A New Approach to Comprehensive Assessing the Service Competitiveness of Motor Transport Enterprises Specializing in Municipal Passenger Transportation

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Abstract **– The author's method for assessing the level of the service competitiveness of motor transport enterprises specializing in municipal passenger transportation is developed and tested. A new approach to the formation of group composition and directly indicators of service competitiveness is offered. The author's method envisaged a combination of qualitative and quantitative aspects of the research, since the indicators' values were obtained as a result of the expert survey. During their elaboration the method of principal components was used to determine the weights of individual indicators and groups of the service competitiveness of motor transport enterprises.**

Keywords **– Enterprise competitiveness, motor transport services.**

1. Introduction

Enterprises that provide consumer services to the public are characterized by a high level of social responsibility. Their activities, of course, have to be effective, but at the same time, aimed at high quality to meet the needs of the consumer.

DOI: 10.18421/TEM93-38
https://doi.org/10.18421/TEM93-38

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Received: 03 March 2020.
Revised: 26 June 2020.
Accepted: 04 July 2020.
Published: 28 August 2020.

These aspects impose their specific characteristics on the development of enterprises and their competitive advantages. Therefore, in assessing the service competitiveness of enterprises specializing in motor transport passenger transportation, it is important to incorporate not only the parameters of operation efficiency into the methodology, but also the results including expert surveys of consumers concerning all possible components of quality and sufficiency of services. In order to ensure the consistency and complexity of the analysis, it is important to develop a questionnaire that, when interviewing experts – consumers of the services of motor transport enterprises would allow covering the whole range of issues related to meeting a consumer demand, transportation needs and related services. Thus, a questionnaire, which included 35 questions on such components of the services of motor transport enterprises for municipal passenger transportation as economic, organizational and process, normative, ergonomic, social, aesthetic, innovative and technological, was developed at the first stage. The surveys were conducted twice a year (in January and June) in 2017, 2018 and 2019 in Lviv, (Ukraine). The survey covered 3,400 respondents in each of the periods, which made about 3% of the service consumers of the city's 5 largest motor transport enterprises.

Most currently available methodological approaches to assess the state and level of competitiveness involve comparing the performance of enterprises and their products with competitors or benchmarks, but do not take into account the opinion of the consumer.

Therefore, the object of the study is to form a methodological approach to assessing the service competitiveness of motor transport enterprises on the basis of a survey of service consumers with a subsequent quantitative estimation and transformation of these data into numerical values of service competitiveness in general and by its individual components.

The methodology involves not only assessing the state of service competitiveness, but also comparing its level with key competitors in the market of motor transport services.

2. Literature Review

The problems of competitiveness management have been researched in scientific works for many years. At present, the scientists have developed the concepts and methodology of studying the competitiveness of goods (services), the enterprise, and economics at a sufficiently high theoretical and methodological level. For the most part, the concept of competitiveness is well-established and seen as the ability to win in the competition against direct rivals.

However, it is clear that, firstly, the type of economic activity (field) in which the enterprise operates imposes its own peculiarities on the processes of competitiveness management; secondly, the specificity of the product (service) determines its own specific parameters and characteristics that need to be additionally taken into account; thirdly, no business entity operates in isolation from the others and from the business environment, which also contributes to the state and special features of competitiveness ensuring.

With respect to the third of these aspects, according to N. Skrypnyk and K. Sidorenko, in the conditions of globalization, motor transport enterprises are increasingly restricted in their own policy of ensuring service competitiveness, since the characteristics of the competitiveness of business and its products are increasingly dependent on such factors of global competitiveness as economic productivity, government policy, business efficiency and infrastructure [1]. This leads to the conclusion that factors and aspects of competitiveness are dynamic categories.

In the research of V. Dubnytskyi and O. Nefedova it is stated that not only different factors determine competitiveness at any given time interval, but also the category itself is different. Therefore characteristics of competitiveness differ by development levels, development stages, spheres of origin and influence on other market entities [2].

The level of competition in the internal market is also influenced by the quality of the state policy with regard to economic protectionism. Just regarding the domestic market of motor transport passenger transportation in Ukraine, there is no competition from foreign motor transport companies [3] and this should be considered in two ways. On the one hand, it creates better conditions for the enterprise functioning and development in this field. On the other hand, it reduces competition and does not promote the development and improvement of the quality of motor transport services.

