WESTERNACHER WHITE PAPER

Empower your transportation network: An ultimate guide to start your digital supply chain journey.

The last few years have helped us realize how fragile our global supply chain is, which has served as a wake-up call for many businesses. They are trying everything from reshoring manufacturing and diversifying supply networks to increasing pipeline inventories to improve supply chain resilience. In the past two decades, the rise of e-commerce has led to the rapid adoption of the "Amazon Effect" by consumers, forcing businesses to re-evaluate their supply chain value proposition.

Breaking down supply chain silos and leveraging prescriptive analytics are the keys to addressing these issues. Transportation is at the tail end of the supply chain, and those who have heard of the bullwhip effect understand that small upstream supply chain errors can trickle down and get amplified during transportation, making the reactive nature of logistics the biggest roadblock to a modernized supply chain.

Integration is the foundation for these keys, and it has two levels of meaning: internal integration with other functions to break down silos and external integration with supply chain partners to enable a holistic view of the network in real time. SAP Transportation Management is a powerful tool in itself, but it shines even brighter with integrations with other modules. However, the journey of a thousand miles begins with a single step. In this paper, we will take a quick dive into the functionalities and capabilities of SAP TM, as well as its potential in the path of digital supply chain transformation.

Complex challenges of modern supply chain.

1. Increase in global sales and driver shortage

In 2022, global retail sales were estimated to be $29 trillion and expected to be over $1 trillion in growth in 2023. As a result, customers are demanding shorter delivery windows with maximum visibility.

On the other hand, the driver shortage continued to worsen in 2022 with a deficit of 240,000 drivers in the US alone. With demand and supply heading in the opposite direction, this provided an incredible challenge for the global supply chain infrastructure.

Over the last two decades, the driver shortage has been

exacerbating. In fact, it is estimated that the US market alone is expected to have a deficit of 240,000 drivers. It seems that a driving career is no longer as attractive as it once was.

Some might argue that autonomous driving technology is getting a strong push, but the reality is that it will still be years, if not decades, for the technology to be truly dependable from a safety and liability standpoint. Not only that, but manufacturing capabilities will also take years before it is able to keep up with the sales growth and starts to close the gap.

Therefore, the long-term solution remains in logistics operating efficiency.

