such as bills of lading, manifests, pickup and delivery instructions and other paperwork.

ColorCode EPG 2109 | #9ed40b



Document Management

Transportation Management > Transportation Management System > Core > Execution

Manages transportation and other relevant documents in the TMS, from system-generated documents to those either received digitally or uploaded by the user.

ColorCode EPG 2110 | #a9e30b



Proof-of-Delivery

Transportation Management > Transportation Management System > Core > Execution

Proof-of-delivery (PoD) can be performed by the driver or carrier, usually via signature or photo. It confirms correct execution and allows tracking of the driver's actions. If the pick-up or delivery cannot be performed properly, documentation and information in the TMS is required.

ColorCode EPG 2111 | #b5f20c



Transportation Order Generation

Transportation Management > Transportation Management System > Core > Execution

Creates and updates system records, enabling end users to manage the data related to a specific transportation order.

ColorCode EPG 2112 | #c0ff12



Backhauls

Transportation Management > Transportation Management System > Core > Planning

Includes management of returns transports in journey planning, taking all available resources and capacities into account, and identifying backhaul opportunities as an opportunity to cover shipments/loads with more cost-effective alternatives. This includes retrievals, returns or refusals. Estimated time of arrivals (ETAs) and estimated distance also form part of this planning.

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | CORE

ColorCode EPG 2113 | #89b809



Carrier and Rate Selection

Transportation Management > Transportation Management System > Core > Planning

Allows the selection of optimal or designated carriers with their associated rates. Supports cost-optimized assignments of multiple carriers for a pool of loads and adheres to designated commitments when provided.

ColorCode EPG 2114 | #95c70a



Continuous Move Optimization

Transportation Management > Transportation Management System > Core > Planning

Supports automated linkage of selected loads to leverage continuous move rates. New loads may be added into an existing schedule or into existing resources during the day.

ColorCode EPG 2115 | #a0d60b



Freight Order Management

Transportation Management > Transportation Management System > Core > Planning

Allows new shipments to be created — or existing shipments to be split into new ones — based on requirements to translate goods movement requests into shippable freight orders. Generates orders manually in the system or by importing order data via interfaces to external systems. Manages different order sizes, by volume or weight, or by item or package size.

ColorCode EPG 2116 | #abe60b



Global Multileg Shipment Planning and Optimization

Transportation Management > Transportation Management System > Core > Planning

Allows creation and modeling of transportation moves using multiple transportation legs across the route of an international shipment. Explores the various transportation mode options (air, sea, rail, road) in concert with consolidation/deconsolidation points between origin and destination locations.

ColorCode EPG 2117 | #b7f50c



Load Consolidation and Optimization

Transportation Management > Transportation Management System > Core > Planning

Supports the ability to consolidate orders and optimize available mode, carrier, route, capacity and resource options (e.g., trucks, containers) and enables optimized conversion to less expensive cost models for a pool of orders/shipments.

ColorCode EPG 2118 | #c1ff17



Mode Selection

Transportation Management > Transportation Management System > Core > Planning

Supports selection of different transportation modes. Example modes include FTL (full truck load), LTL (less than truck load), ocean full container load (FCL), ocean less than container load (LCL), air freight (loose or unit load device [ULD] cargo), bulk commodity, parcel or rail.

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | CORE

ColorCode EPG 2119 | #8bba09



Descriptive Analytics

Transportation Management > Transportation Management System > Core > Analytics

Collects and processes historic data stored in the TMS to create summaries for further analysis.

ColorCode EPG 2120 | #96c90a



Diagnostics Analytics

Transportation Management > Transportation Management System > Core > Analytics

Processes stored TMS data to enable deeper understanding of the cause of certain events.

ColorCode EPG 2121 | #a2d90b



Predictive Analytics

Transportation Management > Transportation Management System > Core > Analytics

Enables prediction of future events based on historic stored TMS data and other data points.

ColorCode EPG 2122 | #ade80c



Prescriptive Analytics

Transportation Management > Transportation Management System > Core > Analytics

Provides specific recommendations to act upon predicted scenarios to support decision-making.

ColorCode EPG 2123 | #b9f70c



Report and Documentation Generation Tools

Transportation Management > Transportation Management System > Core > Analytics

Supports report creation based on different key performance indicators (KPIs), as well as operational and financial data collected within the TMS.

ColorCode EPG 2124 | #c2ff1c



Sustainability Analytics/ Reporting

Transportation Management > Transportation Management System > Core > Analytics

Records and measures transportation-related carbon emissions and other performance indicators in the sustainability field.

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | CORE

ColorCode EPG 2125 | #8dbd09



Automated Transportation Procurement

Transportation Management > Transportation Management System > Core > Freight Sourcing and Procurement

Supports task automation, such as the bidding process. Enables the bidding “send and response” process in which the TMS sends bids to carriers, analyzes responses, awards bids, and imports and saves the provided rates.

ColorCode EPG 2126 | #98cc0a



Brokerage Rates

Transportation Management > Transportation Management System > Core > Freight Sourcing and Procurement

Provides rates from a third-party solution/vendor that acts as an intermediary between the TMS and carriers. This allows the TMS to benefit from a wider network of carriers and faster responses for bids and tenders. Some TMS solutions have built-in brokerage functionalities, connecting the TMS to the customer carrier network as well as to different carriers through integration or partnerships with independent brokerage solution providers.

ColorCode EPG 2127 | #a4db0b



Contract Management

Transportation Management > Transportation Management System > Core > Freight Sourcing and Procurement

Supports freight rating processes within the TMS. Allows storage, management and overview of contracts with different carriers. Creates a central repository for future negotiations as well as documents historical supplier agreements.

ColorCode EPG 2128 | #afeb0c



Integration to Digital Freight Models

Transportation Management > Transportation Management System > Core > Freight Sourcing and Procurement

Matches shipper demand for transportation with real-time, available supply from carriers. Some TMS applications may interface directly with these digital freight models to provide real-time demand, carrier prices and available capacity.

ColorCode EPG 2129 | #bbfa0c



Multimodal Carrier Rate Repository

Transportation Management > Transportation Management System > Core > Freight Sourcing and Procurement

Stores rates for different transportation modes in the TMS. Rates are generally associated with the service contract negotiated with each transport vendor. Allows user to pull stored rates directly into shipments, providing an efficient automating capability that helps reduce user errors. *Note: The robustness (i.e., number of factors, data granularity of freight data and rules), flexibility and number of supported modes differentiate the freight rating capabilities of various TMS systems.*

ColorCode EPG 2130 | #c4ff21



Enhanced ETA Calculation/ Prediction

Transportation Management > Transportation Management System > Core > Visibility

Calculates or predicts an order’s estimated time of arrival (ETA), based on multiple data points (e.g., current order location, estimated route duration, current and forecast traffic, driving performance, weather conditions).

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | CORE

ColorCode EPG 2131 | #8fbf0a



Event Management

Transportation Management > Transportation Management System > Core > Visibility

Provides the ability to include, record and manage specific events within transportation route execution, comparing against intended plans and triggering exceptions should they occur.

ColorCode EPG 2132 | #9acf0a



On-Map Visibility

Transportation Management > Transportation Management System > Core > Visibility

Displays the location of a specific order/truck on a map application.

ColorCode EPG 2133 | #a6de0b



Real-Time Location

Transportation Management > Transportation Management System > Core > Visibility

Indicates the precise location of a specific order/truck, based on a cargo tracking device or truck telematics technology.

ColorCode EPG 2134 | #b1ed0c



Track and Trace/ Real-Time Visibility

Transportation Management > Transportation Management System > Core > Visibility

Track and trace: Enables visibility and traceability of a specific order, including both past and current status. Real-time visibility: Using data collected from global positioning systems (GPS), truck telematics devices or cargo tracking devices, this functionality enables the traceability of an order or shipment in real-time, or near-real time, including stop-off, actual arrival and departure, in-transit location, updated estimated time of arrival (ETA) and proof of delivery.

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | EXTENDED

ColorCode EPG 2201 | #ddff80



Load Design

Transportation Management > Transportation Management System > Extended > 3D Load Building

Load design functionality provides the ability to build plans for mixed pallets and optimal pallet patterns.

ColorCode EPG 2202 | #e1ff8f



Load Optimization

Transportation Management > Transportation Management System > Extended > 3D Load Building

Load optimization functions manage space and capacity to best effect, based on shipment characteristics such as weight and dimensions.

ColorCode EPG 2203 | #e5ff9e



Load Visualization

Transportation Management > Transportation Management System > Extended > 3D Load Building

Visual representation of 3D optimization results. This can be provided digitally or via printout.

ColorCode EPG 2204 | #e9ffad



Appointment Scheduling

Transportation Management > Transportation Management System > Extended > Appointment/Dock Scheduling

Manages appointments for inbound loads/orders or outbound transportation movements and may apply to both internal depots and those of external locations and customers.

ColorCode EPG 2205 | #edffbd



Dock Scheduling

Transportation Management > Transportation Management System > Extended > Appointment/Dock Scheduling

Enables collaboration between shippers and carriers for efficient, timely dock scheduling and in influencing arrival and departure times within operational planning. This leads to greater efficiencies for all parties and helps prevent dock queues and bottlenecks.

ColorCode EPG 2206 | #f1ffcc



Custom Branding

Transportation Management > Transportation Management System > Extended > Customer Engagement

Enables end customers to select design options from a range of branding choices.

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | EXTENDED

ColorCode EPG 2207 | #deff82



Delivery Experience for Drivers

Transportation Management > Transportation Management System > Extended > Customer Engagement

Offers drivers the opportunity to rate the quality of the stop details (e. g., GPS coordinates, notes) provided by the system or via proof-of-delivery.

ColorCode EPG 2208 | #e2ff91



Driving Rating Capabilities

Transportation Management > Transportation Management System > Extended > Customer Engagement

Offers consumer addressees the opportunity to rate the quality of the delivery experience provided by a specific driver.

