

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-

¹Dwight 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) and global trade management (GTM). 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.

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THREE KEY INGREDIENTS FOR A SUCCESSFUL SUPPLY CHAIN



Figure 1: Key ingredients for a successful supply chain

CONTENTS

EPG COLORCARDS FOR SUPPLY CHAIN EXECUTION CAPABILITIES	5 – 6
CAPABILITY-BASED THINKING	6
THE EPG COLORCARDS CATEGORIES	7 – 8
WHAT ARE CORE AND EXTENDED SOFTWARE CAPABILITIES?	9 – 10
USING EPG COLORCARDS	11
SUPPLY CHAIN EXECUTION CAPABILITIES	
WAREHOUSE MANAGEMENT	12 – 19
TRANSPORTATION MANAGEMENT	20 – 42
WORKFORCE MANAGEMENT	43 – 46
DISTRIBUTED ORDER MANAGEMENT	47 – 51
GLOBAL TRADE MANAGEMENT	52 – 56
CONTRACT AND BILLING MANAGEMENT	57 – 62
SUPPORTIVE TECHNOLOGIES	63 – 67
CAPABILITY-BASED THINKING IS THE FUTURE	68
SUPPLY CHAIN EXECUTION: EXAMPLE FOR CAPABILITY-BASED SOLUTIONS	69
AI IN THE SUPPLY CHAIN: USE CASES	70 – 71
ARTIFICIAL INTELLIGENCE: HUMANS IN, ON AND OFF THE LOOP	72
THE POWER OF ANALYTICS FOR INFORMED DECISION-MAKING	73
EVOLVING CAPABILITIES FOR MANAGING AND MEASURING SUSTAINABILITY	74
CONCLUSION	75
GARTNER REPORT – PREDICTS 2025: SUPPLY CHAIN PLANNING TECHNOLOGY	76 – 87
PROVIDE YOUR FEEDBACK	88
REFERENCES AND ADDITIONAL READING	89

CLICK ON THE
REGISTER TO
NAVIGATE WITHIN
THE DOCUMENT

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

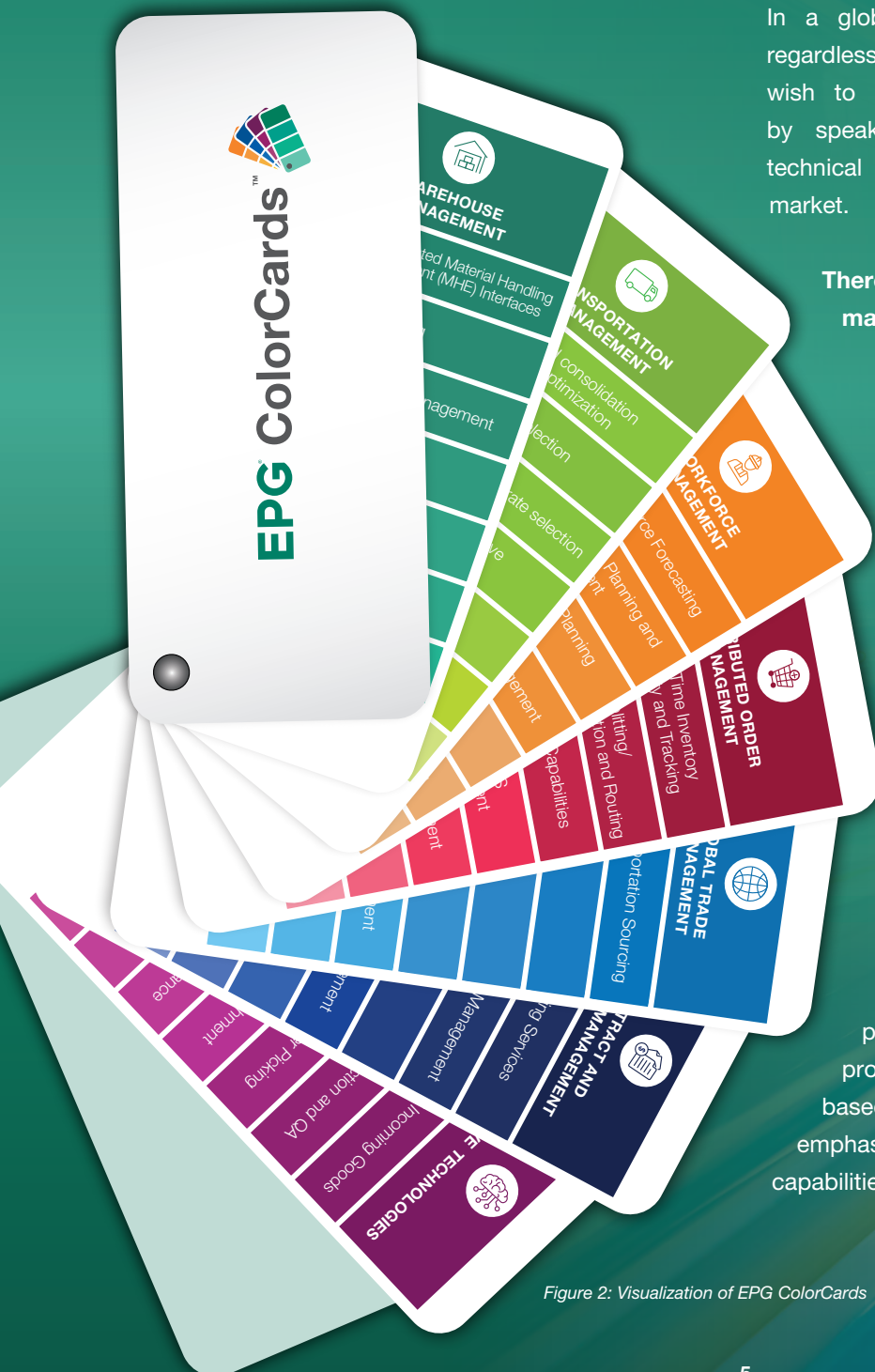


Figure 2: Visualization of EPG ColorCards

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.

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 monolithic product. Instead, individual versioning — paying only for the required capabilities and enabling

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.

