Order-Centric TMS: Managing the Rising Pressures of the Modern Supply Chain

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Introduction:

TMSs Must Evolve to Meet Emerging Supply Chain Challenges

Sustained business success has always relied on more than merely making and selling goods; it has also been about managing delivery and transportation in pursuit of the ‘holy grail’: the “Perfect Order.” Though the principle remains the same – get the products from point A to point B on time and within budget – everything else surrounding this process has changed.

Once commerce went global, the number of viable routes and available modes of transport increased. Businesses started using multi-modal freight, with ocean in tandem with rail and road, as well as air freight to expedite shipments. The need to share pertinent information also evolved as businesses endeavored to dynamically plan, track, and execute shipments more effectively.

In the 1980s and ‘90s, integrated Enterprise Resource Planning (ERP) systems were developed to better support business operations. But they did little to aid supply chain management, so the industry responded with specialized supply chain planning, warehouse management, and transportation management systems. Despite the many drastic changes in commerce which have rattled the 21st century, minor adaptations have allowed these resources to cope for the time being. However, a fundamental aspect of the framework is to separate order management systems (OMS) from transportation management systems (TMS); a siloed approach that was adequate then, but is increasingly limiting businesses, preventing them from effectively contending with today’s mounting pressures.

These systems were initially siloed because of the technological constraints of the time. Their communication was rudimentary and relied on a kind of “batch-mode” handling, wherein orders would be grouped within the OMS then transferred in batches to the TMS for shipment processing and execution. Though TMSs have long since modernized in many ways, they continue to retain this functional architecture, or functional isolation from OMSs. In fact, silos have becoming so routine and unquestioned, that they infiltrate greater organizational structures beyond software packages.

As we gear up for the needs of 2020 and beyond, we need to critically reevaluate this legacy approach to transportation management and the siloed systems that have perpetuated it. The fragmented architecture might have been sufficient thus far, but it introduces many issues for companies operating within expanding and evolving international, multi-enterprise business networks and hinders the supply chain’s continued evolution.
The future requires a much more holistic view of the supply chain, in which the OMS and TMS are not separated but approach all functionality from the perspective of the order. Rather than making stark divisions between types and therefore systems and software, today’s technological advances allows us to simplify the process within a single system that views all order types – whether purchase, sales, return, or transfer – as serving as part of inflows or as outflows from an enterprise location. Systems built from this “order-centric” perspective are designed to manage and optimize across all orders and will be increasingly vital for business excellence in this age of Amazon.

Though the legacy, or functional siloed architecture of TMSs has evolved over the years from big- to split-batches and incorporated rush orders into the core workflow, it is still limited by unnecessary rigidity. Shipment-centricity also limits visibility. Because of their silos, historical TMSs need special processes to obtain contextual information on the orders they ship and gain insight into how other areas of the supply chain are impacted when delays or changes occur. Similarly, the OMS lacks pertinent details about shipments, curbing any chance for optimization and intelligent planning.

Many legacy Transportation Management Systems have tried to evolve to compensate for these shortcomings; for instance, by incorporating electronic communication and data interchange, either through EDI, Web Services, or APIs. Yet, these upgrades are insufficient advancements: They improve the efficiency of discrete functions without addressing the functional issues of the system as a whole. A 2018 IDC Supply Chain Survey found that 33% of TMSs are already in the cloud, and 40% will transition by 2020. Yet, even these so-called modern and cloud-based Transportation Management Systems have a siloed approach and are therefore caught in the same batch-mode paradigm, within an inherently rigid and restrictive process.

Most early transportation management software packages aimed to advance and modernize these systems, but narrowly focused on strengthening a specific mode of transport or need within a particular area or nation. Many organizations have made concerted efforts toward cohesion by acquiring complementary TMSs that address multiple modes or geographies. But this too misses the root of the problem. Businesses still end up accumulating disparate software packages as they grow, because even complementary options are not exhaustive. Moreover, even vendors offering a TMS suite achieved their product by cobbling together multiple packages through mergers. What remains beneath these attempts are disparate architectures and an underlying data model that is incompatible and siloed, hindering holistic decision-making and proactive responsiveness to market forces.

The modern requirements of Transportation Management Systems are therefore outgrowing the historical frameworks that contemporary systems still use. It’s time we start challenging the batch-oriented, shipment-centric approach of TMSs and explore alternate ways of planning and executing transportation on the whole. It’s time we trade in workaround solutions for one that is native to the modern needs of the supply chain.

This paper will discuss the modern challenges of the supply chain in greater depth, clarify how existing legacy TMSs are inadequate to handling these challenges, and offer a new perspective and way forward for effectively managing transportation in the twenty first century.
The Pressing Needs of the Modern Supply Chain

Over the last 20 years, the Internet has become pervasive, revolutionizing how people live their lives and do business. E-commerce and global trade have grown, introducing a host of new challenges and opportunities for the supply chain industry. Specialized vendors and service providers began teaming up to manage rising consumer expectations and shortening product lifecycles.