TRUCK DRIVER SHORTAGE IN THE US FROM 2015 TO 2030
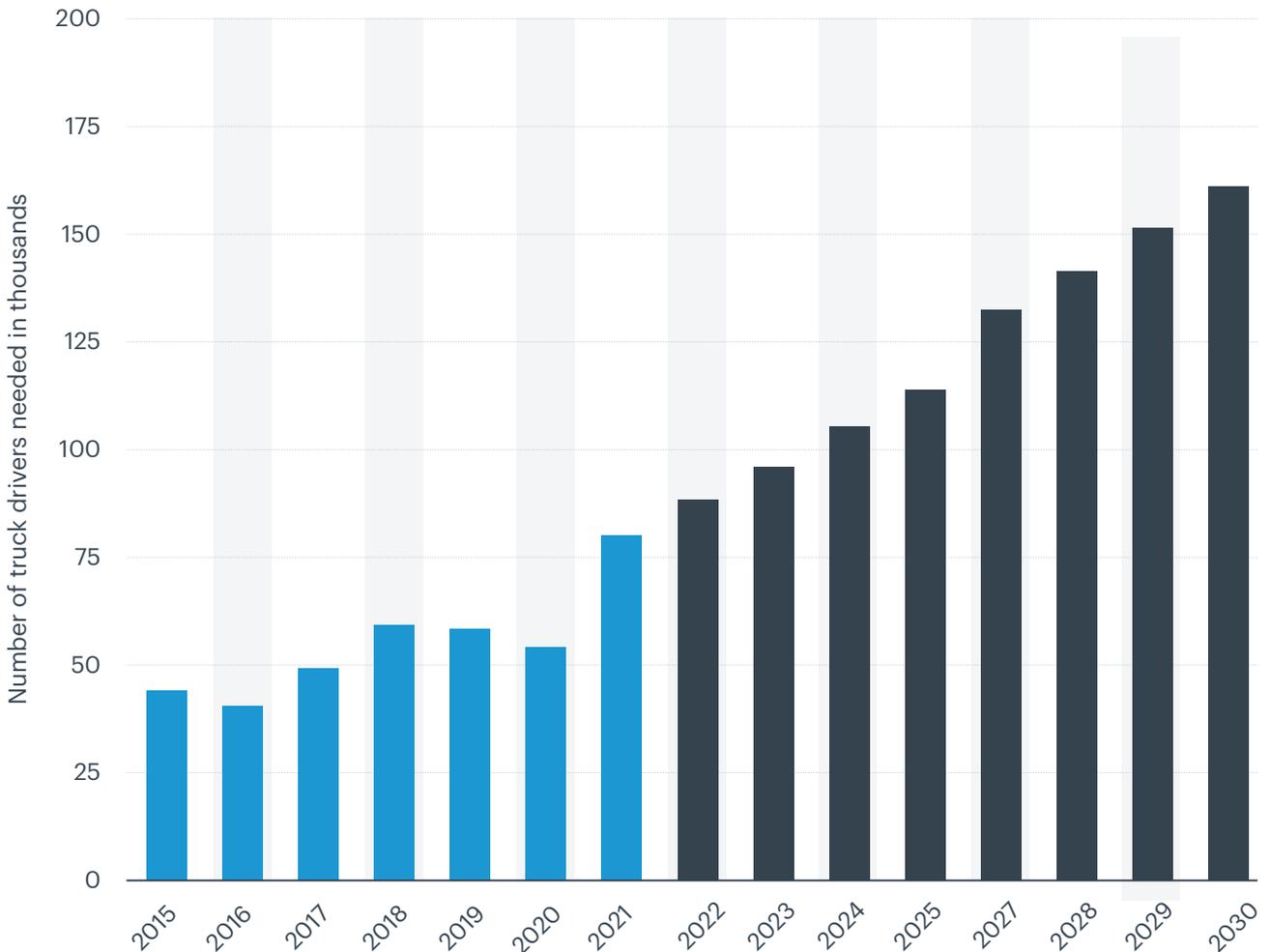
2. Environmental challenge

Our journey in seeking high efficiency and clean alternative energy will never stop. From coal mining to nuclear energy, one thing we are certain of is that the trend of globalization comes with an increased carbon footprint, and our economic growth needs to be in line with our sustainability development.

Generally, emissions are categorized into three types.

Scope 1 – Direct emissions from company owned and controlled assets such as different facilities

Scope 2 – Indirect emissions from purchased resources such as energy or utilities

Scope 3 – Emissions that are related to a company's operations. This includes the entire supply chain (including both upstream and downstream supply chain partners), as well as emissions from essential business travels.

While many organizations target the scope 1 emission within their own operations, almost 90% of the overall emissions that come from supply chain and essential business operations are often overlooked. To target those 90% scope 3 emissions, organizations need enhanced CO_2 tracking capabilities and supply chain transparencies.

To put it into perspective, each commercial freight truck has a limit of 52,000 pounds of mass, assuming the vehicle is operating at around 80% utilization rate (40,000 pounds) year-round, and travels 100,000 miles each year. Each ton-mile emits 161.8 grams of CO_2. For the entire year, one single standardized freight truck could generate 323.6 tons of CO_2.

1 Truck

» 52k lb yearly limit

» 80% utilization (= 40k lb)

» 40k lb + 100k miles/year
(1 ton-mile emits 161.8g CO_2)

323.6t CO_2

1 freight truck could generate in a year.

The task of developing a sustainable supply chain becomes daunting as it requires a tailored IT infrastructure to support its functions such as carbon emission measuring, categorizing, reporting, tracking, sharing, routing, and workflows. It is important for organizations to implement the proper IT infrastructure early in order to establish good processes and practices related to sustainability.

3. Planning challenge

Generally speaking, logistics has been a very siloed function across many organizations due to its nature of the indirect relationship with sales and manufacturing. Unfortunately, this oversight leads to many organizations' planning horizon being less than a week, a day, and in some extreme cases, only hours from the time of receiving the orders to execution.