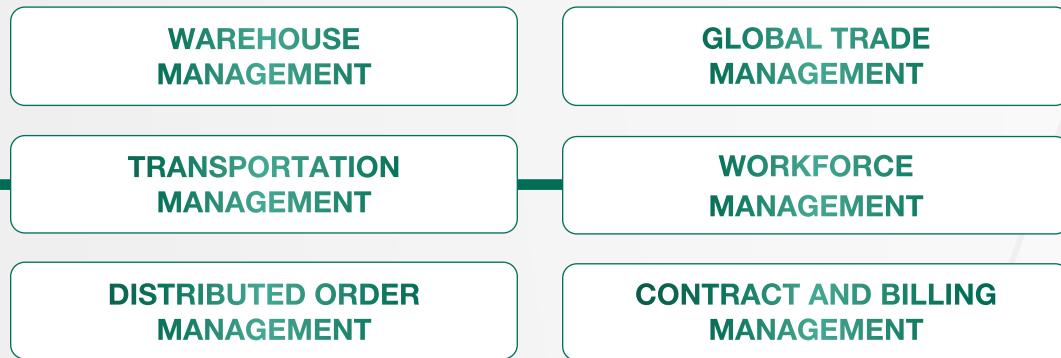
By highlighting the supply chain as a whole — rather than focusing on each area separately — the interconnectivity of each individual area can be better understood. From order management to warehouse management to transportation management, this will allow companies to optimize their supply chain processes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

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:



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.

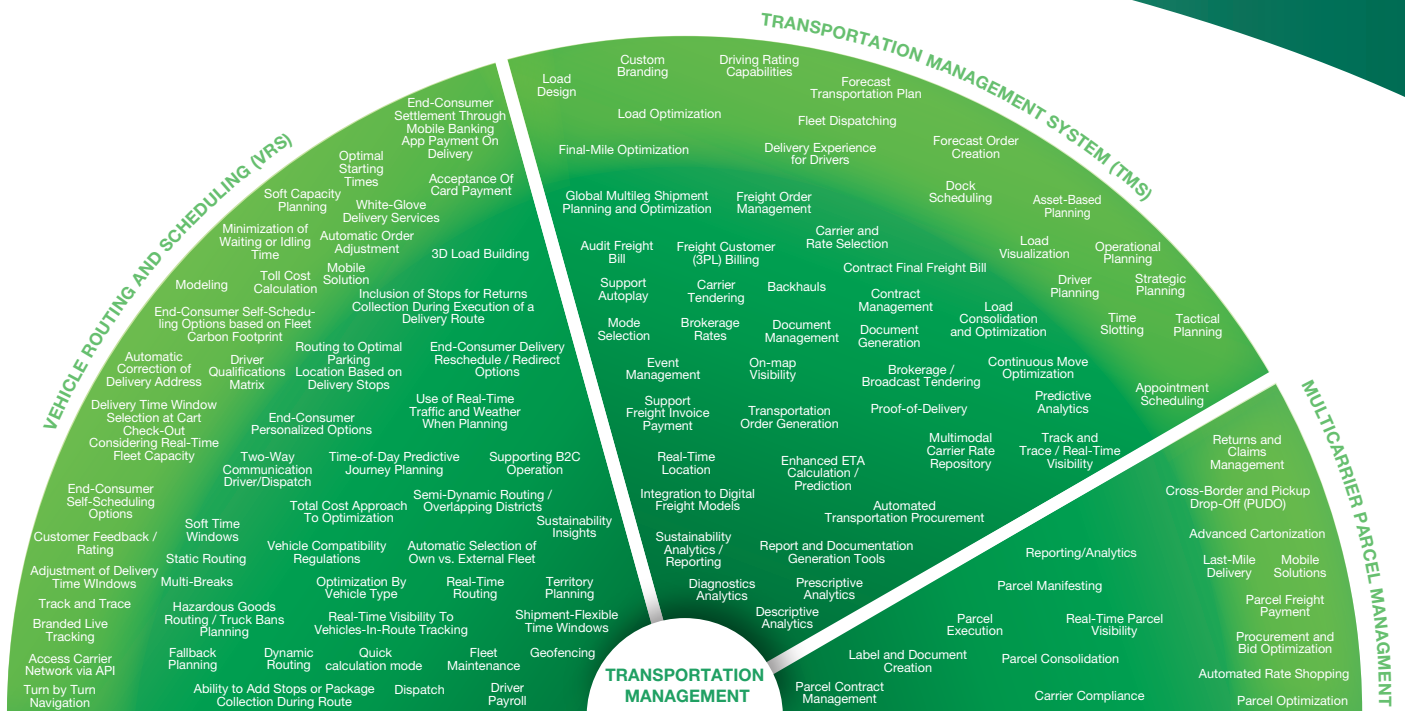
Where a capability exists, it is almost certainly in response to a past question asked by a customer, if not already identified by a software vendor as a future important need. Proactive awareness and anticipation of developing and future customer needs remain key drivers for the dizzying speed of technological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