ColorCode EPG 2209 | #e6ffa1

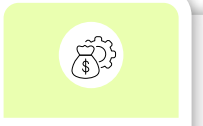


Time Slotting

Transportation Management > Transportation Management System > Extended > Customer Engagement

Presents the opportunity to book a specific time slot for delivery.

ColorCode EPG 2210 | #eaffb0



Asset-Based Planning

Transportation Management > Transportation Management System > Extended > Private Fleet Vehicle Routing and Scheduling (VRS)

Manages the asset inventory (orders, personnel, equipment and vehicles) involved in transportation planning. Identifies the status of different assets based on availability, conditions and localization, and optimizes their load assignment accordingly.

ColorCode EPG 2211 | #eeffbf

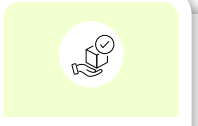


Driver Planning

Transportation Management > Transportation Management System > Extended > Private Fleet Vehicle Routing and Scheduling (VRS)

Supports management and selection of drivers based on different parameters and constraints associated with this asset. Enables optimization of driver hours management via factors such as consideration of parameters such as driver location, break times, licenses, run windows and payroll/cost or non-driving hours.

ColorCode EPG 2212 | #f2ffcf



Final-Mile Optimization

Transportation Management > Transportation Management System > Extended > Private Fleet Vehicle Routing and Scheduling (VRS)

Enables optimization of final-mile deliveries by identifying routes, carriers and equipment best suited to the transportation constraints provided.

TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | EXTENDED

ColorCode EPG 2213 | #deff85



Fleet Dispatching

Transportation Management > Transportation Management System > Extended > Private Fleet Vehicle Routing and Scheduling (VRS)

Provides the ability to send dispatch documents or instructions to and from drivers. Simplifies coordination of routes and deliveries by automating routing and scheduling processes between the TMS and mobile applications (e.g., GPS devices, mobile phones).

ColorCode EPG 2214 | #e2ff94



Forecast Order Creation

Transportation Management > Transportation Management System > Extended > Transportation Forecasting

Inserts placeholders for predicted orders in the future transportation plan.

ColorCode EPG 2215 | #e7ffa3



Forecast Transportation Plan

Transportation Management > Transportation Management System > Extended > Transportation Forecasting

Calculates and manages capacity needs multiple weeks in advance, based on historic shipment data, current demand plans and scheduled promotions.

ColorCode EPG 2216 | #bbffb3



Operational Planning

Transportation Management > Transportation Management System > Extended > Transportation Modeling

Operational planning determines the planning for the respective delivery day. All planning restrictions are taken into account. In addition, alternative scenarios for the execution can be created (e.g., focus on vehicles, costs, times, quality).

ColorCode EPG 2217 | #efffc2



Strategic Planning

Transportation Management > Transportation Management System > Extended > Transportation Modeling

Supports strategic planning — such as “what if” scenarios, potential distribution network changes and new route possibilities — via advanced analytics, dashboards and reporting.

ColorCode EPG 2218 | #f3ffd1



Tactical Planning

Transportation Management > Transportation Management System > Extended > Transportation Modeling

Supports tactical planning, allowing anticipation of near-future specific demand, such as truck or container ship reservations or better use of assets. Improves forecasting for procurement planning, shipment consolidation or equipment sharing among network partners.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | CORE

ColorCode EPG 2301 | #3dad26



Ability to Add Stops or Package Collection During Route

Transportation Management > Vehicle Routing and Scheduling > Core

Enables time- and cost-saving potential and improved customer experience by offering greater flexibility at short notice.

ColorCode EPG 2302 | #42bd2a



Automatic Selection of Own vs. External Fleet

Transportation Management > Vehicle Routing and Scheduling > Core

Automatically optimizes delivery fleet choice outside main fleet if cost, time and customer preference indicate it.

ColorCode EPG 2303 | #47cc2d



Dispatch

Transportation Management > Vehicle Routing and Scheduling > Core

Optimizes departure of goods and parcels at the most appropriate and relevant time.

ColorCode EPG 2304 | #4ddb30



Driver Payroll

Transportation Management > Vehicle Routing and Scheduling > Core

Collates driver working hours automatically and allocates payroll accordingly, thus reducing the potential for confusion and disputes common to manual systems.

ColorCode EPG 2305 | #52eb34



Dynamic Routing

Transportation Management > Vehicle Routing and Scheduling > Core

In dynamic routing, daily orders are entered into the system and dropped into the application for building delivery routes for the next day or next several days. This could be based on real orders from the order management applications or on forecast and placeholder orders. Industries such as retail and grocery might, for instance, take daily store demands in the form of orders and build optimal routes for the next day. The functionality typically works without virtual geographical boundaries, known as geofences.

ColorCode EPG 2306 | #57fa37



End-Consumer Delivery Reschedule/ Redirect Options

Transportation Management > Vehicle Routing and Scheduling > Core

Allows the end consumer to conveniently change a previously entered delivery time or delivery address if their circumstances change.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | CORE

ColorCode EPG 2307 | #3fb028



End-Consumer Personalized Options

Transportation Management > Vehicle Routing and Scheduling > Core

Allows e-commerce customers to select personalized features for a delivery, as offered by the provider. Examples include gift wrapping, personal messages or inscriptions.

ColorCode EPG 2308 | #43bf2a



Fallback Planning

Transportation Management > Vehicle Routing and Scheduling > Core

Ensures that the transport team and drivers can always leave the depot to undertake a route tour, even in the event of a software system breakdown.

ColorCode EPG 2309 | #48cf2d



Fleet Maintenance

Transportation Management > Vehicle Routing and Scheduling > Core

Issues updates, cautions and reminders to ensure vehicle maintenance is legal, on-time and less likely to lead to breakdowns and costly delays.

ColorCode EPG 2310 | #4ede31



Geofencing

Transportation Management > Vehicle Routing and Scheduling > Core

Geofencing allows planned tours to move only within their allocated geographical boundaries. Alerts are triggered when a vehicle or device enters or exits predefined boundaries, such as those of a road delivery route.

ColorCode EPG 2311 | #53ed34



Hazardous Goods Routing/ Truck Bans Planning

Transportation Management > Vehicle Routing and Scheduling > Core

Ensures that route planning accounts for established restrictive factors such as those in place for hazardous goods movement or local truck banning orders, and resets the route accordingly.

ColorCode EPG 2312 | #58fc38



Inclusion of Stops for Returns Collection During Execution of a Delivery Route

Transportation Management > Vehicle Routing and Scheduling > Core

Enables shippers and/or delivery providers to improve cost and carbon efficiencies by including collection of returned items from customers to shippers as part of a standard delivery route.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | CORE

ColorCode EPG 2313 | #3eb327



Multi-Breaks

Transportation Management > Vehicle Routing and Scheduling > Core

Plans for as many breaks per journey or route as required or preferred. This is particularly useful in North American jurisdictions where drivers can undertake multiday tours.

ColorCode EPG 2314 | #44c22b



Optimization by Vehicle Type

Transportation Management > Vehicle Routing and Scheduling > Core

This capability optimizes cost-planning models by assessing the full relevant fleet available and evaluating by type characteristics including load requirements, volume limits and speed profile. It then calculates the most cost-efficient vehicle type — or cross-selection of types — for the task at hand, including recommendation of the number of vehicles required.

ColorCode EPG 2315 | #49d12e



Quick Calculation Mode

Transportation Management > Vehicle Routing and Scheduling > Core

When time is short and full optimal efficiency less of a priority, routes may be calculated and planned at a much faster rate than normal.

ColorCode EPG 2316 | #4fe03



Real-Time Routing

Transportation Management > Vehicle Routing and Scheduling > Core

Provides greater flexibility at speed and is therefore very important in sectors where rapid changes are required, such as same-day or next-day delivery. Offers the ability to optimize daily route plans by rerouting them or by creating new plans.

ColorCode EPG 2317 | #54f035



Real-Time Visibility to Vehicles-in-Route Tracking

Transportation Management > Vehicle Routing and Scheduling > Core

Enables real-time overview of vehicle location and movements when in route.

ColorCode EPG 2318 | #59ff38



Routing to Optimal Parking Location Based on Delivery Stops

Transportation Management > Vehicle Routing and Scheduling > Core

Utilizes existing data and mapping/location software to identify efficient and appropriate parking locations for delivery drivers at each stop on the route.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | CORE

ColorCode EPG 2319 | #3fb528



Semi-Dynamic Routing/ Overlapping Districts

Transportation Management > Vehicle Routing and Scheduling > Core

Route planning traditionally works on a fixed district model, with routes allocated strictly within the confines of each district. This innovation enables time- and cost-saving efficiencies by identifying opportunities for a route to overlap with an adjacent or nearby district either for a single stop or multiple stops.

ColorCode EPG 2320 | #45c42b



Shipment-Flexible Time Windows

Transportation Management > Vehicle Routing and Scheduling > Core

It is sometimes appropriate or desirable for a specific shipment to be allocated flexible time windows for a given route and/or stops. This functionality enables that capability.

ColorCode EPG 2321 | #4ad42f



Soft Time Windows

Transportation Management > Vehicle Routing and Scheduling > Core

Soft time windows allow a fixed delivery time to be applied within looser parameters if it is both acceptable and desirable to do so. For example, a 9AM slot may be allowed to stretch to 9:15AM under certain circumstances — the vehicle routing system (VRS) will plan accordingly for such a scenario if it is optimal for the business.

ColorCode EPG 2322 | #4fe332



Static Routing

Transportation Management > Vehicle Routing and Scheduling > Core

The static routing tool uses a forecast of daily/weekly volume to build the appropriate route a driver would take on each day/shift during the course of the week. Static routing is normally used by organizations that schedule visits to specific locations.

