GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ)
ISSN (E): 2347-6915
Vol. 11, Issue 09, Sep. (2023)

MODERN APPROACHES TO INCREASE THE EFFICIENCY OF THE TRANSPORT-LOGISTICS SYSTEM

Fayzullaev Javlonbek Sultanovich
Associate Professor of Tashkent State University of Economics (DSc)

ABSTRACT

In this article, modern methods of managing the transport-logistics system, the classification of modern management concept styles that form the theoretical and methodological basis of the management of the integrated transport-logistics system, the efficiency of delivery times according to options A, V, S, D, and economic-mathematical methods of managing the transport-logistics system suggestions for using the model are given.

INTRODUCTION

The importance of transport and logistics infrastructures is increasing in the processes of globalization and integration taking place in the world. According to the World Bank, the amount of world transport services in GDP is 4.3 trillion. USD (6.9%) is 110 billion per year. tons of cargo and 1 trillion. more than 100 million passengers are transported, the number of employees employed in the transport infrastructure is 100 million. is organizing a person[1]. The development of these areas is carried out by the global transport and logistic system. Effective organization of management processes in the logistics system of cargo delivery allows to save the volume of material reserves from 30% to 60%, as well as to reduce the transport and logistics costs of enterprises using railway transport services by approximately 30-35%.

As an important branch of the country's economy and an important factor of the integration of the national economy with the world economy, comprehensive and targeted program measures are being implemented in connection with the rapid qualitative development of the transport and logistics sectors. In this regard, the commissioning of the Khairaton-Mozori Sharif and Angren-Pop railways and the establishment of logistics centers in our country led not only to an increase in domestic transportation, but also to the improvement of Uzbekistan's transit capabilities. In the Strategy of Actions on five priority areas of development of the Republic of Uzbekistan in 2017-2021"Increasing the level of competition between national transport logistics companies»[2]important tasks have been defined. The effective performance of these tasks requires increasing the efficiency of the management of the integrated transport-logistics system in our country.

ANALYSIS AND RESULTS

Effective development of the transport-logistics system should be based on principles such as scientific basis, efficiency, optimization, comprehensiveness, flexibility, goal-orientedness. Considering that the listed principles are widely used in modern science, we did not consider it necessary to clarify their content in this study. The classification of modern management concept styles, which form the theoretical and methodological basis of the management of the

[1]The World Bank: World Development Indicators. http: //data.worldbank.org/indicator.
[2]Decree of the President of the Republic of Uzbekistan dated February 7, 2017 No. PF-4947 "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan". // www.lex.uz.

integrated transport-logistics system, is presented (Table 1).

Table 1 **Classification of modern methods that form the theoretical and methodological basis of the development of the transport-logistics system**[3]

Management concepts	Methods used in the management of the integrated transport-logistics system
Systematic approach	– optimization techniques; – statistical methods; – correlation-regression analysis; – forecasting methods; – expert styles; – script styles; – graphic styles; – econometrics; – rating evaluation method.
Process approach	– methods of modeling transport-logistics business processes; – reengineering of integrated transport-logistics business processes; – outsourcing of transport-logistics business processes; – statistical control of processes; – process innovation; – monitoring of transport-logistics business processes; – benchmarking of transport-logistics business processes; – architecture of transport-logistics business processes.
Supply chain management	– management of interaction (actions) with suppliers; – supply chain management planning; – managing interaction (collaboration) with consumers.
Logistics management	– logistics audit; – "just in time" concept; – inventory management models; – AVS and XYZ analysis.
Strategic management	– monitoring of internal and external environment; – SWOT analysis; – strategic matrices – strategy of outsourcing of transport-logistics business processes; – balanced system of indicators; – model of the life cycle of transport-logistics services.
Operational management	– accounting and standardization of transport and logistics costs; – normalization of reserves; – normalization of service employees (personnel) of the enterprise.

It should be noted that the systematic and process approaches and conceptual rules of management serve as the basis for all the listed management concepts and theories. The methods, models and tools developed within these approaches are used in various branches of management.