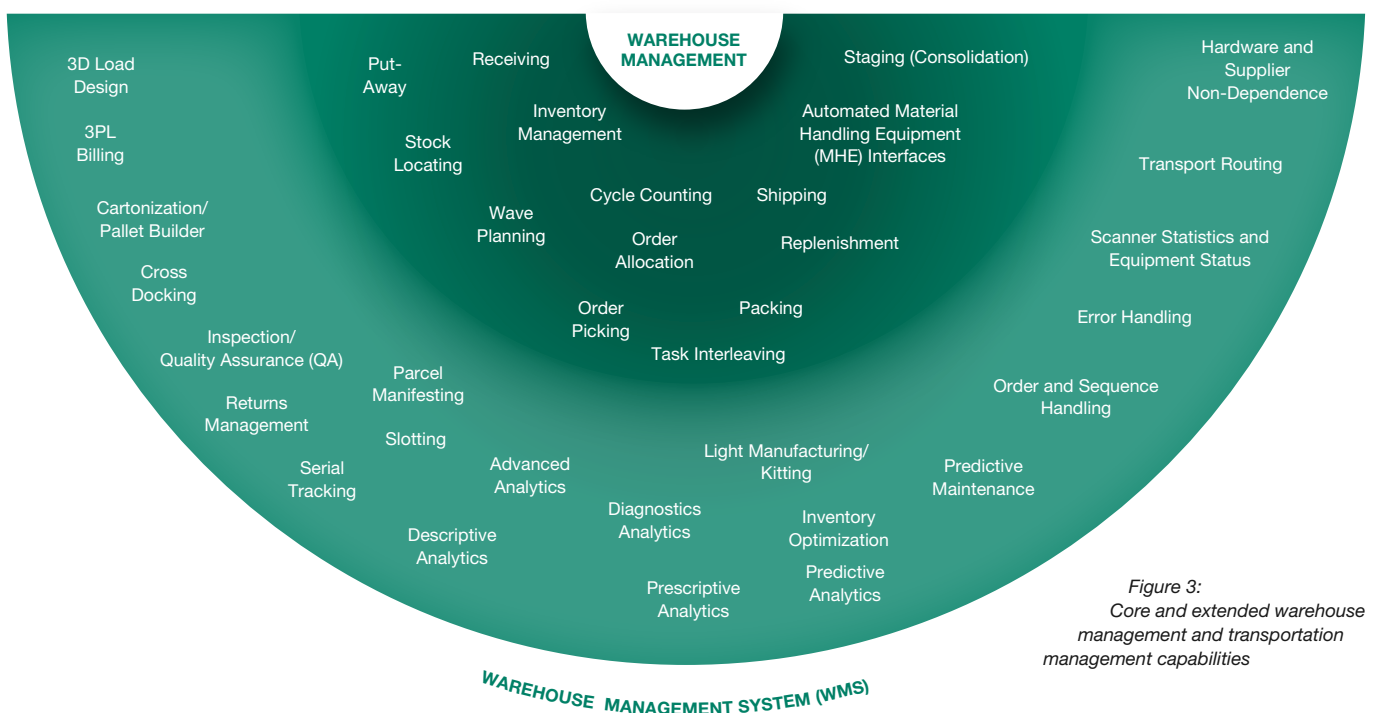
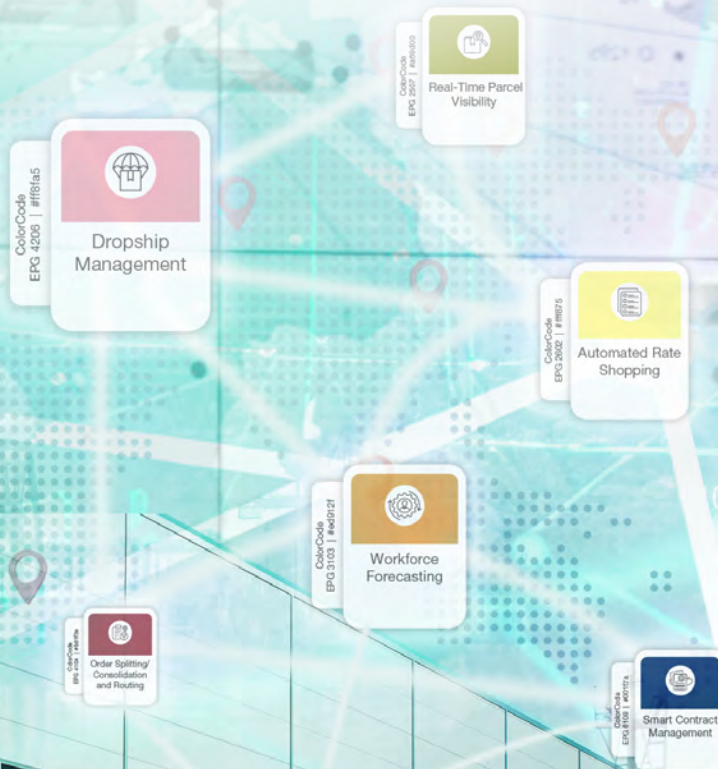


Figure 3:
Core and extended warehouse
management and transportation
management capabilities

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 #2f9e81  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 #32ae87  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



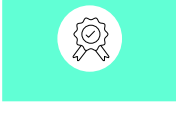
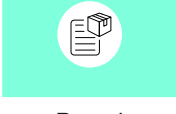
Wave Planning

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 #3dcca6	 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 #3e3e3e8	 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 #433deb4	 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 #473edc1	 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 #4cf6cd	 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 #66ffdc6	 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 #85ffdc	 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 #6bffdb	 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 #52fd1	 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. <i>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.</i>
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 #cddf80  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 #def82	 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 #eefbf1	 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 #f2fcf	 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.

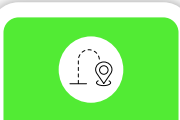
TRANSPORTATION MANAGEMENT

TRANSPORTATION MANAGEMENT SYSTEM | EXTENDED

ColorCode EPG 2213 #def85  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 #ebffb3  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 #33ffd1  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 #aef99e  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 #97f1b2  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 #bdf1b0  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 #caf1bf  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 #99f85	 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 | #9bf187



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 #ff7f66	 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 #ff1875	 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 #ff985	 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 #ffa94	 Last-Mile Delivery	Transportation Management > Multicarrier Parcel Management > Extended Tracks shipment status to final address, captures proof-of-delivery (PoD) information.
ColorCode EPG 2605 #ffa93	 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 #ffbb3	 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 #ff7769  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 #ff8778  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 	Workforce Management > Extended Automatic Planning 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 #ffb77a 	Workforce Management > Extended Demand-Oriented Planning 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 	Workforce Management > Extended Employee Engagement/Gamification 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 #ffc699 	Workforce Management > Extended Performance Benchmarking 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 	Workforce Management > Extended Personnel Cost Planning and Monitoring 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 	Workforce Management > Extended Productivity Monitoring 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 #ffb770	 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 is capable of providing full visibility of the order lifecycle at all times, regardless of order source or inventory/fulfillment location.
ColorCode EPG 4203 #f1335c	 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 #f15274	 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 #ff02951	 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		Global Trade Management > Trade Compliance	Customs Filing	Within a single source, ensures secure control and management of document processing in customs clearance procedures.
ColorCode EPG 5202 #14a5ff		Global Trade Management > Trade Compliance	Denied Party Screening	Screens global lists and identifies restricted or denied persons or entities and sanctioned or embargoed states.
ColorCode EPG 5203 #29adff		Global Trade Management > Trade Compliance	Duty and Tax Management	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		Global Trade Management > Trade Compliance	Export Controls	Ensures compliance with applicable and relevant export controls implemented by local/national authorities.
ColorCode EPG 5205 #52bdff		Global Trade Management > Trade Compliance	Free Trade Agreement and Preferential Agreements Management	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 Management > Trade Compliance	Global Trade Content	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 #255ce6	 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 #9cae6	 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 #6e8c96	 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

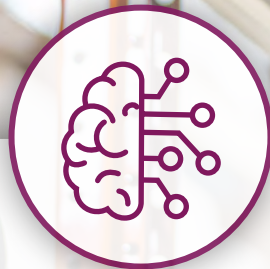
operations managers to determine the best course of action or optimization approach.

