



APPLY TMS TO THE TRANSPORTATION TERMINAL

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***Abstract.** In this scientific article, the influence of transport management systems (TMS) on the efficiency of cargo terminals is analyzed. In the context of the globalization of the world economy and the rapid development of e-commerce, freight terminals have become the main nodes of the supply chain. The article highlights the limitations of traditional management methods, including the inefficiency of manual planning and the use of spreadsheets. The possibilities of integrated management of logistics processes of TMS, combined with artificial intelligence (AI), the Internet of Things (IoT), and big data analysis (Big Data) technologies, were also studied.*

***Keywords:** transport management system (TMS), cargo terminal, logistics efficiency, route optimization.*

The globalization of the world economy and the rapid development of e-commerce have led to a sharp increase in cargo transportation volumes. In this process, cargo terminals located in ports, railway stations, and border crossing points have become the main nodes of the supply chain. However, the complexity of cargo terminal operations, the interaction of many participants (carriers, freight forwarders, customs authorities, terminal operators), and the need for high-level coordination

create serious problems in ensuring the effective operation of these facilities.

Traditional management methods, including manual planning and the use of spreadsheets, are not sufficiently effective in solving the complex tasks facing modern freight terminals. The increase in cargo processing time, excessive waiting time of vehicles at the terminal, empty returns, and document errors are becoming a source of additional costs not only for terminal operators but also for all participants in the supply chain.

Transportation Management Systems (TMS) are emerging as an effective tool for solving these problems. Originally emerging as a simple transport planning tool, TMS has now become a comprehensive logistics process management platform, integrated with artificial intelligence (AI), the Internet of Things (IoT), and Big Data (Big Data) technologies.

The development of transport and logistics infrastructure in the Republic of Uzbekistan is one of the priority areas of state policy. Effective organization of the activities of freight terminals, increasing their throughput capacity and reducing costs are an important factor in ensuring the competitiveness of the economy.

Asia Trans Terminal LLC is a large transport and logistics company located in the Tashkent region of the Republic of Uzbekistan. The company was founded in 2015 and currently operates in the following areas.

Table 1

Areas of activity of Asia Trans Terminal LLC

Direction	Description	Share
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Freight terminal services	Acceptance, storage, and dispatch of goods	40%
Freight services	Domestic and international cargo transportation	35%
Warehouse logistics	Responsible storage, distribution	15%
Customs brokerage services	Customs clearance	10%

Table 2**"Azia Trans Terminal" infrastructure**

Infrastructure element	Amount	Technical specifications
Loading and unloading stations	12	Possibility of simultaneous servicing of 12 vehicles
Open warehouse space	8,500 m ²	For containers and bulky cargo
Closed warehouses	3 200 m ²	Warehouses of categories A and B
Railway entrance	1.5 km	Connection to freight railway station
Vehicle fleet	42 units	Trucks and special equipment
Lifting equipment	18 units	Truck cranes, loaders (3-20 tons)
Customs post	1	Temporary storage warehouse

Table 3**Analysis of problems in the activities of "Azia Trans Terminal"**

Problem type	Description	Quantitative indicator	Economic consequences
Long waiting times	Vehicles wait an average of 2.5-3.5 hours at the terminal	3.0 h (avg)	Daily rotation rate is 20-25% less
Uneven dock load	Some docks are overloaded, some are empty	Employment: 45-65%	Low resource utilization efficiency

Scheduling errors	Time interval planning is done manually	Delays in 18-20% of cases	Customer discontent, penalties
Document errors	Human errors in document processing	in 6-8% of cases	Re-registration, wasting time
Low parking occupancy	Low Vehicle Usage	Employment: 68-72%	Decline in profitability
High fuel consumption	Routes not optimized	8-10% higher than normal	Excess expenses
Data dispersion	Different data from different employees, Excel files	Data 30% duplicates	Poor quality management decisions
Report Delay	Drivers' salaries are calculated in 4-5 days	5 days	Low employee motivation

Purpose of implementing TMS

The main goals of implementing the transport management system (TMS) at Asia Trans Terminal LLC are:

1. Increasing operational efficiency - reducing the waiting time of vehicles at the terminal
2. Optimization of resource use - increasing the occupancy of dock sites
3. Reduce costs - fuel consumption, document flow, administrative expenses
4. Improving the quality of management decisions - based on real-time data
5. Improving customer satisfaction - precise time interval, real-time tracking

Table 4

TMS Functional Requirements

Module	Requirements	Priority
Schedule time interval	Automatically plan dock occupancy, set time intervals for vehicles, report delays	High
Routing	Optimization of freight routes, calculation of fuel consumption, offering the shortest routes	High
Real-time tracking	GPS tracking of vehicle locations, communication with drivers, recording delays	High
Document flow	Automatic generation of electronic waybills, waybills, invoices	Middle
Reporting and analysis	KPI monitoring, cost analysis, automatic driver salary calculation	Middle
Integration	1C: Integration with accounting, integration with customs systems	Middle
Mobile app	Flight acceptance for drivers, arrival confirmation, photo report	High

Based on the research results, the following step-by-step methodology for implementing TMS at freight terminals is proposed:

Stage 1: Audit of existing processes. In the first stage, a clear picture of the terminal's activity is created. Volumes by type of container, frequency of trips, average waiting times at the terminal, number of empty returns and costs are analyzed. This inventory allows you to identify the most important levers for optimization.

Step 2: Select the appropriate TMS. When choosing a TMS, it is necessary to take into account the specifics of the terminal, the types of cargo, and the possibilities of integration with existing information

systems. Modern TMS platforms have a modular structure, allowing users to select the necessary functions.

Stage 3: Implementation of the pilot project. It is recommended that the implementation of TMS begin as a pilot project limited to several regular customers and designated vehicles on a strategic route or port (for example, on the most important route). This allows for full-scale testing to verify compliance with planning, pricing, and monitoring rules.

Stage 4: Monitoring of indicators. During the pilot project, the following indicators should be observed: reduction in transportation costs, efficiency of loading planning, route optimality, and environmental impact. This data, compared to the initial state, serves as the basis for system configuration.

Stage 5: Expansion and enrichment. After the successful completion of the pilot project, the TMS will gradually expand to other ports, more customers, and a variety of cargo types. Additionally, additional functions such as IoT sensors or document management automation will be integrated.

In conclusion, the implementation of TMS is becoming not only a means of increasing operational efficiency for freight terminals, but also a strategic factor in ensuring competitiveness. In the context of digital transformation, there is a risk that freight terminals that do not use TMS will not meet market demands in the long term.

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