ColorCode EPG 2323 | #55f235



Supporting B2C Operation

Transportation Management > Vehicle Routing and Scheduling > Core

Facilitates dealing and communicating directly with an end consumer as opposed to another business or organization.

ColorCode EPG 2324 | #5dff3d



Sustainability Insights

Transportation Management > Vehicle Routing and Scheduling > Core

Provides data to support sustainability targets and emissions accounting across a transport network.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | CORE

ColorCode EPG 2325 | #40b828



Territory Planning

Transportation Management > Vehicle Routing and Scheduling > Core

Supports planning of routes and boundaries to optimize both vehicle and driver resources in terms of time, cost and sustainability factors.

ColorCode EPG 2326 | #46c72c



Time-of-Day Predictive Journey Planning

Transportation Management > Vehicle Routing and Scheduling > Core

Uses predictive algorithms to calculate the route plan via data harvesting of travel speeds and journey times on the same route at different times of day. The same delivery route may take much longer at 12PM than 9AM, perhaps due to prevailing local conditions. The planning software will recognize and incorporate this information into its calculations.

ColorCode EPG 2327 | #4bd62f



Total Cost Approach to Optimization

Transportation Management > Vehicle Routing and Scheduling > Core

Optimizes the cost of a given route/tour, or series of routes/tours, by evaluating a total set of criteria including factors such as driver cost, potential driver overtime costs, and fixed or variable vehicle costs by type. It may then recommend a cost-optimized route which is not necessarily the fastest or shortest, but which makes the most business-efficient use of the human, vehicle and other resources available.

ColorCode EPG 2328 | #50e632



Two-Way Communication Driver/Dispatch

Transportation Management > Vehicle Routing and Scheduling > Core

Enables personal two-way driver communication when preferred or more appropriate with a central control team, offering speed and clarity benefits, especially at busy times.

ColorCode EPG 2329 | #56f536



Use of Real-Time Traffic and Weather When Planning

Transportation Management > Vehicle Routing and Scheduling > Core

Plans routes and timings with advanced insights into real-time traffic and weather conditions and their predicted effect on existing and proposed routes and timings. Real-time traffic patterns may not be available during calculation of the total vehicle routing requirement, but can be used to optimize navigation during tours.

ColorCode EPG 2330 | #62ff42



Vehicle Compatibility Regulations

Transportation Management > Vehicle Routing and Scheduling > Core

Ensures the vehicles used are both appropriate and legally compliant to carry shipments (e.g., hazardous goods) and defines precisely which shipments can be transported by each vehicle type.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | EXTENDED

ColorCode EPG 2401 | #95ff80



3D Load Building

Transportation Management > Vehicle Routing and Scheduling > Extended

Enables companies to build plans for mixed pallets, optimized pallet patterns and trailer loads that maximize vehicle capacity cost-effectively.

ColorCode EPG 2402 | #a2ff8f



Acceptance of Card Payment

Transportation Management > Vehicle Routing and Scheduling > Extended

Enables greater flexibility for shippers/retailers and improved options for end consumers.

ColorCode EPG 2403 | #aeff9e



Access Carrier Network via API

Transportation Management > Vehicle Routing and Scheduling > Extended

Provides access to the widest range of delivery fleet options.

ColorCode EPG 2404 | #bbffad



Branded Live Tracking

Transportation Management > Vehicle Routing and Scheduling > Extended

Enables live tracking alerts and updates with customers to be branded in the colors, logos and vehicles of the shipper or delivery provider, as required.

ColorCode EPG 2405 | #c8ffbd



Customer Feedback/Rating

Transportation Management > Vehicle Routing and Scheduling > Extended

Allows customers to rate or score delivery performance and experience in an easy-to-use format.

ColorCode EPG 2406 | #d4ffcc



Delivery Time Window Selection at Cart Check-Out Considering Real-Time Fleet Capacity

Transportation Management > Vehicle Routing and Scheduling > Extended

Enables the online buyer to select a personally convenient delivery time at time of purchase while giving the delivery provider the efficiency capability to offer times to that customer that suit its real-time fleet capacity.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | EXTENDED

ColorCode EPG 2407 | #97ff82



Driver Qualifications Matrix

Transportation Management > Vehicle Routing and Scheduling > Extended

Shows which fleet drivers are qualified and available to drive vehicles requiring a special license or to transport shipments with particular regulations, requirements or skills (e.g., hazardous shipments).

ColorCode EPG 2408 | #a4ff91



End-Consumer Self-Scheduling Options

Transportation Management > Vehicle Routing and Scheduling > Extended

Enables customers to pick delivery schedule and method at time of order according to a suite of preferences, such as premium delivery at higher cost or much later delivery at lower cost.

ColorCode EPG 2409 | #b0ffa1



End-Consumer Self-Scheduling Options Based on Fleet Carbon Footprint

Transportation Management Vehicle Routing and Scheduling > Extended

Allows customers to schedule delivery time and method options according to a suite of preferences designed to help reduce the carbon footprint of the shipper and/or delivery provider. Examples include accepting a delay or later delivery if it enables a more efficient route for the provider.

ColorCode EPG 2410 | #bdffb0



End-Consumer Settlement Through Mobile Banking App Payment on Delivery

Transportation Management > Vehicle Routing and Scheduling > Extended

Enables convenient payment by the customer at the time of delivery of goods, rather than at the time of order, if the shipper or delivery provider chooses to offer such a service.

ColorCode EPG 2411 | #caffbf



Minimization of Waiting or Idling Time

Transportation Management > Vehicle Routing and Scheduling > Extended

Optimizes route planning and calculation to take into account and reduce potential waiting times for the driver. A good example might be to prevent a scenario where a driver arrives at a route stop at 8AM, only to find that the particular site does not open until 9AM. This works especially well if the tool can make suggestions for an optimal start time for a tour.

ColorCode EPG 2412 | #d7ffcf



Mobile Solution

Transportation Management > Vehicle Routing and Scheduling > Extended

Enables all functions of the system to be deployed and managed via mobile devices, including an app to send the planned route directly to the driver.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | EXTENDED

ColorCode EPG 2413 | #99ff85



Modeling

Transportation Management > Vehicle Routing and Scheduling > Extended

Supports more confident planning of routes and processes via modeling, so that potential restraints, timings and possibly unforeseen circumstances can be identified and tested in an environment that does not negatively impact existing business uptime.

ColorCode EPG 2414 | #a6ff94



Optimal Starting Times

Transportation Management > Vehicle Routing and Scheduling > Extended

Incorporates the best and most appropriate starting times into planning calculations according to local traffic conditions and/or restrictions. For instance, it may be faster and more efficient to begin a route at 7AM rather than 8AM to cut or avoid idling times.

ColorCode EPG 2415 | #b3ffa3



Soft Capacity Planning

Transportation Management > Vehicle Routing and Scheduling > Extended

In urgent or special cases, enables the usual hard capacity of the vehicle to be supplemented where safe, legal and possible, for instance by adding parcels to the passenger seat alongside the driver.

ColorCode EPG 2416 | #bfffb3



Toll Cost Calculation

Transportation Management > Vehicle Routing and Scheduling > Extended

Includes and calculates road toll costs in routing schedules to enable their impact to be incorporated and routes to be recalculated if preferred. Advanced options include toll costs in the total cost calculation of the VRS.

ColorCode EPG 2417 | #ccffc2



Track and Trace

Transportation Management > Vehicle Routing and Scheduling > Extended

Real-time location visibility of shipments and/or individual parcels, often also used as a proof of delivery (PoD) application.

ColorCode EPG 2418 | #d9ffd1



Turn-by-Turn Navigation

Transportation Management > Vehicle Routing and Scheduling > Extended

Provides automated navigation to drivers, using street names, distances and turn advice and alerts.

TRANSPORTATION MANAGEMENT

VEHICLE ROUTING AND SCHEDULING | EXTENDED

ColorCode EPG 2419 | #9bff87



White-Glove Delivery Services

Transportation Management > Vehicle Routing and Scheduling > Extended

Provides suitable care and attention to high-value packages and/or shipments requiring above-average care, perhaps due to size, value or fragility.

ColorCode EPG 2420 | #a8ff96



Adjustment of Delivery Time Windows

Transportation Management > Vehicle Routing and Scheduling > Extended > Machine Learning

This feature allows the customer to adjust time windows after the delivery plan is in execution.

ColorCode EPG 2421 | #b5ffa6



Automatic Correction of Delivery Address

Transportation Management > Vehicle Routing and Scheduling > Extended > Machine Learning

Queries and auto-corrects an existing proven address if that address is entered containing an error.

ColorCode EPG 2422 | #c1ffb5



Automatic Order Adjustment

Transportation Management > Vehicle Routing and Scheduling > Extended > Machine Learning

Queries and corrects an inaccurate address, order quantity, inconsistency or route attribution if it recognizes an anomaly in an existing regular order.

TRANSPORTATION MANAGEMENT

MULTICARRIER PARCEL MANAGEMENT | CORE

ColorCode EPG 2501 | #a39b00



Carrier Compliance

Transportation Management > Multicarrier Parcel Management > Core

Particularly useful in the international market, this capability ensures that complex rules (e.g., import tariffs, customs rules, packaging specifications) are complied with, preventing costly penalties and/or delays.

ColorCode EPG 2502 | #b3aa00

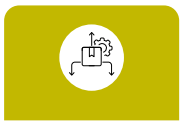


Label and Document Creation

Transportation Management > Multicarrier Parcel Management > Core

Generates parcel labels and related shipping documents.

ColorCode EPG 2503 | #c2b800



Parcel Consolidation

Transportation Management > Multicarrier Parcel Management > Core

Enables shippers with high parcel volumes to consolidate parcels into grouped shipments and potentially benefit from paying cheaper less than truckload (LTL) rates rather than traditional parcel rates. Facilitates zone skipping, the process by which shipments are consolidated and deliberately delayed for cost efficiency purposes until a full truckload volume is reached, before transfer to the parcel delivery carrier.