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 #406ae6  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 #406ae6  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 #406ae6  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 #406ae6  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 #406ae6  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 #406ae6  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

⁴Brenda 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.

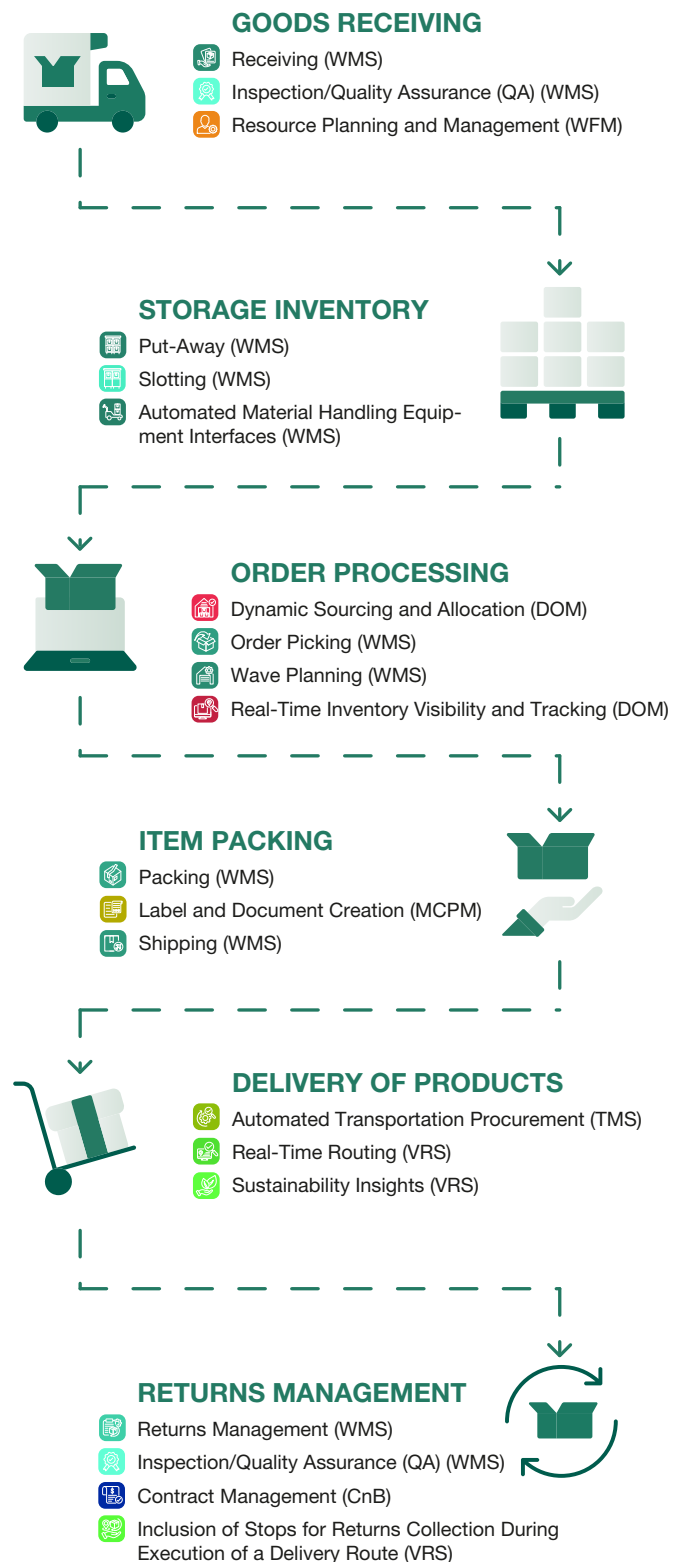


Figure 4: Use case in supply chain with breakdown of capabilities

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.

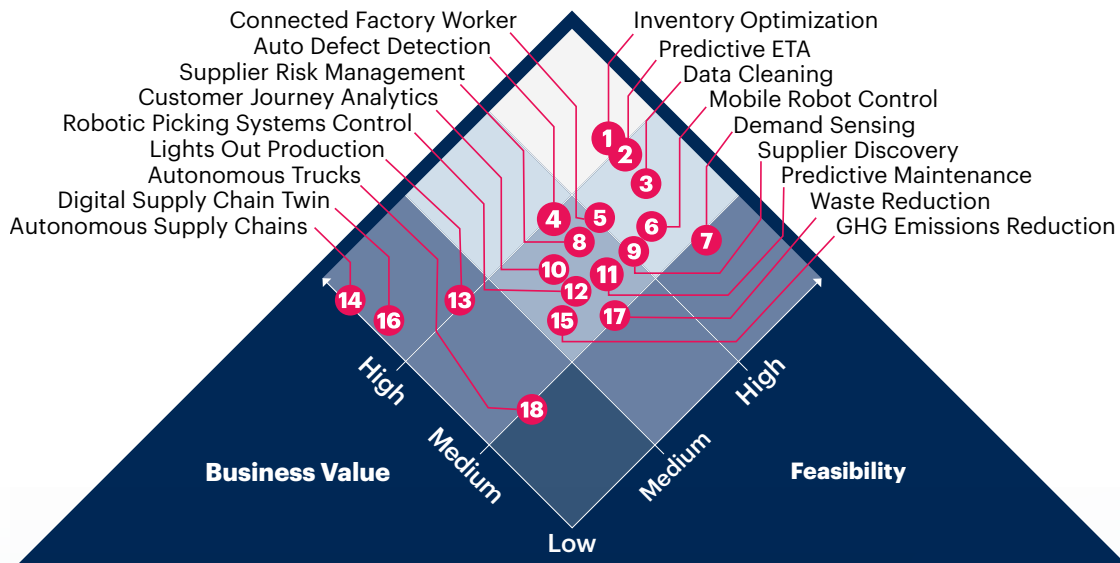
INTELLIGENCE

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

RESILIENCY

Leveraging technologies to help address growing supply chain complexities.