In most cases, this is due to the dependent nature of logistics on other upstream supply chain functions. For example, in retail businesses, backhaul planning remains the biggest challenge in lowering transportation costs because of the lack of transparency in store returns or sweep schedules. For interstate long-haul deliveries, the challenge lies within the compatibility of equipment, driver certifications (doubles, hazmat, dangerous goods, or oversized freights), and hours of service. Once the right freight has been identified, the bidding process takes calls and emails over a few days to get awarded. Unfortunately, due to these combined reasons, often we see most interstate hauls filled up with deadheading miles rather than loaded on both ways to close the logistics loop.

Lastly, when unforeseen orders get trickled down to the logistics team at the last minute, this potentially results in a delay in other shipments and a complex planning overhaul may be needed, which may then lead to potential service issues.

4. Execution challenge

One of the biggest challenges in logistics is real-time transparency and visibility. When the freight is in execution, it is exposed to various risk elements such as mechanical breakdown, traffic, accident, loading/unloading delays, etc. Once such events occur, usually the vendors or receivers do not realize the delays until the appointment or deadline has passed. When evaluating the impact of logistics delays, the shorter distance usually results

in a bigger impact because of a lack of room or flexibility to adjust. Subsequently, this also affects warehousing staff, production and procurement, and ultimately trickles down to further transportation adjustments.

This reactive nature due to a lack of transparency in the logistics operation is a major pain point in a global supply chain and is an issue in any organization with a global footprint.

Some of the other execution challenges that are commonly faced by many organizations are carrier evaluation and tendering selection. Keeping track of vendor performance and awarding strategic carriers proportionally require a lot of manual input to generate KPI reports for updates and analytics. In addition, carrier evaluation is usually conducted at a very high level. As the level gets more complex and specific, the amount of record keeping and manual data input also increases exponentially, not to mention complex root cause analysis and predictive analytics.

5. Settlement challenge

The health of an organization's supply chain finance is just as important as the physical movement and planning of the goods. Currently, the invoicing process remains a very manual one. Typically, when an order is executed, carriers would submit a manual invoice for approval. What leads to this review process varies dramatically depending on contract agreements. If any issues were found, then this process gets reprocessed again, from the beginning.

Some of the inevitable downsides of the traditional invoicing process are long lead times, human errors, manual P&L accruals on a monthly basis, bad debt or uncollected revenues accumulate over time, etc.

These issues may be manageable for smaller sized operations. But for a larger fleet, it usually requires a lot of overhead to process and review the invoices and disputes. As the size of the business grows, the only way to eliminate proportional overhead growth is through process automation and management by exception.

To improve supply resilience, instead of seeing logistics process in a traditional waterfall point of view, we need to prioritize transportation integration and shift away from a traditional waterfall view of logistics processes.

Overcoming the challenges.

1. Increase in global sales and driver shortage

The keys to improving supply chain efficiency are transparency and analytic capabilities down to the package level. For example, pallet optimization directly affects outbound utilization, route planning affects transit lead time and service level and transparency affect planning efficiency and backhaul utilization. All these functionalities aim at providing a prescriptive operation instead of a traditional, reactive supply chain.

With the increasing complexity of the modern supply chain, one of the byproducts is the massive increase in transactional data. In addition, complex optimization also requires advanced computing power to unleash its full potential. With the inevitable supply chain digitalization on a global scale, the traditional data infrastructure is not designed nor capable to handle such advanced optimization and analytics. To tackle this issue, SAP designed HANA, completely overhauling the data infrastructure

from the ground up, to fully enable the automation and integration capabilities.

These are crucial for retail businesses where seasonality plays a huge factor in the freight volume. In modern-day retail where a hybrid of traditional and e-commerce is the main approach, this omnichannel supply chain might require the distribution centers and stores to serve more than one purpose and function. This uniqueness of the retail industry could sometimes easily double, if not triple, the freight volume in the span of a couple of months during the holiday season. Imagine having insight into the capacity forecast and delivery schedule in August for the seasonal surge, allowing the logistics team to plan for valuable resources such as tractors, driver hiring, and securing rental trailers to scale, to meet the forecasted transportation demand. If you wait until the last minute, it is near impossible to secure those resources, as all the retail businesses are battling for the same resources. In addition,

this gives flexibility to distributors and individual stores to set up the backhaul schedule in order to avoid inventory buildup and minimize the empty miles in the transportation, which further impacts the regional DC's staff planning to include pickers, forklift drivers, loading/unloading teams, etc.

