



Rethinking Supply Chains

Digitization and Artificial Intelligence in the Supply Chain of the Freight Forwarding, Industrial, and Commercial Sectors



Digitalization within the supply chain is a key success factor for the freight forwarding, industrial, and commercial sectors. Fast, reproducible KPIs determined via algorithms are crucial for meeting increasing demands for cost efficiency and sustainability. Many companies still use outdated systems or self-created Excel sheets, missing out on the advantages a modern and innovative Transport Management System (TMS) can provide. Modern systems assist management in evaluating business processes and help employees in their daily tasks. The availability of skilled workers is very low throughout the supply chain, with certain areas (e.g., dispatchers, local and long-distance transport) facing near-zero availability. This white paper addresses the challenges and solutions in the following areas:

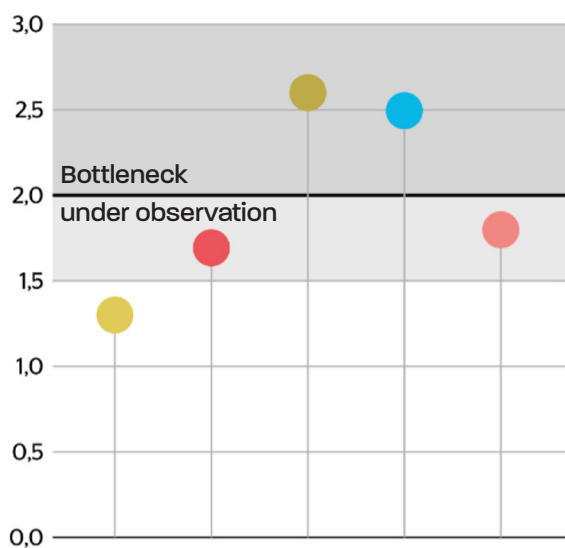
- Countering the shortage of skilled workers through artificial intelligence (AI)
- Increasing cost efficiency through optimized routes and fewer carrier units (trucks)
- Improving sustainability through optimized route planning, which reduces CO2 emissions
- Utilizing data governance as a decision-making tool
- Enhancing resilience by automating processes

Countering the Shortage of Skilled Workers Through Artificial Intelligence (AI)

Challenges Due to the Shortage of Skilled Workers in Scheduling

The shortage of skilled workers in the logistics industry significantly impacts supply chains. The complexity of today's logistics systems requires skilled dispatchers capable of making real-time decisions while optimizing costs and delivery times.

in Points



Annual assessment of the skilled labour situation in selected occupations according to 6 indicators of the Federal Employment Agency, 2024

1.5 - 2 points = under observation,
2 - 3 points = bottleneck

- Professions for postal and delivery services
- Professions in the warehousing industry
- Professional drivers (goods transport/trucks)
- Freight forwarding and logistics clerks
- Professions in freight and goods handling

Source: Federal Employment Agency statistics, 2024; graphic: DVZ

The shortage of skilled workers leads to:

Supply Chain Delays: Fewer dispatchers result in slower or less considered decision-making processes, causing delays and inefficiencies.

Increased Workload: Remaining skilled workers face higher volumes of work, which can lead to overload and burnout, making the workplace less attractive.

Lack of Optimization Potential: An overworked workforce may overlook optimization opportunities, resulting in unnecessary costs and resource misuse.

To tackle these issues, companies must increasingly rely on technologies such as transport management systems and artificial intelligence.

Transport Management Systems (TMS) as a Solution

Definition and Function of a Modern TMS

A Transport Management System (TMS) is a software platform that assists companies in planning, executing, and optimizing their logistics processes. It provides real-time data and analytics, enabling more efficient decision-making and the automation of the entire transport process.

Automation of Routines Modern TMS solutions automate routine tasks traditionally performed by dispatchers, including:

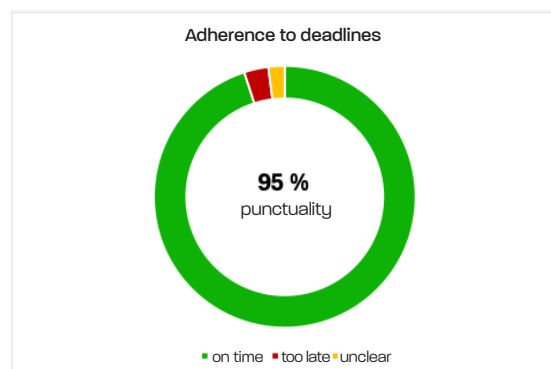
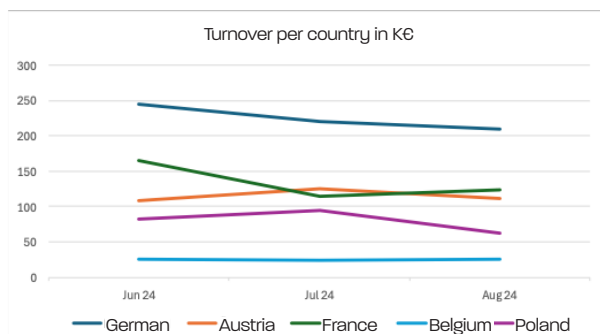
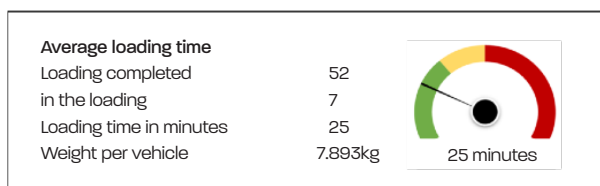
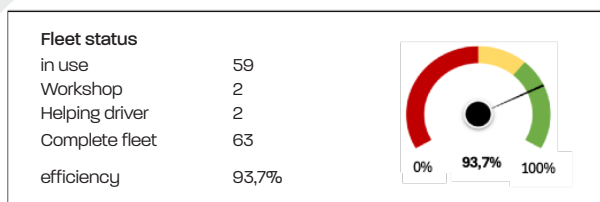
Automated Order Acceptance and Placement: TMS can automatically assign transport orders to available carriers based on criteria such as cost, availability, and delivery times.

Optimized Route Planning: Using real-time data (e.g., traffic and weather conditions), TMS can calculate and adjust the most efficient routes automatically. AI-supported systems can take over tasks traditionally done by local transport dispatchers, saving up to 15% by reducing the number of vehicles used, thus lowering CO2

emissions. Additionally, these systems free up dispatchers to focus on daily challenges.

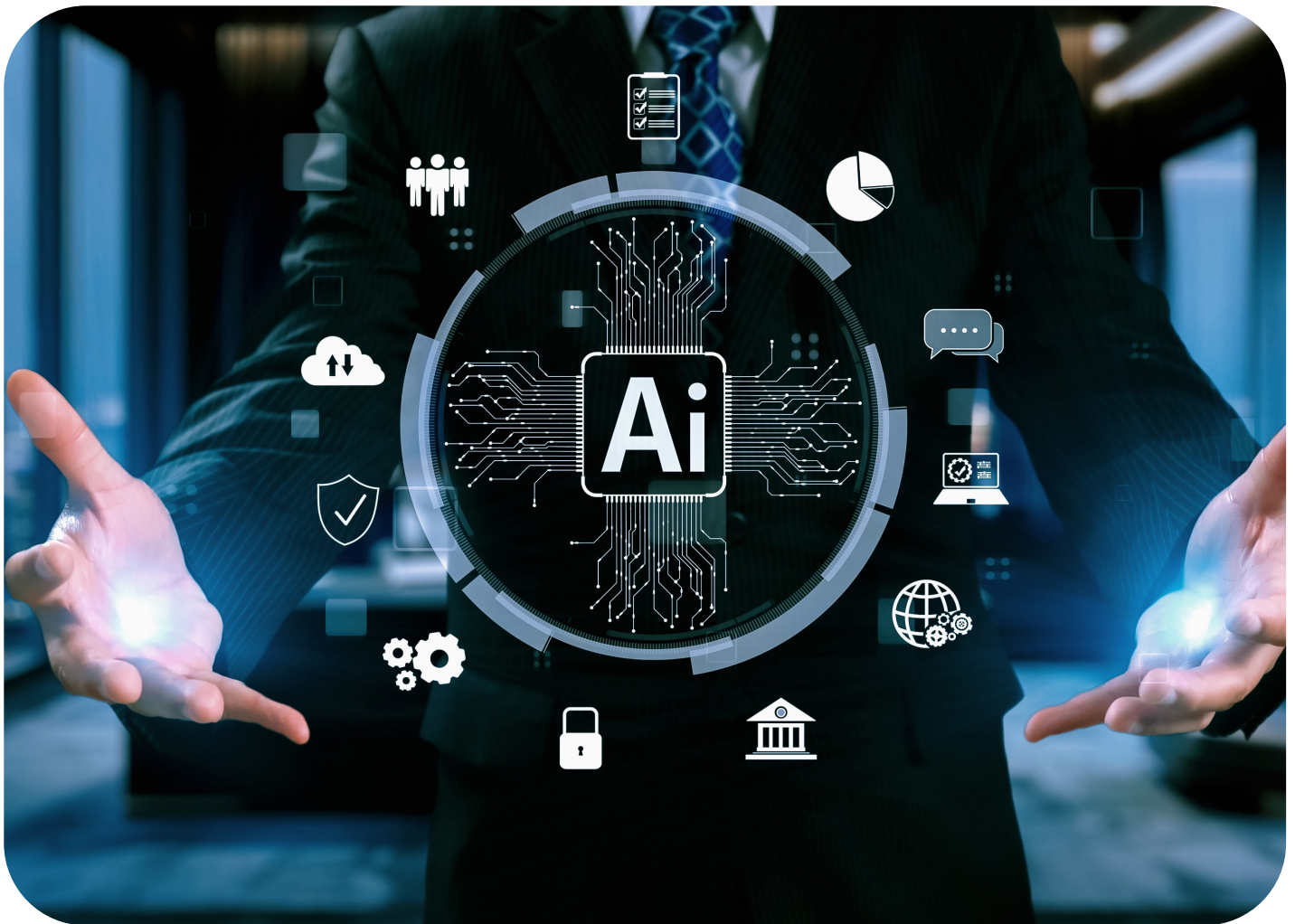
Tracking and Monitoring: A TMS enables real-time shipment tracking, alleviating the burden on dispatchers and providing greater control over the transport process.