ColorCode EPG 2504 | #d1c700



Parcel Contract Management

Transportation Management > Multicarrier Parcel Management > Core

Supports freight rating and shopping processes via full storage and management of contracts with chosen carriers.

ColorCode EPG 2505 | #e0d500



Parcel Execution

Transportation Management > Multicarrier Parcel Management > Core

Facilitates package processing through carrier partners, generating cost and time efficiencies.

ColorCode EPG 2506 | #f0e400



Parcel Manifesting

Transportation Management > Multicarrier Parcel Management > Core

Generates routing and tracking information and numbers and communicates them to the relevant carrier. Validates each shipment against defined carrier rules.

TRANSPORTATION MANAGEMENT

MULTICARRIER PARCEL MANAGEMENT | CORE

ColorCode
EPG 2507 | #a69d00



Real-Time Parcel Visibility

Transportation Management > Multicarrier Parcel Management > Core

Enables customers and shipper/carrier staff to track order locations at all stages of the parcel journey.

ColorCode
EPG 2508 | #b5ac00



Reporting/ Analytics

Transportation Management > Multicarrier Parcel Management > Core

Stores, collates and manages historical data to support evidence-based summaries and reports for further analysis.

TRANSPORTATION MANAGEMENT

MULTICARRIER PARCEL MANAGEMENT | EXTENDED

ColorCode EPG 2601 | #fff766



Advanced Cartonization

Transportation Management > Multicarrier Parcel Management > Extended

Offers data-based guidance and direction on shipping cartons for each order in the most appropriate and cost-effective number and size.

ColorCode EPG 2602 | #fff875



Automated Rate Shopping

Transportation Management > Multicarrier Parcel Management > Extended

Extending core parcel contract management capability, this feature rate shops multiple carriers at shipment level to help ensure that lowest-cost opportunities are explored and implemented where appropriate (e.g., where local or regional carriers may sometimes offer more value).

ColorCode EPG 2603 | #fff985



Cross-Border and Pickup Drop-Off (PUDO)

Transportation Management > Multicarrier Parcel Management > Extended

Supports integration into international carrier PUDO networks by facilitating international consolidation and documentation.

ColorCode EPG 2604 | #fffa94



Last-Mile Delivery

Transportation Management > Multicarrier Parcel Management > Extended

Tracks shipment status to final address, captures proof-of-delivery (PoD) information.

ColorCode EPG 2605 | #fffaa3



Mobile Solutions

Transportation Management > Multicarrier Parcel Management > Extended

Enables authorized staff and relevant individuals to access multicarrier parcel management solutions (MCPMS) via app, mobile and/or tablet devices.

ColorCode EPG 2606 | #fffbb3



Parcel Freight Payment

Transportation Management > Multicarrier Parcel Management > Extended

Pays freight charges directly, reducing discrepancies because electronic charges can be compared easily with final carrier invoices within the system.

TRANSPORTATION MANAGEMENT

MULTICARRIER PARCEL MANAGEMENT | EXTENDED

ColorCode EPG 2607 | #fff769



Parcel Optimization

Transportation Management > Multicarrier Parcel Management > Extended

Selects the most appropriate carrier and transport mode, deploying agreed upon rules and constraints to calculate the best option.

ColorCode EPG 2608 | #fff878



Procurement and Bid Optimization

Transportation Management > Multicarrier Parcel Management > Extended

Supports automation of the transportation “send and response” bidding process. Sends bids, analyzes carrier responses, awards bids, imports and saves provided rates.

ColorCode EPG 2609 | #fff987



Returns and Claims Management

Transportation Management > Multicarrier Parcel Management > Extended

Helps manage the reverse logistics process when retail goods are returned by customers. Creates exception events, generates return labels and connects to the client’s web store to enable returns tracking.



WORKFORCE MANAGEMENT

Workforce management ensures demand-oriented and efficient personnel planning across the supply chain (warehouse, road, rail, sea and air). With this software, companies can optimally allocate the employees and resources at their disposal.

WORKFORCE MANAGEMENT

CORE

ColorCode EPG 3101 | #ed7d05



Operational Planning and Control

Workforce Management > Core

Enables both precision and ad-hoc planning of tasks and/or projects by identifying required needs, lead times, staff resources, mitigating factors and one-off constraints (e.g., break times, working hours, operational and legal regulations). This ensures a transparent, free flow of information and communication to all required parties (e.g., via mobile app).

ColorCode EPG 3102 | #ed8618



Resource Planning and Management

Workforce Management > Core

Plans, schedules and allocates human resources appropriately and cost-effectively in alignment with company goals and objectives, taking into account all mitigating factors (e.g., available staff numbers, shift requirements, timing constraints, human/device interactions, staff skill sets).

ColorCode EPG 3103 | #ed912f



Workforce Forecasting

Workforce Management > Core

Uses data to help prevent overstaffing or understaffing in a specified short- or long-term period, either within a day or over a period of weeks, to save costs and time. Enables managers to determine how many workers are required for each function at each site location to successfully complete tasks within the required time constraints. It is particularly helpful in using data to address required headcount at seasonal peaks.

WORKFORCE MANAGEMENT

EXTENDED

ColorCode EPG 3201 | #ffb86b



Automatic Planning

Workforce Management > Extended

Enables faster shift scheduling at the click of a button, taking into account such factors as available team staff numbers, qualifications and specific shift hours.

ColorCode EPG 3202 | #ffbf7a



Demand-Oriented Planning

Workforce Management > Extended

Supports efficient planning of shifts and tasks via accurate forecasting or import of demand, allocating human resources appropriately to the time and volume required to meet that demand.

ColorCode EPG 3203 | #ffc68a



Employee Engagement/ Gamification

Workforce Management > Extended

Deploys techniques to build stronger relationships with staff, using incentives, achievement recognition, goal-setting and scoring charts to motivate staff, encourage positively engaged performance and build retention. It may integrate with payroll applications to support bonus payouts.

ColorCode EPG 3204 | #ffce99



Performance Benchmarking

Workforce Management > Extended

Enables network-wide performance comparison (e.g., site-to-site) via dashboards, charts and custom reports. Allows comparison between employees and groups of employees, at the same time developing their skills to an agreed upon timetable. This ensures staff engagement as well as a mutually beneficial contribution to company objectives. Ensures regular manager-employee communication via performance reviews and/or key performance indicator (KPI) dashboards.

ColorCode EPG 3205 | #ffd5a8



Personnel Cost Planning and Monitoring

Workforce Management > Extended

Provides full and detailed cost impacts of individual and group personnel, including at nonstandard periods such as holidays or weekends. Assists in determining and calculating of wage types, grades and amounts.

ColorCode EPG 3206 | #ffdcb8



Productivity Monitoring

Workforce Management > Extended

Provides data-based insights via integration with devices into productivity levels per team and/or resource as required. This enables better-informed monitoring of resource and staff role positioning, allocation, task specifics and numbers to optimize human and nonhuman assets cost-effectively.

WORKFORCE MANAGEMENT

EXTENDED

ColorCode
EPG 3207 | #ffba70



Qualification Management

Workforce Management > Extended

With a focus on recruitment, retention and talent management, provides data-based insight into workforce make-up, patterns, skills, qualifications and other relevant factors to enable better decision-making. Such informed access enables better constraint-based planning (e.g., dangerous goods restrictions, forklift driving qualifications, language speaking skills, knowledge of devices). Assists with health/safety requirements by ensuring that at least the minimum number of qualified staff are present for relevant roles where required by regulation or company policy. Sends alerts, reminders and notifications of expiring qualifications; also schedules subsequent training modules or courses to maintain those competencies.

ColorCode
EPG 3208 | #ffc180



Time and Attendance Monitoring

Workforce Management > Extended

Provides time tracking as part of the internal system, eliminating the usual need for external systems to feed in time-related data.

ColorCode
EPG 3209 | #ffc98f



Vacation Planning and Management

Workforce Management > Extended

Employee: Enables submission and status checking of vacation requests and vacation account.
Employer: Facilitates management of vacation roster and enables assessment of the impact of individual vacation requests on overall workforce planning.



DISTRIBUTED ORDER MANAGEMENT

Distributed order management (DOM) uses configurable, rules-based procedures to coordinate the fulfillment of customer orders. A DOM system helps companies optimize costs and efficiencies within their order fulfillment processes, while ensuring that customer needs and priorities are met.

DISTRIBUTED ORDER MANAGEMENT

CORE

ColorCode EPG 4101 | #991a33



BOPIS & BOSS Order Enablement

Distributed Order Management > Core

Buy online, pick-up in store (BOPIS) and buy online, ship to store (BOSS) capabilities are terms associated with in-store fulfillment, offering potentially greater convenience to customers as well as potential cost efficiencies to the retailer (see also “Store Fulfillment“ below).

ColorCode EPG 4102 | #a31c37



Integration Capabilities

Distributed Order Management > Core

Links seamlessly with existing systems such as enterprise resource planning (ERP), warehouse management systems (WMS), transportation management systems (TMS), customer relationship management (CRM) and marketplace (webstore, including dropship if applicable) to enable fast and frictionless implementation with no downtime or related obstacles to the business.

ColorCode EPG 4103 | #ad1d3a



Multi-Channel Order Orchestration & Management

Distributed Order Management > Core

Filters orders from multiple channels — including, but not limited to, brick-and-mortar stores, e-commerce and call centers — and scans inventory at all sites to ensure orders are directed to the optimal fulfillment location, according to a specified set of parameters (e.g., cost-effectiveness, prioritization of loyal customers, routing efficiency, timeliness and customer service requirements).

ColorCode EPG 4104 | #b81f3e



Order Splitting/ Consolidation and Routing

Distributed Order Management > Core

Following agreed business rules — likely to include item availability, as well as time, cost and customer service considerations — consolidates groups of orders into a single order, or splits them, to enable intelligent next-stage routing allocation.