2. Environmental challenge

The most important aspect of the environmental challenge is the packaging and loading optimization. SAP TM is uniquely equipped with several capabilities to help the shipper resolve this challenge:

a. Unified Package Building (UPB) on pallet level is the feature in Advanced Transportation Management (TM) taking into consideration the physical dimensions of each type of package, and automatically identifying the optimal placement of products on each layer of the pallet. In the past, this process relied solely on the experience of the picker. Poor placement of the product could result in damaged products, safety, and overweight issues. In SAP TM, all this is automated and can be used to send out instructions to pickers on their handheld device of the specifically designed pick sequences.

b. Load Planning is another unique feature of SAP TM. During the planning process, the system will take a look at the most efficient route and unloading sequence and then decide on the most logical loading sequence of the pallet through Vehicle Scheduling and Routing (VSR) Optimizer. In addition, incompatibilities can be defined in the event of double stacking pallets so that the lighter weight pallets will always be placed on top.

c. Route Planning essentially is the function that decides the most efficient route and unloading sequence. This function will be tied directly with cost distribution, which enables the transportation costs to be broken down based on the weight, volume, and distance traveled, so that not all packages get the same equally divided transportation charges.

The other important aspect of the environmental challenge is carbon emissions tracking. To effectively reduce the carbon footprint, the first step is to accurately measure the emissions in the supply chain. In SAP TM, users can fully

customize the carbon emissions level based on the means of transportation such as road, rail, air, or ocean. The principle is that by accurately tracking the carbon emissions and using them to inform the decision-making process, it can drive up efficiency while maintaining a high level of sustainability. This baseline data has many use cases inside and outside the system.

For example, this data could be used to influence VSR Optimizer on route planning, allowing the system to automatically select the route that has the lowest level of emissions before tendering to the carrier, or simply providing optimizer solutions within a certain emission threshold.

Another example would be the integration with SAP IBP. Through actively tracking and recording

the emission level throughout the product cycle within the supply chain, users can then receive fully automated reports on emission level breakdown by carriers, suppliers, or processes through SAP Supply Chain Control Tower. This can be utilized to drive strategic partnerships in improving supply chain sustainability, or to influence future sourcing decisions.

3. Planning challenge

Planning transparency – The biggest planning challenge is breaking the siloed operation and information flow. Depending on the business and the industry, the average order lead time can fluctuate dramatically. When everything trickles down the supply chain to the logistics process, the lead time is usually reduced to a week, days, if not hours for planning and communication. In

Advanced TM, users can access orders as soon as they are created, regardless of how far in the future they may be. At the same time, it allows users to set up a planning horizon that acts as a filter, only showing the relevant transportation demands within the desired timeframe from the future.

The reason is that the involvement of the logistics function is usually at the very end of the supply chain. However, in Advanced TM, the logistics team will have immediate access to freight volume information as soon as an order is created.

In addition, the planning profile within the Transportation Cockpit will allow users to select the relevant planning horizon (instead of having all future orders displayed at once) as well as a visual representation of the utilization for that day's breakdown, by the hour. This provides an extremely convenient way for planners to prioritize their planning for the day. During the planning process, the VSR Optimizer will automatically assist the planner in determining the most efficient route and optimal carrier option with just one click of a button.

Tracking and brokerage – From a brokerage standpoint the SAP

Business Network for Logistics is specifically designed to be the hub where all vendors and carriers can meet to engage in live posting, tender/bidding, dock appointment scheduling, execution, and settlement processes. By integrating with SAP TM, order information and changes can be updated in real time, allowing for accurate execution. Appointments and executions reported will also be updated in the freight order within SAP TM, enabling team members to track the execution progress.

Change Management – Market share is everything. The battle for market share comes down to product availability. When the supply chain experiences a disruption, those who can continue to put products on the shelf will dominate that market. However, one of the negative effects that occurs regularly is that downstream supply chain partners or customers make last-minute add-on orders, sometimes minutes before the scheduled departure. While this level of flexibility may seem desirable, it can result in delayed shipment and inconsistent service.