In the world transport market, there is a need to implement deep structural structural changes based on modern logistics approaches. Today, according to local and foreign experiences, there is a need to create a single transport system with an integrated control center, from competition

[3]Compiled by the author as a result of research.

to mixed joint transport. The terms of cargo delivery in the types of transport are determined according to the formulas presented in table 2.

Table 2 **Calculation formulas for cargo delivery by types of transport**[4]

Types of transport	**Estimated delivery time formulas**	
Railway	$T_т = т_{бт} + {L}/{V_y^j} + t_{кўш}^j; \quad T_м + {L}/{тиж}$	(1)
Pipe	$V_{тиж} = \dfrac{l}{\dfrac{l}{V_{кун}} + \dfrac{2\alpha D_r}{M} + t_{кўш}^м}$	(2)
Air transport	$T_х = t_{бт} + \dfrac{l}{V_н^р} + t_{кўш}^р$	(3)
Car	$T_а = t_{бт} + \dfrac{l}{V_{эк}}$	(4)

Here:

$t_{бт}$ –time taken for start-stop operations, days. (k);

l –transportation distance, km;

$V_y^j, V_н^p$ – the norm of the distance covered by vehicles in one day, km;

$t_{кўш}^j, t_{кўш}^м, t_{кўш}^р$ – time, day for additional operations in railway, car and air transport;

$V_{эк}$ – operating speed, km/s;

$V_{тиж}$ – commercial speed, km/day;

$V_{кун}$ – operational speed of vehicles operating in this corridor, km/day;

α – load capacity utilization factor;

D_r – load carrying capacity of wagons, railways;

M – daily average rate of additional operations at the port of shipment and receipt of cargo, t/day;

t – time, days, for collection, storage and shipment of goods.

In order to organize integrated transport-logistics activities, it is desirable to first learn the characteristics of the single transport systems, which include rail, air and road transport. Depending on the management strategy and tasks of the enterprise carrying out transport-logistics operations, optimal types of transport are selected for the delivery of goods. It takes into account the technical and economic characteristics of transport types, their capabilities and shortcomings, which determine their rational use, taking into account the costs and management indicators. When choosing the type of cargo transportation, the shipper has to work based on many criteria. These criteria are implemented on a five-point scale. Here, "1" is the highest score, "5" is the lowest score (Table 3).

[4]Compiled by the author as a result of research.

Table 3 **Evaluation of different types of transport in terms of the main factors affecting the choice of transport type**[5](on a 5-point scale)

Types of transport	Speed (delivery time)	Reliability (adherence to the schedule)	It is possible to transport goods	Number of geographic points served	Cost per ton-km (price)
Railway	3	4	2	2	3
Water	4	5	1	4	1
Car	2	2	3	1	4
Pipe	5	1	5	5	2
Air	1	3	4	3	5

Therefore, based on the above considerations, the following problems affect the process of managing the integrated transport-logistics system at a slow level:

– lack of container transport capacity;
– high prices of freight transportation in railway transport;
– Underdevelopment of 3PL and 4PL logistics service providers;
– about 60% of railway wagons have been in service for 20-30 years, and 13% for more than 30 years;
– 1.5% of refrigerator cars participate in international transportation (15-20% demand), this figure is 4% of railway wagons;
– that there is no single control mechanism in the transport-logistics system;
– the failure of the transport-logistics system coordination mechanism established today;
– that the methodology of general control of the transport-logistics system is not included in the system;
– In 2017, 68% of the trucks involved in international transportation were 15-20 years old, and 10% were 20-30 years old;
– the share of container transportation in international transportation is 7-8% (in the EU - 14%, in China - 51%);
– more than 70% of the country's highways cannot provide the optimal speed of vehicles;
– about 30% of the warehouse's main funds are physically and morally obsolete;
– the level of mechanization of loading and unloading works is 20-30%.

Delivery time is one of the most important aspects of providing well-defined transport-logistics services. In particular, the time spent on organizing transport (when transport is not available, when it is necessary to load and unload, not finding the necessary places, etc.). Sometimes non-transport time is considered more important than transport time.

