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Processing methods of expert assessment in determining the performance of road transport system

Samatov Rustam Gaffarovich, Ergashev BotirZokir 'ogli, Gatesi Jean de Dieu

Senior Lecturer in Logistics and Transportation, Tashkent Institute of Design, Construction and Maintenance of Automotive roads, Uzbekistan

PhD candidate in school of Transportation and Logistics, Southwest Jiatong University, Chengdu, Sichuan-P.R.China

PhD candidate in school of Transportation and Logistics, Southwest Jiatong University, Chengdu, Sichuan-P.R.China

ABSTRACT: In road transportation system, the competitive essence has two aspects: first, competition among motor transport enterprises, and then competition between customers. The fact that the competition has two aspects leads to a large number of species. Different Automobile Transport Companies (ATCs) and their transport services have different operational characteristics.Due to the research objectives, automobile transport has been taken into account that inter-enterprise competition arises in accordance with their exploitation characteristics and that these qualities have a decisive impact on the clients.In their activities, motor transport companies use different forms and methods of competition and their different exploitative qualities. This article shows the evaluation methods of expert assessment to determine the performance of vehicles. The use of a structured approach has allowed to systematize the factors identified by the source of inputs, quality and price components. The concept of exploitative quality also applies to road transport vehicles other than the automobile transport company, which can be grouped according to the influencing factors.In analytical systems of exploitative attributes, relative value is determined using the methods of calculation. The following are most commonly used such as differential, complex, and combined styles.

KEYWORDS: Road transport, International cargo, Quality of performance, Integral indicators, Expert evaluation, Discounting

I.INTRODUCTION

In road transportation system,the competitive environment in the activity of the International Cargo Transport Enterprise (CTE) is one of the main sources of development. However, many competitors, including large transport companies with substantial resources, do not have the capability to meet all the needs of their customers, while they spend most of their time on their activities., the competitive essence has two aspects: first, competition among motor transport enterprises, and then competition between customers. The fact that the competition has two aspects leads to a large number of species. Different automobile transport companies (ATCs) and their transport services have different operational characteristics.Due to the research objectives, automobile transport has been taken into account that inter-enterprise competition arises in accordance with their exploitation characteristics and that these qualities have a decisive impact on the clients.In their activities, motor transport companies use different forms and methods of competition and their different exploitative qualities (refer to figure 1-2).

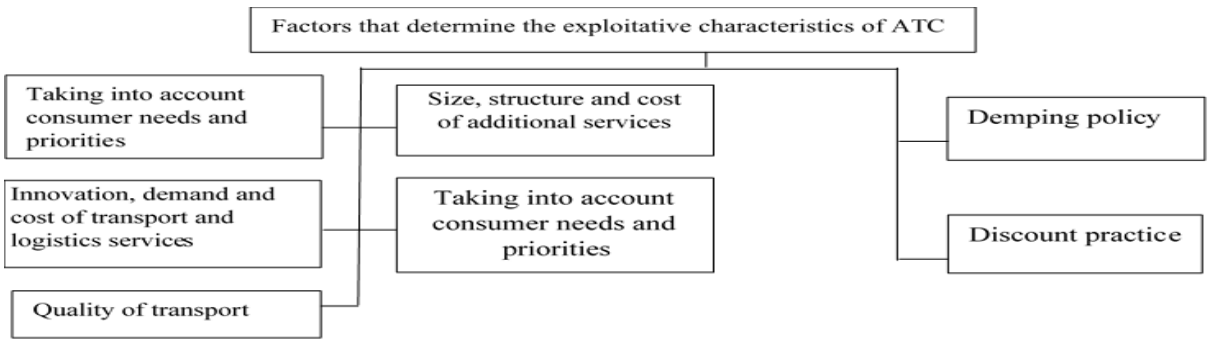

Figure-1: Factors that determine the exploitative characteristics of automobile transport companies.