ColorCode EPG 4105 | #c22141



Real-Time Inventory Visibility and Tracking

Distributed Order Management > Core

Ensures the location of all goods, from a single stockkeeping unit (SKU) to a shipment of totes or group of pallets as required, is always visible and trackable in real-time at any point in the supply chain network.

DISTRIBUTED ORDER MANAGEMENT

EXTENDED

ColorCode EPG 4201 | #e6274d



Advanced Analytics and Reporting

Distributed Order Management > Extended

Deploys precision analysis and predictive technologies to enable confident future short-term decision-making and formulation of longer-term strategies. Examples include demand forecasting, which covers such areas as historical sales data, as well as local, economic, social and weather trends. Capacity planning incorporates warehouse, store, labor, transportation and manufacturing scenarios.

ColorCode EPG 4202 | #f52a52



Centralized Control and Visibility

Distributed Order Management > Extended

Ensures a single central overview and is capable of providing full visibility of the order lifecycle at all times, regardless of order source or inventory/fulfillment location.

ColorCode EPG 4203 | #ff335c



Configure, Price and Quote (CPQ) Integration

Distributed Order Management > Extended

Manages or integrates with sales tools for customizable or configurable product pricing.

ColorCode EPG 4204 | #ff5274



Cross-Border Fulfillment

Distributed Order Management > Extended

Ensures fulfillment conforms with international regulatory requirements concerning cross-border trade, including customs, duties and international shipping obligations.

ColorCode EPG 4205 | #ff708d



Customer Service Support

Distributed Order Management > Extended

Provides all customer support staff with full overview of order status, enabling timely and relevant communication with customers making inquiries.

ColorCode EPG 4206 | #ff8fa5



Dropship Management

Distributed Order Management > Extended

Enables customer orders to be sent to them directly from a chosen third party, such as the manufacturer, wholesaler, another retailer or an external fulfillment provider. This is most common with physically large or bulky products that are challenging for a retailer to carry in-store. Also suitable for products where customer demand is low enough to make holding distribution center (DC) inventory commercially less efficient.

DISTRIBUTED ORDER MANAGEMENT

EXTENDED

ColorCode EPG 4207 | #eb284f



Dynamic Sourcing and Allocation

Distributed Order Management > Extended

Reacts to fast-changing circumstances to reallocate fulfillment orders more optimally, should conditions be favorable and appropriate to do so. Recognizes special rules in place for certain products (e.g., those that might soon be reduced in price) and, for instance, seeks a store with high inventory levels of that product, if appropriate.

ColorCode EPG 4208 | #fa2a54



Exception Management and Resolution

Distributed Order Management > Extended

Automatically identifies and resolves exceptions when they occur, without recourse to a human resource, by taking prescribed actions in such circumstances according to a specified set of criteria and rules. Manual override remains available.

ColorCode EPG 4209 | #ff3d64



Item Substitution

Distributed Order Management > Extended

Following company rules, replaces a specified ordered item with a suggested alternative when the original is unavailable for any reason. The customer may accept or refuse the substitution according to their requirement or preference.

ColorCode EPG 4210 | #ff5c7c



Order Modification

Distributed Order Management > Extended

Allows modifications to an order after it has been placed, within a specified time frame. Configures modification and cancellation rules to match the business or retailer's precise policy concerning a customer change of order request (e.g., revision of delivery address or order cancellation).

ColorCode EPG 4211 | #ff7a95



Payment Checking and Processing

Distributed Order Management > Extended

Integrates with a payment provider to enable customer payment authorization and settlement, incorporating capabilities such as fraud detection, customer address validation and revalidation.

ColorCode EPG 4212 | #ff99ad



Performance Management

Distributed Order Management > Extended

Enables and supports evidence-based assessment and monitoring of fulfillment logics, locations and methods, including comparisons between sites and channels.

DISTRIBUTED ORDER MANAGEMENT

EXTENDED

ColorCode
EPG 4213 | #f02951



Pre-Orders and Back Orders

Distributed Order Management > Extended

Allows ordering of items not yet available in-stock (pre-orders) as well as items previously in-stock that are temporarily unavailable (back orders).

ColorCode
EPG 4214 | #ff2b56



Returns Management

Distributed Order Management > Extended

Facilitates and optimizes the returns process and, where specified and appropriate, integrates returned orders into inventory lists to make them available for fresh orders quickly and seamlessly. Enables fast placement of returned goods within store or fulfillment location for quick sale, thereby minimizing potential for subsequent markdown.

ColorCode
EPG 4215 | #ff476c



Store Fulfillment (or Put-to-Store, Ship-from-Store)

Distributed Order Management > Extended

Configures stores/shops as a source for fulfilling orders either to be collected on-site/self-service/curbside by the consumer, or via shipping directly from the store, to the customer's preferred address or perhaps a remote location (e.g., locker box).



GLOBAL TRADE MANAGEMENT

Global trade management supports the complex and unique logistical, regulatory and financial aspects of the import and export processes associated with international trade (for example, cross-border trade), often using multiple modes of transportation.

GLOBAL TRADE MANAGEMENT

INTERNATIONAL LOGISTICS

ColorCode EPG 5101 | #006eb3



Execution

Global Trade Management > International Logistics

Supports and helps orchestrate efficient and fully visible transportation execution processes, while ensuring correct completion and administration of global trade documents.

ColorCode EPG 5102 | #0078c2



Networks

Global Trade Management > International Logistics

Provides access and connects to relevant trade partners and stakeholders including carriers, forwarders, suppliers and manufacturers, as well as institutions.

ColorCode EPG 5103 | #0081d1



Planning

Global Trade Management > International Logistics

Facilitates transportation planning functions, including carrier booking, multileg design and load schemes.

ColorCode EPG 5104 | #008ae0



Transportation Sourcing

Global Trade Management > International Logistics

Supports transportation procurement, contract management and allocation functions to facilitate international goods movement requirements and necessary visibility to all relevant parties.

GLOBAL TRADE MANAGEMENT

TRADE COMPLIANCE

ColorCode EPG 5201 | #009dff



Customs Filing

Global Trade Management > Trade Compliance

Within a single source, ensures secure control and management of document processing in customs clearance procedures.

ColorCode EPG 5202 | #14a5ff



Denied Party Screening

Global Trade Management > Trade Compliance

Screens global lists and identifies restricted or denied persons or entities and sanctioned or embargoed states.

ColorCode EPG 5203 | #29adff



Duty and Tax Management

Global Trade Management > Trade Compliance

Calculates, applies and manages relevant local and international duties and taxes to goods and shipments for both import and export, as required.

ColorCode EPG 5204 | #3db5ff

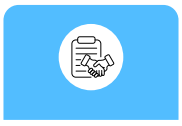


Export Controls

Global Trade Management > Trade Compliance

Ensures compliance with applicable and relevant export controls implemented by local/national authorities.

ColorCode EPG 5205 | #52bdff



Free Trade Agreement and Preferential Agreements Management

Global Trade Management > Trade Compliance

Recognizes and applies free trade agreement (FTA) and free trade zone (FTZ) criteria as well as specific agreements between individual nations and/or territories.

ColorCode EPG 5206 | #66c4ff



Global Trade Content

Global Trade Management > Trade Compliance

Provides holistic global geographical data content including local, territory-specific data, updated and in local languages where required. Includes, but is not limited to, tariff and non-tariff measures, export control regulations, denied party lists, free trade agreements (FTAs) and rules of origin data.

GLOBAL TRADE MANAGEMENT

TRADE COMPLIANCE

ColorCode
EPG 5207 | #0aa1ff



License Management

Global Trade Management > Trade Compliance

Ensures compliance with applicable and relevant trade licensing requirements.

ColorCode
EPG 5208 | #1fa9ff



Product Classification

Global Trade Management > Trade Compliance

Ensures export classification numbers (ECN) are correct to prevent unnecessary delays and/or financial penalties due to error.

GLOBAL TRADE MANAGEMENT

GLOBAL TRADE FINANCE

ColorCode EPG 5301 | #8ad2ff



E-Bill of Lading

Global Trade Management > Global Trade Finance

Provides and manages all digital bills of lading (receipt issued by carrier to shipper detailing key shipment information) and makes them visible to all relevant parties.

ColorCode EPG 5302 | #a8deff



Insurance Management

Global Trade Management > Global Trade Finance

Manages all local and international insurances appropriate to shipments and to agreements among shippers/carriers/customers.

ColorCode EPG 5303 | #c7e9ff



Settlement and Reconciliation

Global Trade Management > Global Trade Finance

Provides management and fully visible trail of all bill payments and settlements.

ColorCode EPG 5304 | #e6f5ff



Trade Financing

Global Trade Management > Global Trade Finance

Facilitates the sourcing and unlocking of working capital to release international trade.



CONTRACT AND BILLING MANAGEMENT

Contract and billing management controls supply chain finances while enhancing both sales and transparency. It enables services to be recorded along the supply chain, while simultaneously digitalizing and automating contract and billing management from node to node. Through smart contract management, these solutions transparently account for all relevant contractual terms, including invoicing and processing steps.

CONTRACT AND BILLING MANAGEMENT

CORE

ColorCode EPG 6101 | #001861



Audit Trail

Contract and Billing Management > Core

Tracks all documentation and enables all changes to be recorded and identified, such as changes to a contract including specific timestamps and the names of individuals making the amendments.

ColorCode EPG 6102 | #001d75



Cancellation Invoicing

Contract and Billing Management > Core

Ensures correct procedure is transparently followed when an invoice is cancelled and that credit is allocated appropriately.

ColorCode EPG 6103 | #002185



Catalog of all Services

Contract and Billing Management > Core

Ensures all inbound/outbound services rendered without exception are documented, including those interfacing from feeder systems — such as warehouse management systems (WMS), transportation management systems (TMS), or enterprise resource planning (ERP) — as well as all special and value-added services (e.g., field service). Services rendered include, but are not limited to, warehouse services (e.g., goods receipt, transfers, order picking or packaging) and multimodal services (e.g., container unloading, returns, tolls, wait times and standstill times).