When this happens, depending on the inventory availability, the shipment can be held off until the shippers receive the missing

product from production, from inbound receiving, or even repack from a local vendor. When there are multiple deliveries on the same truck, all the deliveries are held off due to that delay. In addition, when drivers start their day, the clock does not stop. Therefore, this delay can cause unplanned layovers, and further delays the following day because the driver may be back later than usual, preventing them from starting on time to complete the reset. This may result in

further delays and ultimately poor utilization.

In SAP TM, users are able to set up flexible change rules (Change Controller strategy) to give the system a blueprint of the correct sequence of actions in response to a specific change request. This includes quantity, volume, price, incoterm, delivery approach, and of course, deadlines for change requests.

For example, let's assume that
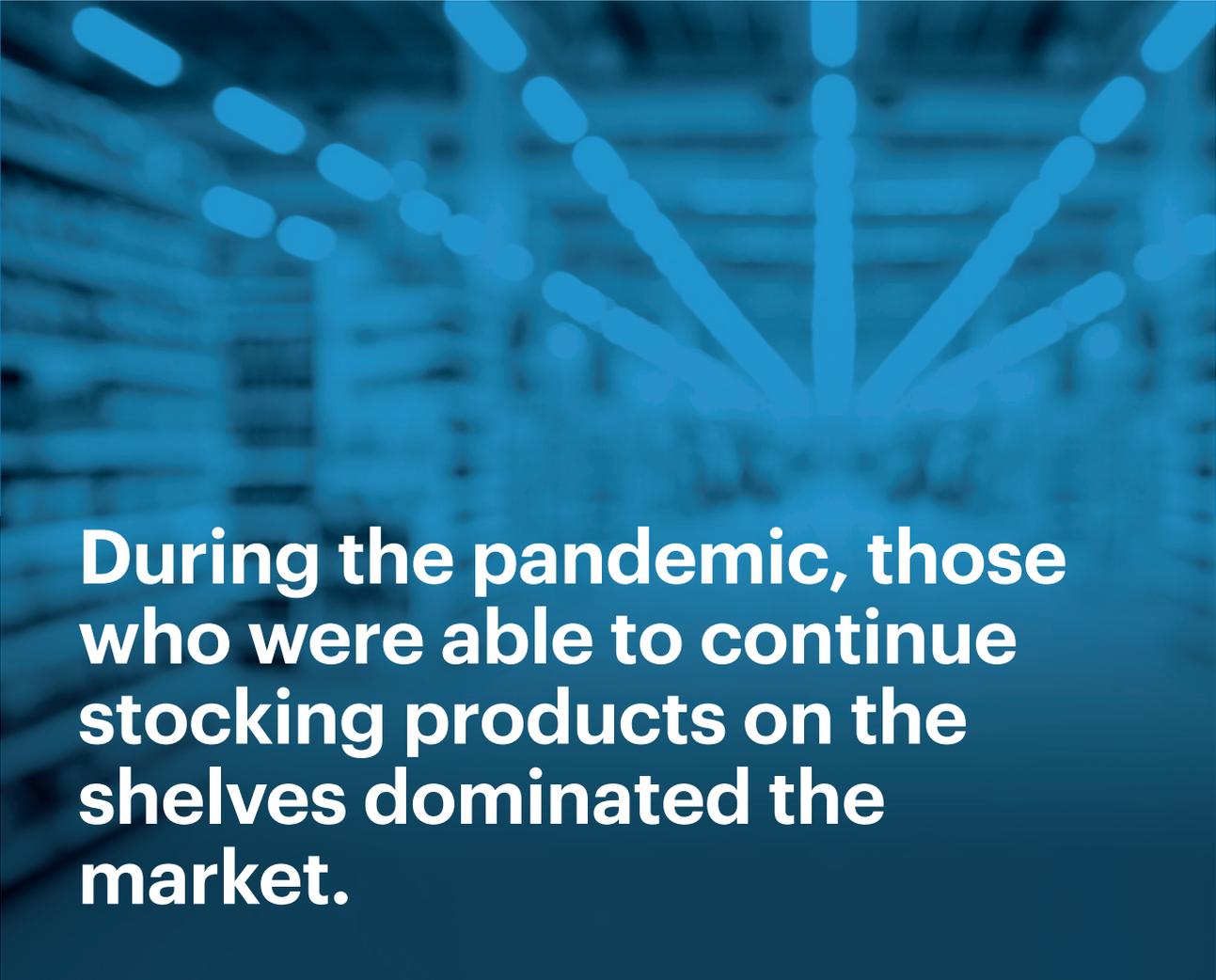
During the pandemic, those who were able to continue stocking products on the shelves dominated the market.