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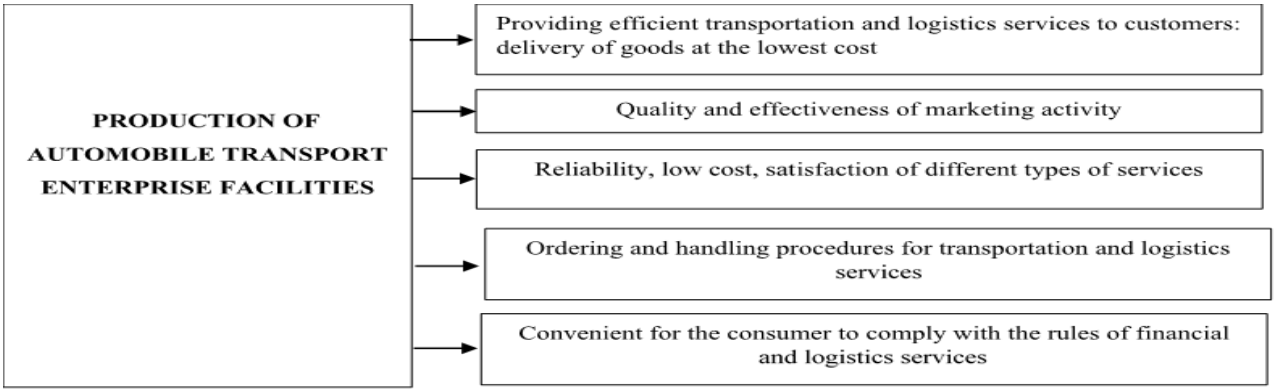

Figure-2: Sources of exploitation characteristics of the motor transport enterprise

Competitiveness is a complex concept, and it is described in various scientific sources **[1, 2]**. The quality of ATC competitiveness is practically determined by their exploitation characteristics.It is therefore desirable to disclose this concept. it is necessary to define the concept of exploitation characteristics of the motor transport enterprise. The exploitation characteristics of the vehicle transport company are the ability to maintain a leading position among other transport companies for a long time in the market of transport services. Quality and exploitation quality of carriage services is a combination of technical and technological features, guarantee system, compensation and benefits that reflect customer satisfaction and the level of traffic, the level of its purchasing, at a specific time of the Market of Transport Service (MTS) within a specific segment of competitiveness.Based on the aforementioned, we can say that external and internal factors influence the ATC competitiveness

II. METHODOLOGY AND DATA ANALYSIS

The use of a structured approach has allowed to systematize the factors identified by the source of inputs, quality and price components (Table 1). The concept of exploitative quality also applies to road transport vehicles other than the ATC, which can be grouped according to figure-1.In analytical systems of exploitative attributes, relative value is determined using the methods of calculation. The following are most commonly used: differential, complex, and combined styles.

Relative values of exploitative characteristics are defined in the differential equation:

$$q_i' = \frac{P_{ib}}{P_i}, (i = 1,\dots,n) \quad (1)$$

where:

P_i is the value of the i;

P_{ib} - base value of indicator;

n - quantity of indicators

Table 1: - Factors influencing the exploitation characteristics of motor vehicles

Factor initiator	**Factors influencing the quality of transport products**	**Factors affecting exploitation characteristics of transport services**
Car traffic management system	Normative documents, appearance of new varieties of enterprises in motor transport	Change of ownership and business structure in motor transport
Government	Environmental policy, normative documents	Economic, credit-monetary, fiscal, customs policy, political factors, economic, political and social stability
Customers	Customer needs	Demand law, price elasticity of demand, segmentation
Competitors	Quality of competitive transport products	Price Strategies, Competitive Transport Costs