Governance and Dashboard: Modern systems offer scalable dashboards that provide different views of business situations based on the desired level of detail—from a general overview down to individual shipments.



Current month	Turnover in K€	Forecast
Total	663,0	716,0
Germany	225,4	243,4
Austria	99,4	107,3
France	151,8	163,9
Belgium	23,0	24,8
Netherlands	12,0	13,0
Poland	75,4	81,5
Czech Republic	17,0	18,4
Slovakia	13,0	14,0
Italy	16,0	17,3
Spain	22,0	23,8
Portugal	8,0	8,6

Possible view of a dashboard. As a rule, this is freely configurable based on the available data.



Artificial Intelligence (AI) as a Key Technology

AI can assume a variety of tasks in logistics that dispatchers traditionally perform. Through machine learning and data mining, AI can:

Make Real-Time Decisions: Based on real-time data, such as traffic and stock levels, AI can make optimal transport process decisions within milliseconds.

Automated Troubleshooting: In cases of unexpected disruptions (e.g., delays), AI can immediately adjust and suggest or implement alternative solutions automatically.

Robotic Process Automation (RPA) in Logistics: RPA, supported by AI, automates repetitive tasks like creating transport documents and processing freight data, relieving dispatchers and reducing error susceptibility.

Resilience: Automating scheduling processes ensures that operations can be maintained even in the absence of all dispatchers. Working from home with modern TMS is also feasible.

Use Cases of AI in Dispatching

Anomaly Detection and Prevention:

AI systems can identify anomalies in the supply chain, such as unexpected delays, and take proactive measures. Numerous synergy effects arise from integrating TMS and AI. This combination offers companies a comprehensive approach to overcoming the shortage of skilled workers in dispatching while improving overall results.

Automated and Optimized Decisions: Combining TMS and AI enables the automation and optimization of logistical decisions in real time, relieving human dispatchers.

Prediction of Transport Requirements: AI-powered TMS can help manage order peaks and utilize resources more efficiently.

Reduction of Human Error: Automation minimizes human errors that may arise due to workload or time pressure. **Optimal Use and Prediction of Loading Space:** Advanced algorithms can calculate required loading areas and visualize detailed stowage plans, ensuring optimal cargo space utilization and avoiding unnecessary costs.

Cost Reductions and Reduced Emissions: AI-driven route optimization can significantly lower logistics costs, typically by 10% to 25%, due to reduced fuel consumption and more efficient vehicle utilization.





Implementation Challenges



Initial Investment:

Implementing TMS and AI requires upfront investment in software and staff training, which can be a hurdle, especially for small and medium-sized companies. However, the modular architecture of modern systems allows for incremental implementation.



Data Integrity:

As reliance on data-driven systems increases, protecting sensitive transport and customer data is crucial. Organizations must ensure compliance with the latest security standards to prevent data breaches.



Acceptance and Trust:

New technologies may face resistance from employees. Comprehensive training is essential to help staff understand the benefits, ensuring high adoption rates.

Result

The shortage of skilled workers in the supply chain poses a significant challenge for companies. However, implementing transport management systems and artificial intelligence offers effective solutions to address this shortcoming. These technologies enable the automation of routine tasks, optimizations, and real-time decision-making.

By integrating these systems, companies can overcome the skilled labor shortage while significantly enhancing the efficiency and transparency of their logistics processes.

Recommendations

Invest in TMS and AI:

Companies should invest in modern TMS and AI technologies now to remain competitive and mitigate the skills shortage.

Training and Further Education:

Ensure employees receive thorough training on new technologies for smooth implementation.

Focus on Data Security:

Invest in IT security to protect sensitive data and bolster customer and partner trust.

Small Steps into Automation:

Begin by automating routine tasks and gradually expand AI-powered solutions.

With a strategic approach, companies can successfully navigate the skilled worker shortage in logistics while optimizing their processes.



About the Author:

Mark Klinghammer has extensive experience in various management roles in medium-sized companies and corporate environments, focusing on logistics, task force management, and purchasing. He also has experience in change management projects and the implementation and development of various IT systems.





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