flexible change rules are in place, allowing changes to occur up to six hours prior to departure. In this case, when the change is made, the freight order is reoptimized to the new quantity and then the load plan is automatically sent to the warehouse. Ultimately a notification is sent to the selected carrier highlighting changes in the shipment and Bill of Landing. This saves a lot of time for the team and minimizes the chance of human error.

Fleet Management – The last piece to this solution is that SAP TM provides a tremendous value-add through its fleet management solutions. In Advanced TM, the user will have access to the transportation cockpit. Many who specialized in transportation operations are familiar with the terms DUC (Driver Utilization Chart) or TUC (Truck Utilization Chart). In the Transportation Cockpit app, each driving resource such as trucks and drivers, are shown in the form of DUC or TUC chart (or Gantt Chart in SAP terms). Each resource can be assigned a unique calendar, or Hours of Services, for drivers in this case. We understand that, depending on the business and personal preference, each driver's schedule can be dramatically different. This is why SAP TM

enables users to have complete flexibility in creating unique calendars and working schedules for each driver. The interactive nature of the transportation cockpit will allow users to drag and drop each transportation request onto a different driver/tractor during its operating window to complete the dispatching process. The system can be configured to send out automated messages, notifications, or emails to inform the drivers of the changes. In some business cases, we have also integrated the transportation cockpit with driver apps. What we have seen is a seamless communication channel both for the planners and drivers, significantly improving the planning accuracy as well as efficiency.

4. Execution challenge

To resolve the execution challenges, Advanced TM is uniquely integrated with SAP Event Management and SAP Business Network for Logistics. These two modules allow users to update the critical events as they executed the freight order.

For example, depending on the user's unique Standard Operating Proceduresfor transportation process, they are able to define a list of expected events, as well