To evaluate the efficiency of cargo delivery time, it is appropriate to calculate according to formulas (1), (4) given above. Let's consider a mathematical model for evaluating the efficiency of cargo delivery time when using 3PL and 4PL level logistics services:

– travel time – 36 hours;
– the time to start emptying containers is 13:00.
– unloading time is 22:00
– loading and unloading time - 33 hours;
– intensity during unloading – 12.78 containers per hour.

So, let's consider different options for the time of delivery of goods (Table 4).

[5]Compiled by the author as a result of research.

Table 4 Options for carrying out transport-logistics operations[6]

Options	Option calculation formulas	
A	$T_A = T_{1-3} + T_3 + T_{3-4} + T_4 + T_{4-6} + T_6$	(5)
V	$T_B = T_{1-2} + T_2 + T_{2-3} + T_3 + T_{3-4} + T_4 + T_{4-6} + T_6$	(6)
S	$T_C = T_{1-3} + T_3 + T_{3-4} + T_4 + T_{4-5} + T_5 + T_{5-6} + T_6$	(7)
D	$T_Д = T_{1-2} + T_2 + T_{2-3} + T_3 + T_{3-4} + T_{4-5} + T_5 + T_{5-6} + T_6$	(8)

Here:

1 – cargo dispatch point; 2 – raid; 3 – inspection of vehicles; 4 – customs; 5 – transfer of cargo to another type of transport; 6 – cargo acceptance point.

– the time it takes to deliver goods according to the chain 1-2-3-4-5-6 as shown in Figure 3.2.T_i Based on formulas (7–10), the delivery time was calculated in all cases for options A, V, S, D. Data on the standardization of cargo delivery time and the calculation of its results are presented in Table 5.

Table 5 Calculation results of cargo delivery time by options[7]

Vari-ants	$T_{вар}$	T_{1-2}	T_2	T_{2-3}	T_{1-3}	T_3	T_{3-4}	T_4	T_{4-5}	T_{4-6}	T_5	T_{5-6}	T_6	$\sum T_i$
T_A	T_{A1}	-	-	-	46	4	0.2	1.5	-	40	-	-	2	93.7
	T_{A2}	-	-	-	41	9	0.3	5.55	-	42	-	-	3	100.8
	T_{A3}	-	-	-	52	6	0.4	5	-	44	-	-	4	111.4
T_B	T_{B1}	33	4	-	-	8	0.3	2.5	-	35	-	-	3	85.8
	T_{B2}	40	2	1	-	9	0.2	1.5	-	30	-	-	4	87.7
	T_{B3}	35	3	-	-	9	0.3	4.5	-	36	-	-	3	90.8
T_C	T_{C1}	-	-	-	41	8	0.4	2.5	0.2	-	58	20.5	3	133.6
	T_{C2}	-	-	-	46	6	0.4	3.5	0.4	-	76	25.5	4	162.8
	T_{C3}	-	-	-	38	7	0.3	4	0.3	-	106	30.5	3	189.1
$T_Д$	$T_{Д1}$	45	3	1	-	8	0.4	3.5	0.4	-	96	31.5	2	189.8
	$T_{Д2}$	46	2	-	-	9	0.4	4.5	0.4	-	146	35.5	3	246.8
	$T_{Д3}$	43	3	1	-	7	0.3	4	0.3	-	180	31.5	3	273.1

Based on the calculation results in Table 8, the delivery time of goods according to options A, V, S, D was determined in the form of a diagram. According to the analysis, options A and V are preferable to options C and D due to less time consumption. Based on the results of Table 8, the efficiency of delivery time was evaluated using the transformation coefficient for options A, V, S, D (Table 6).

Table 6 Efficiency of delivery times for options A, V, S, D[8]

Options	The effectiveness of the compared options	
A	$K_{A2} = 1 + \frac{\sum T_{A2} - \sum T_{A1}}{\sum T_{A1}} = 1 + \frac{100{,}8 - 93{,}7}{93{,}7} = 1{,}07$ $\delta_{A2} = (K_{A2} - 1) * 100\% = 7\%$ $K_{A3} = 1 + \frac{\sum T_{A3} - \sum T_{A1}}{\sum T_{A1}} = 1 + \frac{111{,}4 - 93{,}7}{93{,}7} = 1{,}18$ $\delta_{A3} = (K_{A3} - 1) * 100\% = 18\%$	(9)

[6]Compiled by the author as a result of research.
[7]Developed by the author as a result of research.
[8]Calculated by the author as a result of the conducted research.