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Partners	Strategic potential of partner companies	Partner behavior
Investors	Investment Terms	Interest rates on loan, debt repayment
Working Resources	Quality of human resources	Workforce Cost
Environment	Climate, road conditions	Climate, road conditions
Freight Suppliers	Quality of material resources, availability of resources	Level of material resources prices
Non-budgetary funds	Funding policy	Interest rates and conditions
Illegal environment	Racer, theft, the sharp deterioration of the situation	Racer, theft, the sharp deterioration of the situation
Casualty	force-major cases	force-major cases
ATC environment	Efficiency, corporate governance structure, business strategy of enterprise strategic capacity	Organizational business strategy - organizational structure and market strategies management, type of transport
Car transport system	Advances in scientific and technical development of the motor transport	ITT achievements in motor transport, trends in the economy, level of development of demand for goods

Equation (1) is selected from the formula and then used in which the increase in motion will lead to an increase in the operational characteristics of the moving vehicles.The differential estimation method does not necessarily help to find the best, exploitative model simultaneously.

In this case, it is accepted to apply a comprehensive approach to evaluate the competitiveness of vehicles. Quantitative assessments of this method are elaborated in scientific sources [4] and are:

$$K_{б.р.} = \frac{E_{б.с.}}{E_{с.б.}} \quad (2)$$

where:

Kb.r. - Unit model, which analyzes the model of the vehicle, showing the exploitative quality of the market;
Eb.s. - the effectiveness of the model of the action vehicle being analyzed in a particular market;
Es. - The best of the kind used in the particular market, ie the efficiency of the exploitative model.
The average arithmetic (U) can be calculated by the following formula for the complex value of exploitative qualitative:

$$U = \sum_{j=1}^{n} m_j \times Q_{ja} \quad (3)$$

Where:

m_j- is the weight indices of the j-th group;
Q_{ja}- total indicator of group i of indicators;
n - The number of indicators grouped for evaluation of exploitation characteristics.
Comprehensive index of group Q_{ja} is calculated according to the formula:

$$Q_{ja} = \sum_{i=1}^{n_j} m_{ij} \times q_{ij} \quad (4)$$

where:

m_{ij} - the weight ratio of the i-th group of the j-th group;
n - number of indicators in the j-th group;
q_{ij} - relative to the base analogue of the action tool's exploitative characteristics. Equation (4) is expressed in the m_{ij} points given in the formula

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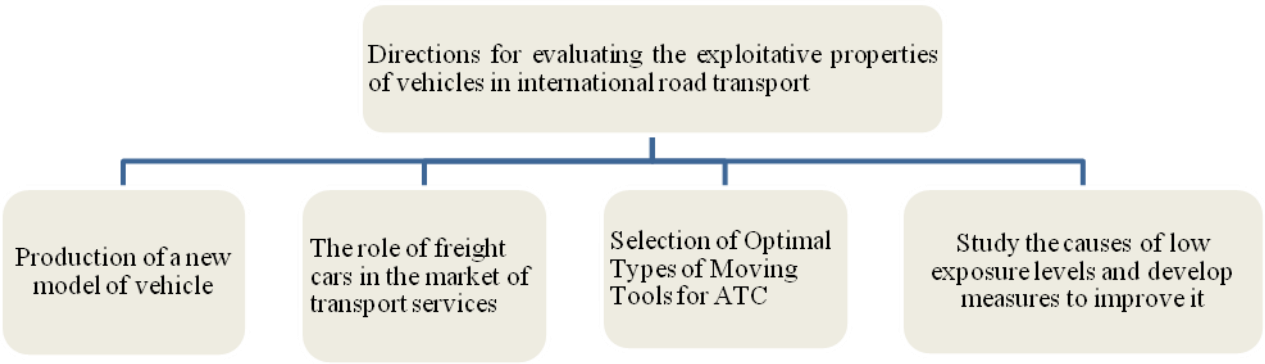

Figure: -3 Objectives of the evaluation of the operational quality of vehicles for international road transport

In the composite set of indicators commonly used, an integral indicator of exploitative quality can be determined which can be determined by the sum of the sum of the action of the tool of action, in relation to the total cost of its creation and operation:

$$K_i = \frac{P_s}{X_{YA} + X_E}, \quad (5)$$

where:

P_S - the sum of the effects of the tool operation;
X_{YA} - sum of cost of creating the tool;
X_E - the sum of exploitation costs.