ColorCode EPG 6104 | #002594



Contract Partner Handling

Contract and Billing Management > Core

Stores and administers all relevant data from contract partners, such as suppliers and customers.

ColorCode EPG 6105 | #0029a3



Invoicing

Contract and Billing Management > Core

Automates and manages all invoicing appropriately to the contract and service level agreement (SLA) with each client as well as to auditing requirements, deploying both pro forma invoicing and electronic invoice formats. Ensures relevant documentation including proof of service materials is attached. Shows customer-specific cost matrices where required (e.g., distance, size, weight) and works with various agreed upon criteria (e.g., cost of fuel or tolls) to calculate freight cost invoicing precisely and transparently.

ColorCode EPG 6106 | #002db3



Purchase Order Number Handling

Contract and Billing Management > Core

Recognizes and references handling by purchase order (PO) number to ensure transparent processes throughout the supply chain.

CONTRACT AND BILLING MANAGEMENT

CORE

ColorCode
EPG 6107 | #001b6b



Recording Services

Contract and Billing Management > Core

Ensures all services rendered across all modes throughout the supply chain are clearly recorded and logged, either via interface or mobile app.

ColorCode
EPG 6108 | #001f7a



Smart Contract Management

Contract and Billing Management > Core

Provides an overview of all customers, supplier and subcontractor arrangements and integrates all contract management functions. Includes automatic contract document creation, version management, document approval procedures and change histories as applicable.

ColorCode
EPG 6109 | #00228a



VAT Handling

Contract and Billing Management > Core

Ensures international, national and local value-added taxes (VAT) are added to goods and services and accurately included in all invoices and transactions where applicable.

CONTRACT AND BILLING MANAGEMENT

EXTENDED

ColorCode EPG 6201 | #2e5ce6



Automatic Checking of Invoices

Contract and Billing Management > Extended

Verifies incoming invoices and recalculates accordingly within the system.

ColorCode EPG 6202 | #6585e6



Client Invoice Before Carrier Invoice

Contract and Billing Management > Extended

Automated invoicing cycle ensures step-by-step invoicing process is always followed.

ColorCode EPG 6203 | #6585e6



Connection to Interface Systems

Contract and Billing Management > Extended

Links to customer and partner systems to facilitate the seamless transmission of data and information as well as easy implementation.

ColorCode EPG 6204 | #819ae6



Credits and Subsequent Debits

Contract and Billing Management > Extended

Allows for additional invoicing of previously invoiced transactions.

ColorCode EPG 6205 | #9caee6



Customer Web Portal for Invoice Checks

Contract and Billing Management > Extended

Allows customers to both check and approve invoices online within a specific portal, with all services clearly displayed. Enables easy digital management of queries and feedback.

ColorCode EPG 6206 | #b8c3e6



Management of Credit Note Procedures

Contract and Billing Management > Extended

Facilitates management and processing of self-billing procedures and related transactions when required.

CONTRACT AND BILLING MANAGEMENT

EXTENDED

ColorCode EPG 6207 | #3763e6



Multicurrency Handling

Contract and Billing Management > Extended

Recognizes, manages and integrates contract and billing matters across multiple currencies, as required and selected.

ColorCode EPG 6208 | #5377e6



Multilanguage Handling

Contract and Billing Management > Extended

Recognizes, manages and integrates contract and billing matters across multiple languages, as required and selected.

ColorCode EPG 6209 | #6e8ce6



Multilocation Handling

Contract and Billing Management > Extended

Recognizes, manages and integrates contract and billing matters across multiple locations and territories, as required and selected.

ColorCode EPG 6210 | #8aa1e6



Rate Shopping

Contract and Billing Management > Extended

Assists with benchmarking and best-price calculations, particularly useful in spot and contract freight buying.

ColorCode EPG 6211 | #a5b5e6



Release Workflow

Contract and Billing Management > Extended

Ensures clear workflow communications during creation of new contracts or contract versions.

ColorCode EPG 6212 | #c1cae6



Tender Management

Contract and Billing Management > Extended

Facilitates the process of tendering by enabling service providers to submit bids in a portal to promote easy evaluation and selection of bids, all within a clearly marked audit trail.

CONTRACT AND BILLING MANAGEMENT

EXTENDED

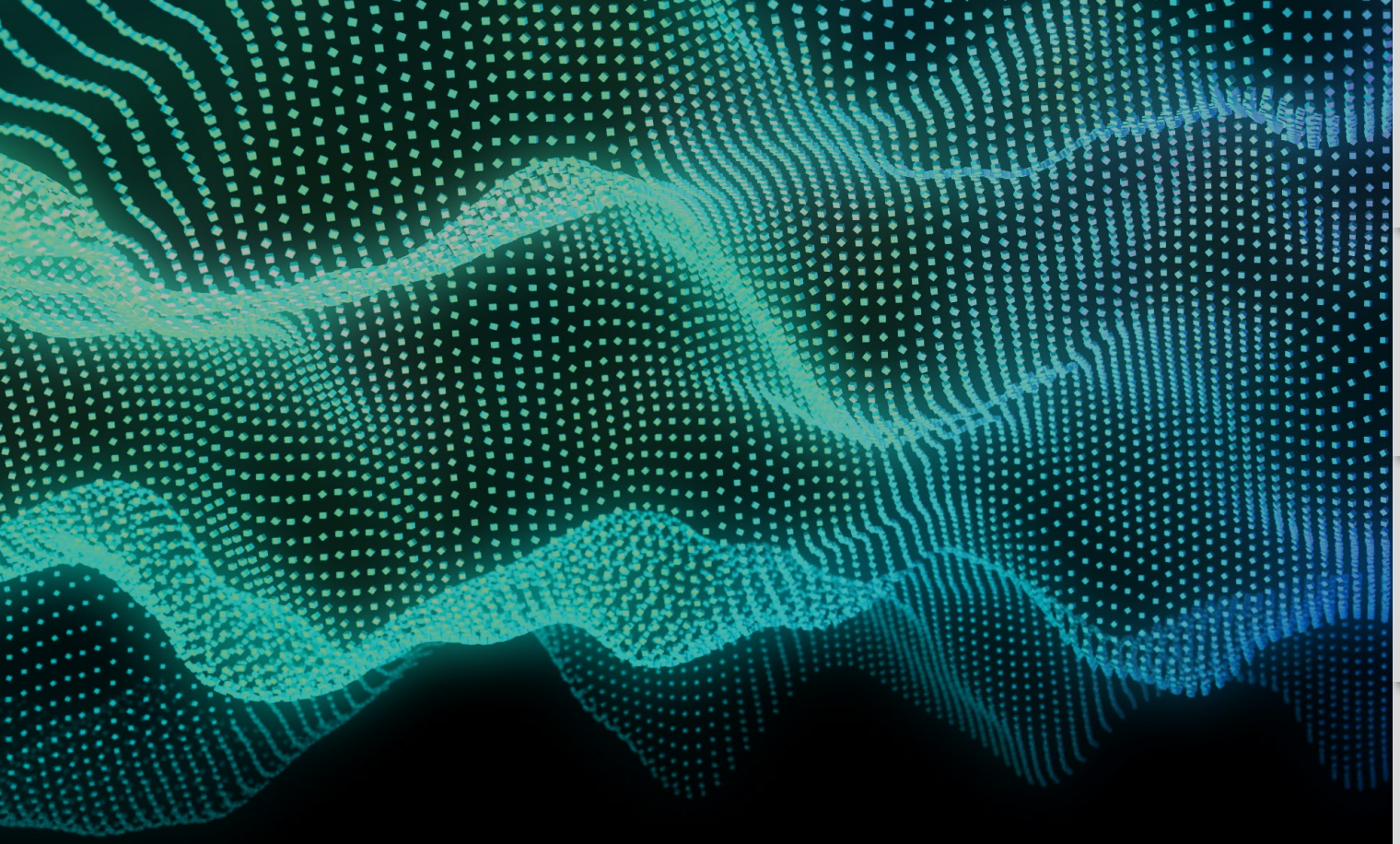
ColorCode
EPG 6213 | #406ae6



Turnover/
Contribution
Margin Handling

Contract and Billing Management > Extended

Calculates and analyzes accurately, via integrated reports and dashboards and, where required, via linking to external business intelligence (BI) systems.