V	$К_{В2} = 1 + \frac{\sum Т_{В2} - \sum Т_{В1}}{\sum Т_{В1}} = 1 + \frac{87,7 - 85,8}{85,8} = 1,02$ $\delta_{В2} = (К_{В2} - 1) * 100\% = 2\%$ $К_{В3} = 1 + \frac{\sum Т_{В3} - \sum Т_{В1}}{\sum Т_{В1}} = 1 + \frac{90,8 - 85,8}{85,8} = 1,05$ $\delta_{В3} = (К_{В3} - 1) * 100\% = 5\%$	(10)
S	$К_{С2} = 1 + \frac{\sum Т_{С2} - \sum Т_{С1}}{\sum Т_{С1}} = 1 + \frac{162,8 - 133,6}{133,6} = 1,21$ $\delta_{С2} = (К_{С2} - 1) * 100\% = 21\%$ $К_{С3} = 1 + \frac{\sum Т_{С3} - \sum Т_{С1}}{\sum Т_{С1}} = 1 + \frac{189,1 - 133,6}{133,6} = 1,41$ $\delta_{С3} = (К_{С3} - 1) * 100\% = 41\%$	(11)
D	$К_{Д2} = 1 + \frac{\sum Т_{Д2} - \sum Т_{Д1}}{\sum Т_{Д1}} = 1 + \frac{246,8 - 189,8}{189,8} = 1,30$ $\delta_{Д2} = (К_{Д2} - 1) * 100\% = 30\%$ $К_{Д3} = 1 + \frac{\sum Т_{Д3} - \sum Т_{Д1}}{\sum Т_{Д1}} = 1 + \frac{273,1 - 189,8}{189,4} = 1,43$ $\delta_{Д3} = (К_{Д3} - 1) * 100\% = 43\%$	(12)

Therefore, according to the results of the calculations, the transformation coefficient, which shows that more time is spent in carrying out transport-logistics operations, provides an opportunity to evaluate the efficiency of the compared options in the delivery of goods. Accordingly, options A and V allow for a 25 percent reduction in delivery time compared to options C and D.

This result can be achieved by effective management of the cargo delivery process. Below we will consider the economic-mathematical model for evaluating the efficiency of the management of the integrated transport-logistics system.

Evaluating the effectiveness of managing an integrated transport-logistics system is a somewhat complicated process. Therefore, it is desirable to determine the main criteria for evaluating management efficiency and to express the interrelationship between them through a mathematical function. So, the main criteria in system operation were considered to be:

– cargo mass "", in tons;M
– traveled distance "", in kilometers;L
– delivery time "", in hours;T
– transport and logistics costs, "" in soums.X

The relationship between these criteria was expressed on the basis of the following economic-mathematical model:

$$И_к = M^x * L^y * T^z * X^f \quad (13)$$

Here - indicator of economic evaluation of integrated transport-logistics activity;$И_к$

x, y, z, f - general calculated indicators, which are a clear and interpretable result in the analytical examination within the following limits:

$$-3.0 \leq x, y, z, f \leq 3.0 (14)$$

x, y, z, fthis relationship can be taken as an indicator that can be used for any type of transport in general. Based on this, $x = 0, y = 1, z = 0, f = 0$ bwhen dying, the following relationship occurs:

$$И_к = M^0 * L^1 * T^0 * X^0 = км, \text{ distance } (15)$$

$x = 0, y = 1, z = -1, f = 0$ and the following equality arises:

$$И_к = M^0 * L^1 * T^{-1} * X^0 = \frac{км}{соат}, \text{ speed of movement} \quad (16)$$