AI Use-Case Prism for Supply Chain



Source: Gartner
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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?)

Prescriptive analytics
(What should I do?)

Predictive analytics
(What will happen?)

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.

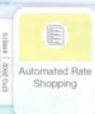
CONCLUSION

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.



Gartner Report

Predicts 2025: Supply Chain Planning Technology

Published 22 April 2025

By Analyst(s): Caleb Thomson, Pia Orup Lund, Jan Snoeckx, Ingrid Gonzalez McCarthy

Predicts 2025: Supply Chain Planning Technology

By Caleb Thomson, Pia Orup Lund, Jan Snoeckx, Ingrid Gonzalez McCarthy

Supply chain technology leaders often cite improving their market position as a key driver for investing in supply chain planning technology. Leaders can use this research to discover where future risks and opportunities lie for supply chain planning technology.

Overview

Key Findings

- The supply chain planning (SCP) solutions market is expected to grow from \$7.62 billion in 2024 to \$15.84 billion by 2029. Further consolidation is anticipated since not all incumbent vendors will be able to meet buyers' expectations on architecture modernization together with functional expansion.
- GenAI can expedite implementation timelines and improve overall quality and success rates. It is likely that this will only improve further in the coming years.
- SCP-T (SCP technology) is productivity enhancing and labor saving, and can also qualitatively improve decision making. It is expected that this will also continue over the coming years.
- Machine learning (ML) analytics in demand planning are available today and help to provide a step change in productivity gains while delivering more accurate forecasts.
- Advanced techniques allow for digital models to be created that anticipate customer behavior based on the historic relationship and other external factors that can provide insight.

Recommendations

- Assess the risk that your SCP solution and provider could be acquired in the future. Consider if this should impact your decision-making criteria during vendor selection.
- Work with SCP-T vendors and third-party systems integrators to understand how emerging technology like GenAI can streamline and improve the implementation process. Each vendor (including systems integrator) will have its own view on how to leverage these tools, including solutions it has developed in-house.
- Maintain a focus on user experience and decision automation to drive productivity improvements when implementing SCP-T, in addition to improved decision quality.
- Establish a data-driven demand planning process for future forecasting with ML technology enabled. Organizations will require process redesign and specialized staff to leverage this technology.
- Determine how to more accurately model customer behavior, based on historic customer demand data and other external market and real-time insight, to create a digital twin of the customer.

Strategic Planning Assumptions

By 2028, the SCP solution market will have grown more than 100%, with 10% fewer broad solution providers.

By 2027, 50% of data integration efforts within planning system implementation will be accelerated by GenAI for code development and analysis.

By 2030, the result of automation in supply chain planning decisions will reduce the need for human planners by 30%.

By 2030, 70% of large organizations will have adopted AI/ML-based forecasting to predict future demand.

By 2029, over 70% of B2C organizations will rely on digital-only representations of customer behavior to predict new product demand.

Analysis

What You Need to Know

This research focuses on the evolving landscape of SCP-T, providing predictions of how the overall market may evolve through 2030. Beyond market growth combined with vendor consolidation, the predictions focus on how technology itself can shape the future of the SCP-T market by creating more efficient implementation (system integration) cycles and reducing the need for headcount growth in planning organizations. By leveraging emerging and available techniques and solutions, the SCP organizations of 2030 will be much better situated to manage dynamic markets, leveraging robust datasets to optimize decision making, and reduce the need for unsupported assumptions.

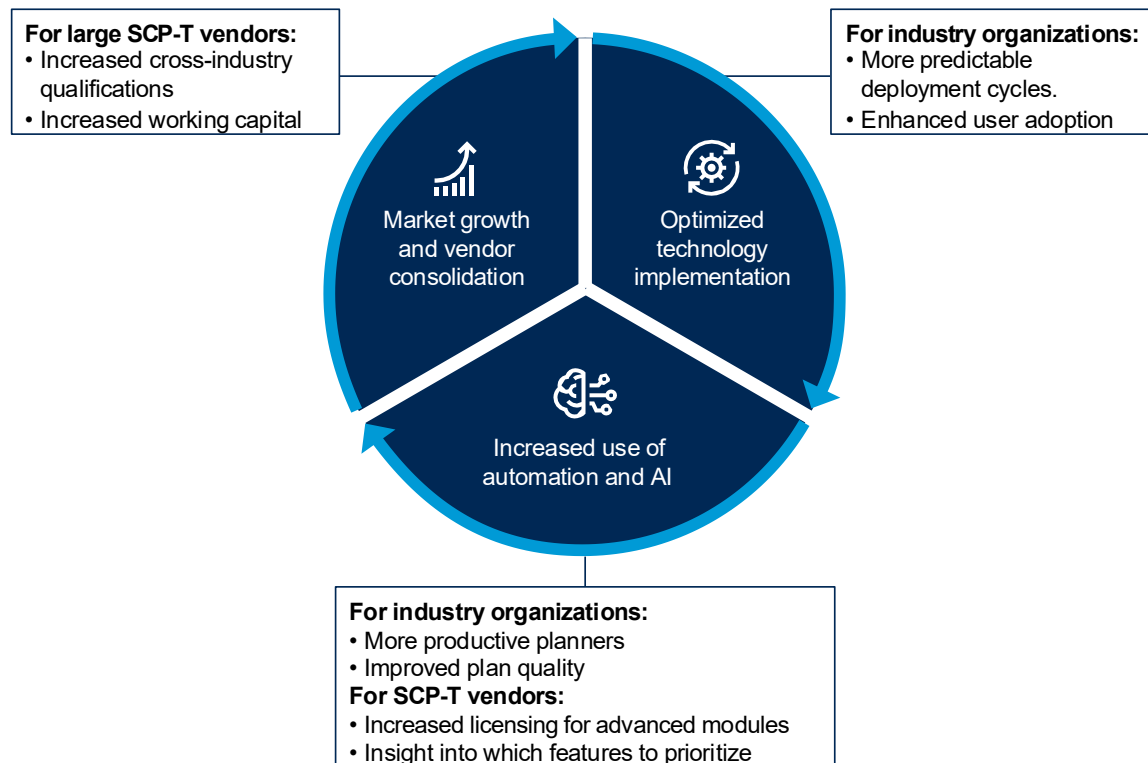
In our SCP-T predictions this year, we identify two categories of trends around:

- Software and service providers
- Planning optimization (including operational optimization)

Figure 1 shows how these trends can become self-reinforcing to drive further competition in the market as well as the industry adoption of advanced techniques that can boost both productivity and the quality of decision making in SCP.

Figure 1: Synergistic Effects Will Drive Consolidation and Solution Advancement

Synergistic Effects Will Drive Consolidation and Solution Advancement



Source: Gartner
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We continue to see a double-digit growth market attracting new entrants as well as M&A activities such as Logility's 2023 acquisition of Garvis, building upon its prior acquisitions, including the 2022 acquisition of Starboard Solutions. Additionally, in January of 2025, Aptean announced the intent to acquire Logility. Similarly, we see incumbent vendor consolidation of mature solution vendors, such as Blue Yonder's 2024 acquisitions of One Network Enterprises and Flexis (both previously honorable mentions in our Magic Quadrant for Supply Chain Planning Solutions).

Consolidation within this market is expected to continue, creating greater opportunity for industry customers of SCP-T vendor solutions to realize a singular and best-in-class technology footprint. Beyond core SCP-T capabilities around demand, inventory and plan optimization, emerging technologies such as GenAI also help to optimize the implementation (system integration) cycle.

While GenAI is still at the peak of our 2024 Hype Cycle for Supply Chain Planning Technologies, we are beginning to see the first opportunities for deployment into productive use, primarily as an advanced search function for existing documentation. Beyond planning technology vendors, we are also seeing third-party systems integrators (SIs) starting to develop GenAI-based service offerings to differentiate within the implementation cycle. Currently, many global SIs are leveraging internally developed GenAI tools to support project documentation search and development, and end-user training needs from their clients' organizations. This is expected to evolve further to provide greater quality and clarity into the SCP-T implementation cycle, including GenAI use to help in custom interface and other custom software development needs that exist within SCP-T system integration.

This advancement of technology solutions, supported by acquisition of innovative recent entrants and improved software delivery cycles, is resulting in the increased adoption of labor-saving, productivity-enhancing and decision quality-improving software. Emerging planning capabilities depend on large, historic datasets that include external market signals to drive improvements to both decision quality and cycle time. By leveraging these methods, planning organizations can realize opportunities for greater levels of decision automation that can free up planners to focus more on only the most complex and chaotic decisions they face.

Strategic Planning Assumptions

Strategic Planning Assumption: By 2028, the SCP solution market will have grown more than 100%, with 10% fewer broad solution providers.

Analysis by: Jan Snoeckx

Key Findings:

- According to the Gartner Enterprise Application Software Forecast, the SCP solutions market will grow from \$7.62 billion in 2024 to \$15.84 billion by 2029, representing growth of more than 100% in market value over the course of five years.¹
- The average age of vendors represented in the 2025 Magic Quadrant for SCP Solutions is more than 30 years, indicating a mature market with high entry barriers for newcomers. Established vendors continue to expand their functional depth and breadth through acquisitions and R&D.
- Most leading SCP vendors are modernizing their architecture and underlying technology stack, which is time- and investment-intensive. Not all vendors have the resources to meet the buyer expectation to combine modernizations while extending their functional scope significantly, including with GenAI, and limiting technical debt. This will lead to further market consolidation.

Near-Term Flag:

According to the 2022 Gartner Supply Chain Business Case Survey, the technology solutions supporting supply chain processes are consolidated after completion of the SCP transformation effort.² This indicates that companies are choosing a single technology vendor for broader scope solutions that can cover an extensive list of functional requirements and act as a foundational business application.

Market Implications:

The SCP solutions market is appealing to vendors, considering its historical and projected growth trajectory. We expect new entrants and an increase in competition and innovation. New entrants will often develop competitive advantage by focusing on specific regions, industries or use cases, such as AI/ML forecasting, and developing a narrow functional scope of solution capabilities, at least initially. While opting for newer vendor spot solutions can be appealing for supply chain planning leaders, this might introduce risk with regard to establishing target end-state capabilities. This is especially true when the end-to-end business needs are not sufficiently considered, such as end-to-end scenario planning across demand and supply.

On the surface, a broader offering with more choice can be expected in the coming years; however, fewer vendors will remain and offer complete capabilities that cover demand, supply, inventory and replenishment planning. New entrants will need to become large, focusing on capital as a competitive advantage, to cope with steep competition and to overcome entry barriers such as long sales cycles and incumbent planning systems. The barrier to entry reduces the list of potential entrants to, for instance, hyperscalers or vendors from adjacent markets, such as financial planning and analysis. This will lead to a decline in choice when evaluating and selecting broad scope planning solutions.

Collaboration with SCP solution vendors will become a strategic activity, considering that more planning processes and users will be supported by one single solution. Thus, the selected solution will be more critical compared to using multiple spot solutions from a variety of vendors.

Recommendations:

- Create an extensible technology roadmap that underpins business agility, particularly a composable technology and data architecture that supports horizontal and vertical end-to-end scenario planning and decision making.
- Invest in planning technologies that have a demonstrated continuous modernization and innovation track record by not only looking at vendor roadmaps and their ability to invest continuously in new and emerging technologies, but also by analyzing their functional and technical enhancements of the past two years.
- Develop a strategic partnership with your SCP solution vendor to ensure there are continued R&D investments in technology capabilities that are required for your business.