Today, the notion of a networked supply chain is increasingly commonplace. IDC predicts that by 2020, half of the large organizations will have begun shifting their supply chain applications from enterprise centric to network centric, driving productivity gains. In this collaborative environment, different organizations assume various, contingent roles when partnering with one another, switching between customer, vendor, and service provider as needed. As a result, more and more businesses are realizing that the linear supply chain model is collapsing in favor of this matrixed one.

In the new global playing field, supply networks must continuously morph and adapt to cope with everything from geopolitical change (Brexit, NAFTA) to environmental disruptions (tsunamis, volcanoes), and also take advantage of structural adjustments, like the widened Panama Canal, which can now support the passage of greater tankers and sea going vessels.

Additionally, goods delivery models are continuously evolving to keep pace with competitive pressures and market demands. Businesses must be ready and able to switch smoothly between various modes and service levels of delivery, and incorporate and support many types of transportation flows, like milk runs, shuttle runs, line-hauls, pool points, and whatever innovations come next.

Given these new and evolving pressures of today’s supply chain, a modern Transportation Management System must deliver on the following:

1. **Flexibility** – Where change is the only constant, systems must be highly flexible, configurable, and adaptable to accommodate regularly evolving business networks and transportation and fulfillment models.

2. **Support for Global Supply Chains** – Within an increasingly global arena, systems must support everything from multiple languages and currencies to cross-border fulfillment management via multi-modal, multi-leg shipments.

3. **Actionable Transparency and Visibility** – To better meet customer demands and effectively collaborate within a business network, systems must provide the means for greater context on shipment orders beyond a simple “track-and-trace,” so users can easily note the impact of delays, among other things, and act on it, or expedite downstream processes as needed.
A New Way Forward: From Shipment- to Order-Centric

The modern networked world requires corporations to see everyone outside the enterprise as a customer; suppliers are as important as customers, who are as important as carriers and other service providers. Regardless of the partner or the nature of the transaction, they all share orders in common. Orders bind and define each of these relationships. And, while companies achieve success by securing orders, that success is sustained by their timely fulfillment – ideally, at the lowest feasible costs.

“\textit{It’s no longer enough to think of shipments in isolation; context is crucial.}”

For this reason, especially, it’s no longer enough to think of shipments in isolation; context is crucial. Without a link to the delivery location, tasks to perform en route, and information about how shipments impact other processes, like downstream manufacturing operations, or customers – and therefore the order as a whole – you impede effective and timely decision-making. That last part is especially vital. For systems to be effective going forward, they must integrate decision-making rather than merely indicate problems and require users to employ other systems to take corrective action.

Order-centric models enable better decision-making and add business value by focusing on the customer order, which lies at the heart of all exchanges. Whether sales orders or return instructions are coming in, or a purchase or transfer order is issued out, an order-centric system picks them up as “customer orders” and applies appropriate rules and grids regarding inventory, sourcing, and replenishment to decompose them to one or many shipment orders.
Initiating the transportation planning and execution process with a variety of triggers is the core of the order-centric model. Triggers may include transportation orders (like most legacy and modern TMSs), as well as the original sales or purchase orders. Because shipment-centric TMSs are primarily triggered by transportation or shipment orders, they depend on an external system (such as an OMS or ERP) to first aggregate and batch sales or purchase order lines (alike in destinations, delivery dates, and source locations), before initiating planning and execution.

An order-centric TMS uses real-time API-based integration with the ERP, so each sales, purchase, or return order instruction is delivered to the TMS immediately on receipt. Order modifications and changes are transmitted in real-time to the TMS, in accordance with preset rules, such as order status. By leveraging real-time communication along with data about future orders, the system can optimize how it groups and executes shipments, including rush orders.

Also, with order-centricity, status updates transmitted to the ERP or OMS can be configured to communicate at any preferred “level.” Similar to current batch-oriented TMSs, updates can occur at the transportation or shipment order level, where an intermediary system translates it into whatever form is most useful to the ERP (for example, at the order level or order line level). Alternatively, businesses can configure updates to appear directly at the order and order line levels in the OMS, which greatly reduces losses and errors in translation and speeds up the decision-making process.

Order-centric TMSs are designed to natively support another key capability: integrating other complementary processes into the shipment flow. Whether you need to merge upstream activities at the shipment source or processes along the way (like customs clearance, repair and refurbishment, or final labeling), you can manage everything within the main shipment workflow. This feature improves customer order execution, as it optimizes each stage of the process through timely, cascading alerts that enable proactive corrective actions as needed.