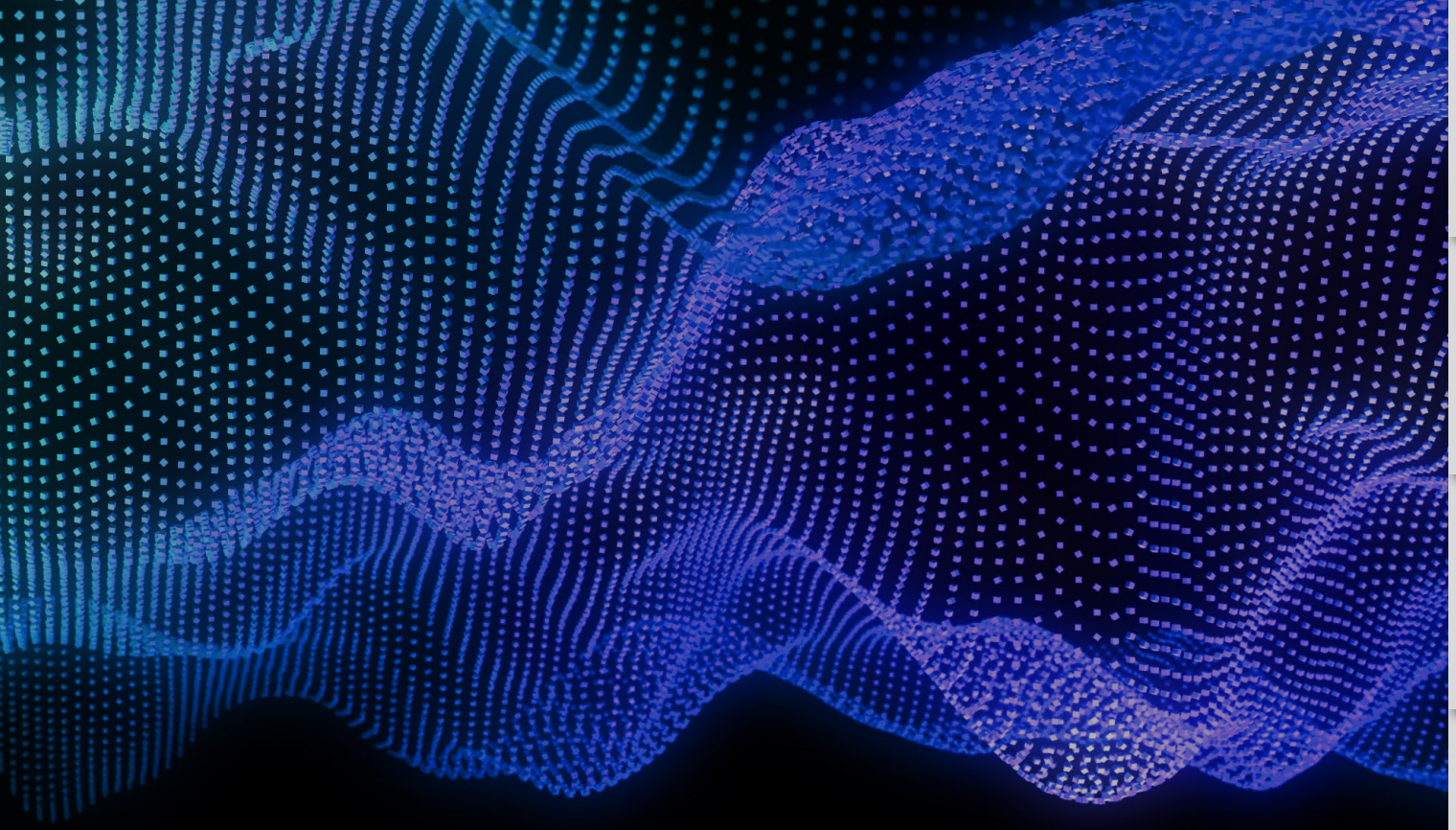
SUPPORTIVE TECHNOLOGIES WITHIN THE SUPPLY CHAIN

Advances are always coming. Beyond the core and extended capabilities of supply chain software applications, an increasing range of supportive technologies make supply chain processes and operations more efficient. Examples include warehouse picking technologies such as pick-to-light or pick-by-voice. Emerging concepts such as digital twins and the industrial metaverse will likely become factors moving forward.

VOICE ASSISTANCE

Voice assistance technology initially found great success as a warehouse picking solution. Now it is expanding into a wider set of use cases across such diverse fields as parcel delivery and automotive quality assurance (QA).

Voice has a number of compelling business advantages. It can be used both hands- and eyes-free, allowing workers to complete tasks without breaking routine or concentration. In a globalized world in which working environments include persons from many nations and cultures, voice recognizes multiple languages. Voice also requires no staff-guided training to learn, a significant benefit in fast-moving environments juggling high seasonal staff turnovers. As the technology develops, deep learning and neural network principles are breaking new boundaries in individual user recognition and data optimization opportunities.



DIGITAL TWINS*

The digitalization of supply chains means more learning opportunities, because the enormous breadth and depth of available data offers levels of actionable intelligence that were unthinkable until now. Thanks to this technology, the concept of digital twins is being used increasingly.

By harvesting data from a physical, actual supply chain to create an identical virtual digital twin model of it — or any component part — scenarios and their consequences can be fully visualized and explored before implementing them in the real world, all via an intuitive dashboard.

A digital supply chain twin (DSCT) is a virtual replica of the connections within a supply chain process, end-to-end. It includes inventory, suppliers, customers, markets, transportation routes, transactions, warehouses, distribution centers, factories, and more. Changes can be made to the digital twin to test different "what-if" scenarios and understand outcomes prior to implementing those changes in the actual supply chain. This supports supply chain planning by allowing operations managers to determine the best course of action or optimization approach.

INDUSTRIAL METAVERSE*

The industrial metaverse may play a role in improving supply chain operations moving forward. Conceptually, the industrial metaverse is an immersive, 3-dimensional, virtual, and shared environment that simulates and synthesizes data inputs from businesses, operations, and people.

Within an industrial metaverse, different stakeholders collaborate to design, engineer, and test products, processes, and systems. It typically incorporates digital twin models, pulling them together for a more expansive view of interrelated network components. That capability to simulate, test, and validate different concepts and modifications throughout an end-to-end supply chain makes it a potentially powerful tool.

**As digital twins and the industrial metaverse are still emerging technologies, they are not currently included in the EPG ColorCards but will be added in the future.*



SUPPORTIVE TECHNOLOGIES

Beyond the core and extended capabilities of supply chain software applications, an increasing range of supportive technologies are enhancing the opportunity to make supply chain processes and operations more efficient. Notably, these innovations encompass AI-driven capabilities that augment existing functions or, for example, voice-enabled solutions within warehouses such as voice picking technologies.

SUPPORTIVE TECHNOLOGIES

VOICE ASSISTANCE

ColorCode EPG 7101 | #851c60



Control of Incoming Goods

Supportive Technologies > Voice Assistance

Assists and confirms goods-in accuracy, verifying quantities of mixed or full pallets as required. Records damage identifications and assists in sorting and staging for put-away. Voice technology can be combined with other technologies such as barcode scanning or radio-frequency identification (RFID) to enable even more precise identification of products in incoming shipments.

ColorCode EPG 7102 | #99206f



Deliver by Voice

Supportive Technologies > Voice Assistance

Supports safer, more efficient and paperless e-commerce delivery logistics by enabling the vehicle driver to manage all steps in the last-mile process via voice command. Hands-free/eyes-free capability ensures driver attention is fully focused on road and traffic conditions (e.g., via voice retrieval of next delivery address). Combines with mobile devices as required (e.g., if customer signature is required for proof of delivery).

ColorCode EPG 7103 | #ad247d



Maintenance, Inspection and QA

Supportive Technologies > Voice Assistance

Helps engineers or technicians via step-by-step voice direction in maintenance, servicing and quality assurance (QA) tasks. Ensures productivity and efficiency improvements because it enables workflows unimpeded by paper or tablet data entry. Captures data to assist in checking and compliance, minimizing the potential for manually entered data errors. Hands-free capability reduces the need for a second human resource to assist in goods handling when such inspections take place. The voice application may run on a display device (usually a smartphone or tablet) in order to allow deployment of additional checking and confirmation functionalities, such as imagery or digital signatures. Deployable in multiple scenarios, such as industrial, vehicle, aircraft and machine production lines and/or safety routines.

ColorCode EPG 7104 | #c2298c



Order Picking

Supportive Technologies > Voice Assistance

Voice-directed warehouse management solutions use speech recognition and speech synthesis technologies to drive activities in warehouse operations, integrating speech-collected information into a warehouse management system (WMS). This enables hands-free operations for tasks such as carton or single-item picking, where the additional data collection steps can be removed with the use of speech input.

ColorCode EPG 7105 | #d62d9b



Replenishment

Supportive Technologies > Voice Assistance

Uses voice commands and responses to enhance and accelerate standard warehouse replenishment workflows. This may be applied as an independent, standalone process or form part of picking workflows or other tasks as required.

ColorCode EPG 7106 | #eb31aa



Stocktaking

Supportive Technologies > Voice Assistance

Reduces potential errors in data entry in the stocktaking task by removing the need for manual input. Counted quantities are documented by voice input and verified directly via connection to the warehouse management system (WMS). Accelerates staff operations because hands-free capability enables working without pausing to enter data on paper or device. The stocktaking audit can be carried out as a standalone application or as a permanent, random function included as part of the picking process.

SUPPORTIVE TECHNOLOGIES

VOICE ASSISTANCE

ColorCode
EPG 7107 | #8a1d64



Voice Smart Assistant

Supportive Technologies > Voice Assistance

Supports retail staff in a multitude of point of sale (PoS) processes in physical stores enabling them to provide optimal shopping experiences for customers. These processes include replenishment, order picking, managing tasks and reminders or querying product data (e.g., price, item number, availability). Deployed via a smart device, it can be combined with visual information and multimodal input options to complement speech interaction. Voice command-and-response dialogs can be revised or refined to suit precise tasks applicable to the specific environment.

ColorCode
EPG 7108 | #9e2172



Worker Guidance

Supportive Technologies > Voice Assistance

Supports, guides and instructs workers in workflow sequences (e.g., complex sequences of parts assembly) by offering step-by-step instructions where appropriate. Visual support information can be added, depending on the hardware device in use. Voice technology therefore enables faster onboarding of inexperienced or seasonal staff, increases the quality of work with fewer errors and ensures standardized processes across the organization.

CAPABILITY-BASED THINKING IS **THE FUTURE**

The gap between planning and execution is closing. Capability-based thinking is here to stay as a key aspect of supply chain execution (SCE) now and in the future.

Its flexibility is ideally suited to the technological advances being provided by artificial intelligence (AI) applications as well as global megatrends. These include sustainability and climate change concerns, as well as the need to manage near-constant unpredictable disruptions — which by necessity will play an increasingly important role in supply chain strategies.

It will no longer be enough for companies to assume that future outcomes will match those of the past. Traditional planning methods will become too slow for effective use. Instead, planners need to deploy advanced analytics and business intelligence technologies to allow them to respond to fast-changing market dynamics with agility and confidence.