In the various sources **[3],** the use of exploitative quality assurance methods is based on the conventional assessment of the results of expert evaluations. The drawback of this approach is that attracting experts can lead to such a situation in which it is impossible to guarantee that some of the values of the indicators reflect the objective situation. Therefore, this research has suggested a methodology for re-evaluating expert assessments. The following list of quality indices can be developed using this technique in the scope of research of exploitation characteristics of vehicles.

Transportation and logistics systems (LTS) are not limited to the transportation process. They do not depend on the type of transport used by carriers or passengers, but by taking into account the required dimensions, duration and quality characteristics. Thus, he uses the principle of constructing a multitude of logistics modeling systems that allows the management of logistics systems on a single basis. Evaluation of factors influencing the exploitation quality characteristics of motor transport enterprises is carried out in several stages.

If experts have been forced to give the same or average color to several factors in the process of color separation, then in this case, the Co-ordination Coefficient can be determined using the following formula:

$$W = \frac{S}{\frac{1}{2}m^2(K^3-K) - m\sum_j^m T_j}, \quad (6)$$

$$\sum_d^m T_j = \frac{1}{12}\sum_i (t_i^3 - t_i) \quad (7)$$

where m-the number of identical colors in $t_{i\text{-}j}$-colors. The coefficient of conversion varies between 0 <W <1. When W is greater than 0, the opinions of the expert are so compatible. The significance of the coefficient of the coefficient is estimated by the Xi-square (Pyrrhic Conformity):

$$X^2 = \frac{12S}{mK(K+1)} \quad (8)$$

If it is determined by formula 6, then

$$X^2 = \frac{S}{\frac{1}{2}mK(K+1) - \frac{1}{K-1}\sum_j^m T_j}, \quad (9)$$

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With the formula calculated, Detecting the table value of Xi is 95% probability for practical matters. If X^2-critical (0.05; k) <X^2-calculated, it is possible to estimate 95% probability of the experts' opinions. Let's go back to the question now. Experts assessments are based on the matrix of color-based distribution factors (Table 3).
As seen in the table, experts have estimated several factors. Therefore, we have to calculate the corresponding colors:

$T_1 = 2^3 - 2 = 6$; $T_3 = 2^3 - 2 = 6$; $T_5 = 2^3 - 2 = 6$; $T_6 = (2^3 - 2) + (2^3 - 2) = 6 + 6 = 12$
$T_7 = 2^3 - 2 = 6$; $T_{10} = 2^3 - 2 = 6$; $T_j = \frac{6+6+6+12+6+6}{12} = \frac{42}{12} = 3.5$

The coefficient of the coincidence is:

$$W == \frac{2612.5}{\frac{1}{12} * 10\ (7+1) - \frac{1}{7-1} * 3.5} = x = \frac{2612.5}{46.6 - 0.58} = x = \frac{2612.5}{46.02} = 56.8$$

Calculate the sum of the square of x_i:

$$X^2 = x = \frac{2612.5}{\frac{1}{12} * 10 * 7(7+1) - \frac{1}{7-1} * 3.5} = \frac{2612.5}{46.6 - 0.58} = \frac{2612.5}{46.02} = 56.8$$

95% of the square value of X^2_i; with probability and X^2critical= (0.05 / 6) = 12.59.

12.59 << 56.8 So 95% of probability is that the opinions of the experts are compatible.

When selecting the factors affecting exploitative quality characteristics of the motor vehicle, the diagram of their color distribution is shown in the following table-3.

Table-2: Diagram of the colors by factors influencing the performance characteristics of road transport.