Strategic Planning Assumption: By 2027, 50% of data integration efforts within planning system implementation will be accelerated by GenAI for code development and analysis.

Analysis by: Caleb Thomson

Key Findings:

- SCP solution vendors continue to prioritize enhanced data integration using cloud technologies and APIs. By improving and standardizing data flows, supply chain planning leaders can more readily realize reduced cycle time for data integration, leveraging GenAI for interface development.
- SCP solution vendors are beginning to mention, and position, direct supply chain planning data lake and data fabric capabilities within solution sales cycles. These are foundational elements to further reduce data interface development cycle time.
- Third-party systems integrators also continue to focus on data quality and governance as part of the implementation scope to drive client and supply chain performance outcomes from technology deployment. Offshore support teams are increasingly transitioning beyond system support to data management, expanding the visibility of data-interface-related deficiencies. GenAI can accelerate remediation.
- As data quality, availability and latency continue to improve, supported by standard, cloud-hosted solution environments, GenAI solutions can be more fully leveraged to support supply chain organizations' distinct system and data integration needs, including planning.

Market Implications:

As organizations drive toward a modern system architecture and cloud-hosted vendor solutions, their data integration needs will become less complex. Coupled with GenAI capabilities for code development, which can be proficient at logical mapping and code generation, this creates an opportunity to reduce the complexity of point-to-point data integration needs and reduce the cycle time required for code development and analysis.

Organizations with rationalized supply chain technology portfolios and modern cloud-hosted solutions will be better-suited to drive future acceleration of data integration efforts. Legacy solutions leveraging outdated architectures, including middleware, and programming languages will be more likely to have a build-up of technical debt and poor practices around data quality and use. These create further complications for those organizations as they seek to drive continued modernization in their planning processes to become more decision-centric.

Recommendations:

- Validate existing supply chain system architecture, including execution systems, planning solutions and middleware, to understand current technical debt, data latency and availability constraints. These will be more challenging to address as part of future data integration efforts.
- Vet SCP solution vendors for their off-the-shelf capabilities to integrate with common supply chain execution systems, including ERPs, and with data lake/cloud-data-platform environments. These will create a strong foundational starting point for driving reductions in data integration development work volume by leveraging GenAI for interface development.
- Work with third-party systems integrators that can leverage internally developed and commercial data integration and interface development tools to realize faster point-to-point integration development, which increasingly will involve GenAI and related capabilities (i.e., data fabric).

Strategic Planning Assumption: By 2030, the result of automation in supply chain planning decisions will reduce the need for human planners by 30%.

Analysis by: Pia Orup Lund

Key Findings:

- SC technology is highly prioritized in the majority of companies. According to the 2025 Gartner Supply Chain Technology User Wants and Needs Survey, 78% of high-performing organizations plan to increase the investments in supply chain business applications over the coming two years.³
- Gartner Peer Insights data shows that 74% of organizations invest in supply chain planning solutions to become more efficient internally, which is largely achieved through automating decisions.
- SCP solution providers focus on automation as part of their research and development efforts, which is highly driven by customer demand.

Near-Term Flag:

The 2022 Gartner Supply Chain Planning Business Case Survey found that supply chain planning solutions drive planner productivity through automation. The current typical range of improvements is 5% to 15%, with some companies reporting significantly higher improvements.² With the increased focus on automation from both SCP solution vendors and end-user organizations, the degree of automation is expected to increase, impacting the need for human planners.

Market Implications:

Many end-user organizations are looking for technology to support growth while limiting the need to hire more resources. As the use of supply chain planning solutions increases across organizations, the level of automation is expected to also increase, resulting in more efficient SCP decision making.

An important factor for automation in SCP decision making is the use of more advanced techniques, such as AI and advanced analytics, in SCP solutions. The broader use of these techniques has the potential to change the way planning is performed in different organizations. This means we will increasingly see the roles and responsibilities of planners change as the nature of their tasks changes.

We anticipate a shift from planners manually updating plans — a repetitive task — to concentrating on modeling rules, business policies and priorities in the SCP solution, which is less frequent. This approach allows the technology to generate high-quality, actionable, end-to-end plans. As part of this transition, organizations must pay attention to the skills and profiles of their future planning workforce alongside the size of the planning organization.

While the use of technology and higher degrees of automation is a priority for many organizations, it still isn't easy to achieve. Data shows that organizations are currently struggling to adopt SCP solutions consistently across their planner workforce. Therefore, it is important for organizations to pay special attention to how they maintain or increase the user adoption of their tools to ensure a high ROI.

Recommendations:

- Invest in technology to improve and automate SCP decisions. Focus on capabilities that create high-quality plans while ensuring a high degree of automation.
- Create a roadmap for how to increase automation through the use of technology alongside changes in organization (size and structure), roles and responsibilities, etc., to reach the automation goals.
- Evolve the skills and profile of the planners as the nature of their tasks changes. This may prove difficult for some current planners, so it will likely result in some planners moving to different tasks/jobs.
- Track levels of adoption of the technologies, and plan and execute activities that focus on maintaining or increasing user adoption.

Strategic Planning Assumption: By 2030, 70% of large organizations (i.e., revenue greater than \$1 billion) will have adopted AI/ML-based forecasting to predict future demand.

Analysis by: Jan Snoeckx

Key Findings:

- ML-based forecasting technology as a complement or alternative to statistics is now available, with 85% of leading SCP solution vendors offering it and ensuring ongoing investment.
- Seventy percent of companies adopt SC solutions before the technology is fully mature and several iterations of the technology have been released, according to the 2025 Gartner Supply Chain Technology User Wants and Needs Survey.³
- New SCP market entrants apply an ML forecasting-first approach, making classical statistical methods substandard from a technology point of view.

Near-Term Flag:

In 2024, the adoption rate of ML-based forecasting reported across all leading SCP solution providers was 20% within their client base. This aligns with the risk appetite toward SC technologies that are emerging in early stages of commercialization with demonstrated successful deployment by industry leaders. Further validation should be made to track the adoption of ML-based forecasting methods, especially as to when a majority (i.e., more than 50%) of industry organizations adopt these methods.