The economic-mathematical model of the evaluation of the efficiency of the management of the integrated transport-logistics system represents the interrelationship between the consideration of the efficiency indicators of the transport-logistics activity and its quality management. The quality indicators of the management of the integrated transport-logistics system affect the performance indicators, and the economic-mathematical model of the management efficiency of the integrated transport-logistics system is represented by the following indicators:

$$C_j = f(К_{бс}, И), \quad (17)$$

$$x_{imin} \leq x_i \leq x_{imax} \quad (18)$$

$$Y = \varphi_i(И_i) \leftrightarrow ext \quad (19)$$

here:

C_i –indicator of economic efficiency of integrated transport-logistics activities;

$К_{бс}$ –coefficient determining the level of management efficiency;

x_i – organizational and economic indicators;

x_{imin}, x_{imax} –the highest and lowest values of organizational-economic indicators;

Y –a multifactorial function affecting performance.

Thus, based on the formulas (3.20-3.26), the effective management process of the integrated transport-logistics system was expressed by the following function.

$$Y = 0.243 * x_1 + 0.192 * x_2 + 0.17 * x_3 + 0.109 * x_4 \quad (20)$$

Therefore, the concept of a specific term that allows to minimize the delivery times of goods, an economic-mathematical model of organizing the activities of a logistics company at the level of 3PL and 4PL, a target function that allows to evaluate the economic efficiency of the system, to effectively carry out activities on integration,reduce logistics costs andWe believe that the system allows to increase the efficiency of management activities.

CONCLUSIONS AND SUGGESTIONS

In short, one of the main elements of the efficiency of the transport-logistics system in "Uzbekistan Railways" JSC is the minimization of logistics costs and the shortening of the terms of fulfillment of orders of consumers of services. It has been confirmed that delivery time can be reduced by 25% as a result of the use of modern logistics technologies and the concepts of "Ishikawa diagram", "value creation flow map" and "just-in-time" (JIT) in JSC "Uzbekistan Railways". Proposed methods and recommendations for increasing the efficiency of the management of the integrated transport-logistics system, development of short-term and long-term strategies for effective management of the integrated transport-logistics system, modernization of the system,

REFERENCES

1. The World Bank: World Development Indicators. http: //data.worldbank.org/indicator
2. Zakhidov AA Alternative transportation corridors in Central Asia: factors, interdependence, and integration problems // Central Asia and Caucasus, Sweden. - Vol. 15, Issue 1, 2014. – P. 149-159.

3. Irisbekova M.N. Improvement of transport service market optimization techniques based on marketing principles. Iqt. science. doc. ...dis. Autoref., Tashkent 2017.
4. Bowersox D. Logistics. Integrirovannaya tsep postovok. — M.: Science-Business, 2001.
5. Zohidov A.A. Improving the effective management mechanism of the Central Asian transport system. Iqt. science. doc. ...dis. Autoref., Tashkent 2018.
6. Fayzullaev J.S. Improving the efficiency of management of the integrated transport-logistics system. Iqt. science. div. doc. ...dis. Autoref., Tashkent 2019.
7. Fayzullayev JS The economic-mathematical model of the organization activity of the modern transport-logistics system. // Bulletin of Science and Pracrice nauchnyy zhurl (scientific journal). 2018. No. 5 (4). S. 345-352.
8. Fayzullayev JS Development of theoretical foundations management of transport-logistics system. //European Applied Sciences, 2018. No. 2, - B. 7-10.
9. Fayzullayev JS Evaluation of efficiency of transport - logistics system. // XLVII International correspondence scientific and practical conference "International scientific review of the problems and prospects of modern science and education" (Boston. USA. July 24-25, 2018). 62-65.
10. Fayzullayev JS Effective management methodology of integrated transport-logistics system // International Journal of Advance and Innovative Research. 2019. Volume 9, Issue 1 (I). Impact Factor (5) GIF – 0.676.
11. Faizullayev JS Improvement of Economic Efficiency of Development of Railway. // Asian Journal of Technology & Management Research (AJTMR) ISSN: 2249 –0892 Vol9 Issue–2, Dec -2019
12. Fayzullayev JS Theoretical Aspects of the Transport Logistics System Management // Asian Journal of Technology & Management Research (AJTMR) ISSN: 2249 –0892 Special Issue–2, Sep -2019.