This flexibility is enabled by modularity. SCE systems built on precise, capability-based formulas can be enhanced by adding modules as relevant functions become available, rather than switching to an entirely new product suite. Such enhancements and advances are likely to become a requirement for supply chain planners, not a choice.[4]



[4] Brenda Westbrook, Caleb Thomson (May 2023): Embracing the Future: A Guide to Successfully Implement AI/ML in Supply Chain Planning

SUPPLY CHAIN EXECUTION: EXAMPLE OF CAPABILITY-BASED SOLUTIONS

To gain a sense of how the various capabilities and disciplines work together, consider this case study depicting a typical supply chain execution journey. The starting point is the shipment's arrival at the warehouse or DC. The process passes through the warehouse to the transportation of the goods out of the facility and on to their arrival at the final customer.

The graphic to the right is an illustrated example of the module capabilities that might be added to a software solution as the result of emerging technologies — such as AI — or in response to socioeconomic shifts that generate new demands and requirements for sustainable supply chain execution.



Figure 4: Use case in supply chain with breakdown of capabilities

AI IN THE SUPPLY CHAIN: USE CASES

The 2021 Gartner Supply Chain Wants and Needs Survey identified the prime motives for supply chain organizations to invest in emerging technologies as the needs to:

- support new business/operating models;
- improve supply chain resiliency/agility;
- enhance decision making;
- improve process efficiency/productivity; and
- address labor constraints or shortages.

It identified three focus areas of emerging technology investment:

AUTOMATION

Supplementing, enhancing or replacing humans with things that can perform tasks independently.

INTELLIGENCE

Leveraging technology to make better, faster and more informed decisions.

RESILIENCY

Leveraging technologies to help address growing supply chain complexities.



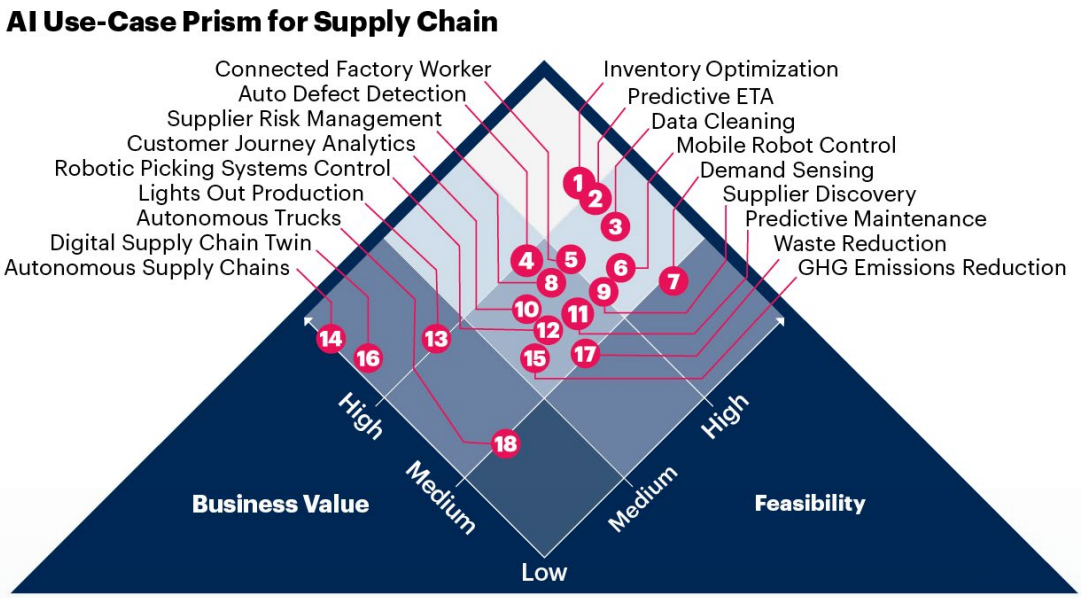


Figure 5: AI use case prism for supply chain

Gartner

"Artificial intelligence (AI) presents an opportunity to transform a range of use cases in the supply chain. AI can be embedded in use cases that span plan, source, make, transportation, warehousing and customer fulfillment functions. AI can also support supply chain priorities to improve quality and sustainability efforts."[5]

Gartner Use-Case Prism for Supply Chain, published in May 2023, identifies top AI use cases in supply chain functions. It shows the extensive list across a range of business value and feasibility dimensions, including revenue growth, efficiency gains, talent and technology readiness and service improvement, among others. The degree of risk and feasibility are significant factors in the prism.[6]

Each and every supply chain organization should assess such a chart with forensic focus on its own requirements and maturities. The use cases reveal a strong picture, not only of the general business benefits gained, but also of how such capabilities can bring benefits across the breadth of supply chain categories as defined by EPG ColorCards: **Warehouse Management, Transportation Management, Workforce Management, Distributed Order Management, Global Trade Management, and Contract and Billing Management.**

[5] Dwight Klappich, Christian Titze, Tim Payne, Amber Salley, Simon Tunstall (November 2022).: Predicts 2023: Supply Chain Technology
[6] Noha Tohamy, Lindsay Azim, Beth Coppinger, Cian Curtin, Simon Jacobson, Dwight Klappich, Ankur Mehta, Tim Payne, Christian Titze, Carly West (May 2023): Use-Case Prism: Artificial Intelligence for Supply Chain

ARTIFICIAL INTELLIGENCE: HUMANS IN, ON AND OFF THE LOOP

Artificial intelligence (AI) is set to transform supply chain planning and execution. However, it would be a serious mistake to trust AI-generated intelligence to the exclusion of everything else — particularly the ingenuity and adaptability of the human mind.

Successful utilization of AI in the supply chain should therefore keep humans in the loop, on the loop and off the loop.

First, decisions are made by humans in reaction to alerts, visualizations and other supports generated by AI.

Second, AI identifies patterns and generates recommendations which humans then analyze and either approve or reject the advised actions.

Third, all decisions are made autonomously by machines using forecasts, simulations, predictions, rules, optimization or other AI. Human intervention only occurs when exceptions arise.

Another reason it would be a mistake to assume AI trumps all else at all times: There are cases in the supply chain where mathematics can still beat the machine.

Take route planning, for instance, a key component of vehicle routing and scheduling (VRS) capability. It is not uncommon for special cases to arise during this process. For example, a delivery at the edge of a destination area might be limited by specific vehicle type regulations (such as electric) as well as narrow weight restrictions. It is rare, but in route planning, it happens.

That infrequency, however, makes it less likely that an AI-based system will learn it. If intentionally fed in, that system is likely to draw incorrect conclusions as to the vehicle type and mix. With algorithmic planning — driven by mathematics rather than AI — the rare situations can be explained and managed in ways that AI cannot match.



THE POWER OF ANALYTICS FOR INFORMED DECISION-MAKING

The field of analytics is certain to represent one of the great leaps in supply chain management over the next decade, forming an integral part of state-of-the-art and future solutions. The explanation is simple: Analytics in different forms are at the very core of the opportunity to enhance decision-making, to help address labor issues and to improve supply chain agility, resiliency and repeatability. All are prime motives for investment.

Verifiable evidence supports confident decision-making. Leveraging a versatile analytics capability supplies that evidence, which falls into broadly definable categories:

Descriptive analytics (What has happened?)

Predictive analytics (What will happen?)

Prescriptive analytics (What should I do?)

Diagnostic analytics (Why has it happened?)

The ultimate aim of A&DI platforms is to take supply chain organizations toward a more flexible, adaptable and composable analytic approach through the following journey:

MONITOR, ALERT, NOTIFY AND PRESENT
The use of visual exploration and analysis, data storytelling, dashboarding and reporting provides contextual exploration and business intelligence. This primarily targets business analysts or the analytics developers who author content.

EXPLORE AND DIAGNOSE
With the use of augmented analytics and self-serving analytics capabilities, the analytics and business intelligence (ABI) space is converging with data science and machine learning (ML), while becoming AI-enabled. The standard business analyst is becoming a power user and lowering the bar for adoption by augmented consumers of analytics.

PREDICT AND PRESCRIBE
Data science methods from computer science, statistical analysis, ML techniques, cognitive behavioral science, decision science and engineering, and domain and subject matter expertise from diverse fields are allowing experts within supply chain to understand and support better decisions making.

GENERATE, ADAPT AND LEARN
Advanced analytics and AI techniques allow organizations to generate new information, adapt to changes in data or business operations and learn from the additional insights.[7]

[7] Christian Titze, Noha Tohamy, David Pidsley, Leonard Ammerer (June 2023): Market Guide for Analytics and Decision Intelligence Platforms in Supply Chain

EVOLVING CAPABILITIES FOR MANAGING AND MEASURING **SUSTAINABILITY**

Alongside emerging technologies, global megatrends will have a huge impact on the future priorities of supply chain planners. Chief among these will be sustainability and climate change.

Many capabilities can be added to modular software suites to help address cost and efficiency challenges in this sector. In transportation management, dock and yard management and vehicle routing and scheduling, fast, accurate data reporting to improve cost and time efficiencies is central, with capabilities in all disciplines geared toward reduced fuel, idling and emissions numbers.

Example capabilities of available technologies include carbon management; environmental, social and governance (ESG) reporting; supplier data collection and management; Scope 3 emissions measurement; and tools to aid circular economy initiatives. Companies will need to adapt swiftly because national and international regulation will play an important role throughout the next decade.



CONCLUSION

Supply chain technology is evolving and adapting quickly to meet the fast-changing and variable needs of those who require it. That duality will likely never change.

However, there is another central truth at the heart of the quest for better efficiency, lower costs and more visible operations – people remain central and will continue to make the decisions.

EPG ColorCards are here to help supply chain organizations make the right decisions as business evolves. They can be used to select the suite of capabilities that are the right ones for today, tomorrow and the future.



Source: EPG

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This point of contact is designed to ensure we remain at the forefront of the industry benchmarks, ensuring that every piece of input is evaluated impartially and in detail.



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