as exceptions from standard loading/unloading to mechanical breakdowns and traffic congestion. The level of flexibility and detail enhances the accuracy of the reporting, and each report is directly updated at the freight order level.
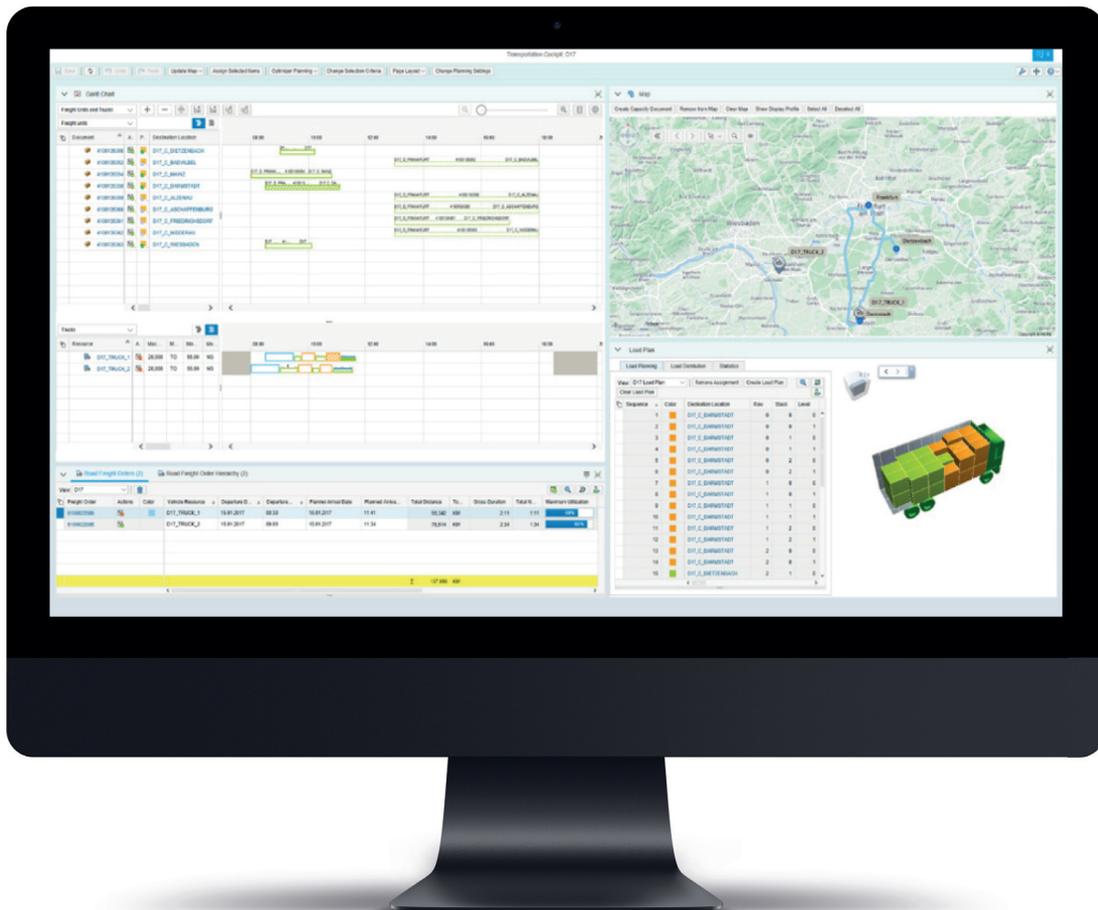
On a larger scale, for international or multi-modal shipments, SAP Business Network for Logistics GTT (Global Tack & Trace) allows common carriers and vendors to access the freight order information and provide updates. This information can be directly used to provide a real-time virtual representation of the physical movements of the goods.

In addition, to help users better understand the carrier performances, SAP TM can be further integrated with SAP Supply Chain Control Tower to keep track of each carrier's performance history on a specific lane, while providing out-of-box reports and analytics that are ready to assist

users for better carrier evaluation and contract management. In echoing to the Change Management section above, SAP Supply Chain Control Tower can also automatically perform analytics for past service levels and root cause analysis by the carrier in each lane. This allows the user to evaluate and adjust their supply chain strategy based on the feedback.

5. Settlement challenge

In the past, depending on the freight volume, the invoice was submitted periodically such as weekly or monthly. Once submitted, it typically would be reviewed manually for approval. Such a process could take weeks, if not months to finalize, and could be subject to longer lead times if discrepancies were to occur.

Such a process has multiple disadvantages:

1. Long lead times result in poor financial turnover and cash flow

2. Human errors

3. Extensive record keeping is required in case of discrepancies and disputes, months after the execution.

4. Inaccurate accruals for monthly P&L reporting, as well as inaccurate forecasts.

To improve this process, SAP TM will enable users to set up the contractual rates and charge tables in the system, based on the cost distribution and incoterm. The correct amount will be calculated and stored in TM / ERP financial documents, which are used to compare carrier submitted invoices for any discrepancies and notifications for the team to review and approve.

In addition, SAP Business Network for Logistics will allow carriers to submit digital invoices on an order-by-order basis. Due to the nature of the instant matching and approving process, this significantly improves transactional lead time and accuracy. This removes the repetitive nature of the process and enhances staff utilization through managing by exceptions.

Centralized logistics.

A globalized supply chain should not be a siloed operation. Digital supply chain transformation is essentially focused around breaking down siloed operations by seamlessly integrating between modules and a healthy flow of data from order creation to settlement.

Taking SAP Transportation Management for example, there are integrations with all relevant SAP application such as Finance, Extended Warehouse Management, Yard Logistics, Business Network for Logistics, and Integrated Business Planning. These integrations help to remove latency both downstream and upstream in the supply chain.