Market Implications:

Limited productivity advancements have been made within the demand forecasting function since the introduction of statistical engines in the early 90's. Now there is an opportunity to gain productivity and accuracy, and break through traditional barriers imposed by statistics, such as frequency, granularity and type of data sources, by leveraging ML analytics.

However, making use of ML forecasting in place of traditional statistical engines requires more than only making the technology investment. Different skill sets are required, as well as the need to rethink organization, processes and data usage. This is because enrichment data becomes part of an automated flow, rather than being layered manually on top of the baseline forecast, including forecast enrichment sources such as channel partner point-of-sale (POS) feeds and economic indicators.

While most SCP solution vendors are adding ML capabilities to their existing statistical engines, we expect that in future iterations, those capabilities will become the foundations in part or as a full replacement of the statistical engines, driven by standardization and simplification reasoning.

Recommendations:

- Include ML forecasting in your SC planning technology roadmap as a foundation, rather than an add-on, as part of an overarching AI vision and strategy.
- Evaluate and select beyond forecast accuracy improvements as measured through a blind test. Assess the vendor's capabilities and vision on data science, data integration, data management and data governance.
- Start looking for additional market driver data sources now that can feed into the ML engines delivering additional predictive value, and develop a governance and management approach for these data sources.

Strategic Planning Assumption: By 2029, over 70% of B2C organizations will rely on digital-only representations of customer behavior to predict new product demand.

Analysis by: Ingrid Gonzalez McCarthy

Key Findings:

- According to the evolution spectrum for the metaverse, a majority of organizations will have advanced metaverse capabilities by 2029.
- Fully immersive online communities are expected by 2028 in 63% of organizations.
- As of June 2024, the industry average forecast accuracy rate for new product introductions (NPI) was only 48%. This remains a top driver of waste and inefficiencies.

Near-Term Flag:

Organizations have been increasing their investment in and use of immersive online communities since 2024.

Market Implications:

Organizations are continually challenged to increase the diversity of offerings to customers; however, the speed to market and accuracy of expanded offerings have not improved over time, limiting the business impact of these offerings. Concept to market in transformational projects has a median cycle time of 18 months, while projects that are incremental have a median of 8 months cycle time. When this prediction becomes a reality, concept-to-market cycle time will be reduced as consumer needs identification and matching will be faster, since working with online communities is faster and less expensive than searching and building live focus groups. Accuracy will improve because of both scenarios: working in the metaverse where testing and profiling can be done in multiple settings, and with online communities where there is plenty of data to improve the likeability of new products.

Recommendations:

Identify which drivers of new products are related to consumer and market data.

Increase your online community presence and start piloting virtual interactions with a small representative group of consumers.

Work with vendors and internal areas of the organization to integrate data into the demand planning process as changes in behavior are sensed.

A Look Back

In response to your requests, we are taking a look back at some key predictions from previous years. We have intentionally selected predictions from opposite ends of the scale — one where we were wholly or largely on target, as well as one we missed.

On Target: 2024 Prediction — By 2024, 0% of companies will have achieved autonomous planning.

- While some organizations have achieved a limited level of “touchless planning” across their portfolios, these tend to be across very stable demand pattern products, such as consumer staples or other products managed via stable min/max replenishment models.
- No organization has achieved a completely autonomous end-to-end SCP capability. This continues to be limited by market dynamics, technology and data availability.
- To realize high levels of autonomous planning, SCP leaders need to more fully collect, interpret and represent second-party (customer and supplier) and third-party (other market intelligence) data into their planning models to create a true digital twin of the supply chain.
- Supply chain organizations that operate with extended second- and third-party data models are more likely to be high-performing organizations that consistently meet or exceed their goals and objectives.²

Missed: 2022 Prediction — By 2026, more than 75% of commercial supply chain management (SCM) applications vendors will deliver embedded advanced analytics, artificial intelligence and data science.

- The 2022 prediction is a partial miss because the percentage of vendors offering these capabilities was already greater than 75% at the end of 2024.
- Of the vendors included in the 2025 Magic Quadrant for Supply Chain Planning Solutions, 85% offer some level of AI and ML support. When considering advanced analytics, including predictive and prescriptive decision support and augmentation, the percentage of vendors offering these capabilities increases.

Evidence

¹ Forecast: Enterprise Application Software, Worldwide, 2023-2029, 1Q25 Update

² 2022 Gartner Supply Chain Planning Business Case Survey. This survey was conducted to understand what the supply chain planning (SCP) business case should be — especially when investing in new SCP technology or embarking on significant process improvement projects within SCP. The research was conducted online from 20 April through 6 June 2022. In total, 300 respondents were interviewed across North America (n = 107), Western Europe (n = 98) and Asia/Pacific (n = 95). Qualifying organizations operated in the manufacturing, retail, natural resources and wholesale industries and reported enterprisewide revenue for fiscal-year 2021 of at least \$250 million or equivalent. All organizations had completed a significant SCP implementation or improvement project within the past five years. Qualified participants had a role tied to a supply chain function and were in senior manager roles or above, except for CEO, COO, president, owner or board of directors. All respondents were solely responsible, leader or advisor to the group responsible for making decisions related to recently completed SCP implementation or improvement projects. Disclaimer: The results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

³ 2025 Gartner Supply Chain Technology User Wants and Needs Survey. This survey aimed to investigate the roles of digital and technology in supply chains. It also aimed to assist supply chain technology leaders in their efforts to modernize legacy application landscapes and create credible business cases for their digital transformations. Additionally, it examined how supply chain organizations are structuring themselves to support digital initiatives and their evolving perspectives on effectively leveraging emerging technologies within their supply chain organizations. The survey was conducted online from 16 October through 6 December 2024 among 506 respondents from North America (n = 153), Western Europe (n = 162), Asia/Pacific (n = 111) and Latin America (n = 80). Respondents were from organizations with \$250 million or more in 2023 enterprisewide annual revenue. Industries surveyed included manufacturing (consumer products, industrial, high-tech, life sciences and healthcare), retail, transportation and logistics, and wholesale trade. Qualifying respondents had job roles tied to supply chain function and were involved in decision making regarding supply chain management processes or operations. Disclaimer: The results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

Source: Gartner Research Note G00822979 22 April 2025.

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PROVIDE

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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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