10 20 30 40 50 60 70 80 90 100	14.5	16.5	35.5	42.2	43.5	59.1	68.5

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Table-3: Matrix of distribution of experts' assessments of factors influencing the exploitation characteristics of transport services

№	Factors	Conditional mark	Conditional number of the experiment										COLOR collection	An average deviation of the color combination	Heavy Quadrature
			1	2	3	4	5	6	7	8	9	10			
1	Delivery Guarantee	X_1	1,5	2	1	2	1	2	1	2	2	2	16,5	-23,5	552,25
2	Delivery time	X_2	1,5	1	2	1	2	1	3	1	1	1	14,5	-25,5	650,25
3	Delivery to destination	X_3	6	5	4	5	4	3,5	4	4	4	3	42,5	2,5	6,25
4	Delivery of the required volume of cargo	X_4	3	4	5	3	5	3,5	2	3	3	4	35,5	-4,5	20,25
5	Full satisfaction of transportation needs	X_5	5	3	3	4	3	5	5	5	5	5,5	43,5	3,5	12,25
6	Providing the requested type of transport	X_6	4	6	6,5	6	6,5	6,5	6,5	6	6	5,5	59	19	361
7	Choosing the optimal shipping scheme	X_7	7	7	6,5	7	6,5	6,5	6,5	7	7	7	68,5	28,5	812,2
													280		2612,2
													T=40		

III.CONCLUSION

It is important to note that the models of vehicles, which are almost identical to their technical specifications and exploitation costs, can be used for the promotion of ATC at the expense of indicators such as aesthetics, ergonomics, and so on. indicators are of great importance. The purpose of this paper was to Process the methods of expert assessment in determining the performance of road transport system. From the results obtained in this research, it shows that the calculated chi-square was 56.8 and the critical value from the table with degree of freedom of 0.05 was found as 12.59. according to the data analysis, it concluded that the expected value with the matrix of color-based distribution factors was greater than the critical value, which meant 95% of probability was that the opinions of the experts are compatible.

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AUTHOR'S BIBLIOGRAPHY

MrSamatov Rustam Gaffarovich, was born 1972 in Uzbekistan, his completed Bsc in Mechanical engineering (Tashkent Institute of Design, Construction and Maintenance of Automotive roads, Uzbekistan) in 1994, from 1994 to 2016 Specialist of the Commercial Department of the Foreign Economic Trade and Dealer Firm "O'rtaOsiyo Sav Savdo" of the Ministry of Foreign Economic Relations of the Republic of Uzbekistan, from 2016 till now Director of "O'RTA OSIYO TRANS SERVIS" LLC and Senior Lecturer in Logistics and Transportation. During the many years he was published several research papers in national and international journals

Mr ERGASHEV BOTIRZOKIR O'GLI, was born 1990 in Tashkent which is capital city of Uzbekistan, he completed Bsc in Transportation and Traffic Engineering (Tashkent Institute of Design, Construction and Maintenance of Automotive roads, Uzbekistan) in 2009, master's degree holder in Civil (Road construction), in the same university, Uzbekistan in 2015.At present is Doctorate student with majoring in Transportation Engineering under the school of Transportation and Logistics, Southwest Jiatong University-P.R.China. He has several research papers in national and international journals.

Mr. GATESI JEAN DE DIEU, was born 1983 in Rwanda, his completed Bsc in Civil Engineering & Environmental Technology (College of Science & Technology-University of Rwanda) in 2010, master's degree holder in Civil (Transportation Engineering), L.D College of Engineering -Gujarat Technological University, India in 2015. He worked as Assistant Lecturer at University of Rwanda. At present is Doctorate student with majoring in Traffic Engineering under the school of Transportation and Logistics, Southwest Jiatong University-P.R.China. He has published more than three research papers in national and international journals. He has also presented the one more paper in international conference, India. Interested area of research: Traffic Flow Theory and Modelling, Intelligent Transportation System, Public Transport System, Road Traffic Safety, Highway Pavement Materials.