- When orders are created in SAP S/4HANA ERP, the integration will create corresponding freight units in SAP TM and set up cost distribution based on the provided incoterm.

- Utilizing the load planning and route optimization through the VSR Optimizer, the load plan is then finalized and released to SAP EWM for picking, packing, and staging.

- At the same time, SAP TM will send the result of route optimization to the carrier highlighting the most efficient route and calculating the freight settlement document according to the planning result. Meanwhile, the carrier will execute the planning and tendering to allow the carriers to log into SAP Business Network for Logistics to schedule respective appointments.

- This information will then be trickled down to SAP YL for the proper yard movement so that the live load/preload process can be executed without any delays.

- Once the shipment is on route, carriers will then be able to report executions and exceptions through Business Network for Logistics to inform the business of any delays and estimated time of arrivals.

- After all the execution is reported and Proof of Delivery is provided, the carrier invoice will then be automatically compared against Freight Settlement Documents for any discrepancies for approval.

- Once the invoice is approved, payments and transactions will then be processed based on the contract terms.

Centralized logistics provides many additional benefits, such as tracking carbon emission and centralized analytics.

Next steps.

From automated vehicles to ChatGPT, from digital supply chain to Industry 4.0, the world is advancing at an increasingly rapid rate. This progress has led to greater interconnectivity in the global landscape, which has also increased the uncertainties in the supply chain.

The unshakable truth about not only surviving but also remaining competitive in the supply chain of the modern world is to manage the polarities between performance, cost, and timeliness. For the last few decades, the focus has been on the warehouse and manufacturing. From what we have seen, this focus has begun to shift to logistics and transportation, be it yard logistics, general freight hauling, or integration with brokers and 3PLs. This field has remained manual in the past but it is changing fast because of the huge potential in so many areas to improve efficiency and lower the operating costs.

In the past, people saw transportation as a non-value-added activity in the supply chain. However, organizations are starting to realize that logistics and transportation play an equally large part in the value chain. When Amazon promised a two-day delivery guarantee, consumers adopted this concept and it quickly became an expectation. When an expectation is created, failure to meet it results in a decrease in customer satisfaction, thus lowering the market share.

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> Integration leads to standardization, standardization results in improved efficiency.

For example, imagine the same barcode that can be used across the supply chain by different organizations. This would not only significantly increase the efficiency of the operation, but also unlock other potentials such as food safety and supply chain sustainability. This concept is an information highway where data can be communicated and exchanged safely and efficiently.

Whether it's Industry 4.0, AI, or predictive analytics, the end goal of a smarter supply chain is to play a larger role in the repetitive part of the operation and free up talented team members for more complex and strategic decision-making, thereby running a much more efficient operation. To tailor a product specifically to your needs, it requires extensive knowledge and experience in industry best practices and implementations.

At Westernacher Consulting, we break down the implementation process into three steps: Crawl, Walk, and Run to ensure successful implementation.

Crawl – Ensuring all integration points function properly. Not all materials or master data are in the system yet.

Walk – Efficiency is much improved. Users will be able to flow through their respective procedures without issues and perform a basic diagnostic of basic errors.

Run – Utilize reports and data to perform advanced decision-making, turning reactive operations into preventative operations.

Talk to one of our experts to explore the scope of implementation and discover how your business can benefit from SAP TM.

Start your digital transformation with Westernacher.

Westernacher has been innovating business and IT for more than 50 years. We are successful in helping our customers with many different transformation initiatives by providing solutions for operational, organizational and technical issues:

Technical:

From implementing SAP TM, EWM, S/4HANA, SCE and other SAP solutions to developing custom ABAP and Fiori solutions.

Organizational:

Supporting businesses in the transformation to becoming digital organizations.

Operational:

Developing innovative business processes to make the most of the new technology and information. Improving KPIs and creating KPPs to move the company from a reactive stage to an orchestrating stage.

To provide you with a better understanding, we offer an Inspiration Day, where we show you what a logistics-centered IT landscape looks like and how it might impact your company. This is achieved through demonstrations and discussions with our logistics experts.

Yuwen Wang
SAP TM Consultant
Westernacher Consulting
MU Americas
yuwen.wang@westernacher.com
M + 1-602-684-4750