An order-centric Transportation Management System therefore goes beyond the conventional, siloed definition of a TMS, as it is designed to also integrate other functions along the way, including customs clearance, warehouse flows, repair and refurbishment – balancing the requisite service level agreements (SLAs) with the costs and latency of each step – to determine the best options and optimize the entire order execution process.
Applying the Order-Centric Model to the Needs of the Modern Supply Chain

In essence, transportation management has not changed: The system is comprised of the same basic functions. Businesses contract with carriers then plan and execute shipments as needs arise. The shipments are monitored, and this visibility is leveraged for appropriate adaptive actions. After executing the shipment, the carrier submits an invoice, which is matched against promised SLAs and actual delivery performance before it is settled.

What has changed is the number and nature of the players involved in these transportation processes, the volume and complexity of variables that enterprises must deal with as networks and markets expand, and the pressures and demands placed on businesses by customers in a global, business environment. Here is how an order-centric system handles these new complexities:

Flexibility to Accommodate Complex Transport Flows

Business rules can be easily configured to accommodate evolving needs for different types of transportation flows. For instance, it's possible to configure everything from milk runs and pool-point distributions to rush orders and prebookings, as each can be understood as a different type of service order chain.

Incoming rush orders can be handled easily and without any special processing, while continuing to take advantage of consolidation and other cost-optimization opportunities. Capacity can be easily prebooked and managed. The system accommodates complex flows in spare parts logistics, customer swaps for defective parts, and swaps in transit for shipping out the defective part.

Similarly, the roles of network participants can be flexibly configured. Businesses can seamlessly add partners and adjust among the various roles they play when orchestrating flows.

Natively Global, Multi-modal, and Multi-leg

A true order-centric system enables a classic, multi-step process which could span modes, and be global and multi-leg, as it is not designed for any specific region or mode of transport. Rather, order-centric systems are limitlessly configurable to suit a business's needs and effortlessly scale to help enterprises seize opportunities that arise during times of environmental, technological, and geopolitical change.

Actionable Visibility

Order-centric Transportation Management Systems can quickly relate the impact of delays in one leg of a shipment to downstream processes and enable corrective action from within the TMS. Knowing what purchase or sales order is impacted, where inventory is needed, and where it may be available, as well as information about other shipments and orders being processed, gives businesses the comprehensive information they need to make swift decisions and take corrective actions.

This link between the shipment and the purchase or sales order it references allows planners and analysts to quickly grasp the downstream impact of a shipment delay or expedite an order if needed.
Conclusion

Transportation Management Systems today emerged from technological practices and limitations that existed in the 1990s, just before the Internet became pervasive. They are shipment-centric and favor the batch mode of processing; outlooks which were advanced at the time and had enough flexibility to adapt and accommodate the needs of business until now. To sustain success going forward, companies need to rethink the fundamentals. The approach that informed specialized TMSs from the 1990s onward has been so ingrained in common practice, that even modern TMSs follow in the old architecture and philosophy, regardless of its inherent limitations. The results are increasingly sub-optimal solutions that impede companies from being competitive and cutting-edge.

The old framework does not allow for rush order optimization and constrains a company's ability to respond to real-time events. Its cumbersome batch-and-release paradigm hinders timely status. Since most legacy TMSs were designed to be mode and region specific, businesses have needed to create "special layers" to support modern multi-modal and multi-leg freight options and requirements. Modeling geographies with multiple national borders and currencies is a challenge for these legacy TMSs, many of which were developed with a very U.S.-centric perspective.

In the context of the modern supply chain, order-centric Transportation Management Systems are game-changers. Rush orders are treated as part of the regular process, and details, like delivery requirements and other terms, are applied in real-time via automated rules. Support for multi-modal, multi-leg freight is native to these systems, allowing for unprecedented levels of flexibility and configurability.

The supply chain has evolved into a matrix of partnerships that provide endless possibilities for innovation in transportation planning and execution. Enterprises regularly struggle with customer demands and cut-throat competition. To rigid legacy systems, matrices and limitless possibilities can be unwieldy, requiring quick fixes or patchwork solutions to simply get by and stay in the race. For an order-centric Transportation Management System, however, the modern supply matrix is native to its design. It was built to see these possibilities not as challenges but as welcome opportunities for attaining new levels of customer service, profitability, and competitive advantage.

About the MP Objects Supply Chain Orchestration Platform

MP Objects helps some of the world's largest shippers and logistics service providers embrace the increasing complexity of their global supply chains to achieve real and sustainable results that drive business critical performance, increase customer satisfaction, and reduce critical supply chain costs in inventory and transportation.

With Supply Chain Orchestration for inbound, outbound, and return customer order flows, clients get actionable end-to-end visibility internally and across all partners, whether it's a small parcel e-commerce order or an overseas order, requiring multi-leg and multi-mode orchestration, or anything in between.