In order to avoid mistakes in the state regulation of certain aspects of competition, the state has to adhere to the principles. V. Shynkarenko refers scientific validity, systematicity, hierarchy, feedback, complexity, economic optimality, development, combination of interests, etc. [4] to the basic principles of ensuring the competitiveness of motor transport enterprises. Obviously, these aspects need to be taken into account when analyzing the state of competitiveness.

The researches by Yu. Vakulenko, A. Oliinyk and O. Hevlenko are devoted to the identification of a key object of the competitiveness of motor transport enterprises. Is it consumer and price characteristics of motor transport services or the quality of business management? The main conclusion is both, because these are interrelated things [5].

However, I. Borysiuk and K. Melnyk hold to another point of view, arguing that the resultant sign of management quality is external and internal factors of the competitiveness of motor transport enterprises. The external ones include: price, cost of materials, logistics, road condition, depreciation rates; the internal ones – use of road transport vehicles, personnel, economic rationalization, improvement of management, innovative activity [6].

Summarizing the fore cited, authors can sum up that these certain special features and key aspects should be taken into account when assessing the service competitiveness of motor transport enterprises. However, it is also important to understand methodological approaches that are applied.

In general, the methods of assessing the service competitiveness of motor transport enterprises have two directions: (1) analysis of partial parameters, (2) integral estimates.

As for the first one, for example, T. Vasyltsiv in the process of analyzing the business competitiveness consistently characterizes individual indicators by means within such components of the enterprise service competitiveness as financial, technical, technological, intellectual and personnel, investment an innovative, marketing, and product [7].

V. Bilichenko and O. Ohnevyi, analyzing the service competitiveness of motor transport enterprises, use only such indicators as investment volumes, net present value, profitability index, internal rate of return, virtually reducing service competitiveness only to the investment process [8].

However, when it comes to integral approaches to analyzing the service competitiveness of motor transport enterprise, a much broader set of indicators is used. Thus, O. Zorina and O. Syvolovska operate with 18 indicators [9], and R. Zakharchenko, L. Zakharchenko, T. Kiriushova and I. Larchenko [10] – with a whole array of competitiveness parameters, which numbers more than 50 indicators.

There are views due to which not only one integral approach is offered for analysis, but their immediate combination. Therefore, T. Diachenko and V. Sedoi offer to use matrix, index and graphical methods [11], and in the work [12] – tactical and strategic methods, which is justified and allows, firstly, carrying out paired checks of the obtained results and, secondly, more thorough approaching to assessment.

However, the methodological approaches available today do not take into account the key specific feature of the operation of motor transport enterprise specializing in municipal passenger transportation, which lies in the fact that service competitiveness is directly determined by the consumer, assessing its quality, accessibility, and other characteristics. Therefore, the analysis should be based on a consumer survey on all the possible characteristics of the service that they receive and consume.

Aims

The purpose of the study is to substantiate and test a new methodological approach to analyzing the service competitiveness of motor transport enterprises specializing in internal municipal passenger transportation.

Methods

The general methodology for analyzing the level of the service competitiveness of motor transport enterprises is shown in Fig. 1.

In any case, the purpose and objectives of the analysis should be determined first. In this case, the key tasks are not reduced to a conclusion on the level of the service competitiveness of motor transport enterprises in comparison with key rivals. It is also the identification that conveys problem areas of operation in relation to meeting needs of direct consumers of the services.

The next step is to select the method of analysis. In this case, it is a comparison between the obtained data with their limit data and the calculation the level of deviation of the actual data from the limit ones.

It is important for the further analysis to determine the extent to which each indicator from the data array affects the integral criterion. For these purposes, the method of principal components is applied, which allows determining the coefficients of weight of all the indicators and their groups using solely an empirical method (with the avoidance of subjective expert judgment).

In the next stage, the groups and direct indicators were identified by means of which the analysis was performed (formula 1). Thus, 35 indicators were selected, 5 in each of 7 groups: economic, organizational and process, normative, ergonomic, social, aesthetic and innovative and technological.

For comparison, the activity of the 5 leading Lviv motor transport enterprises was selected: Mira ltd., Motor Transport Enterprise № 1, Fiakr Lviv ltd., Uspih BM ltd., Motor Transport Enterprise 14630.

The research was conducted using a survey of consumers of the services of motor transport enterprises.

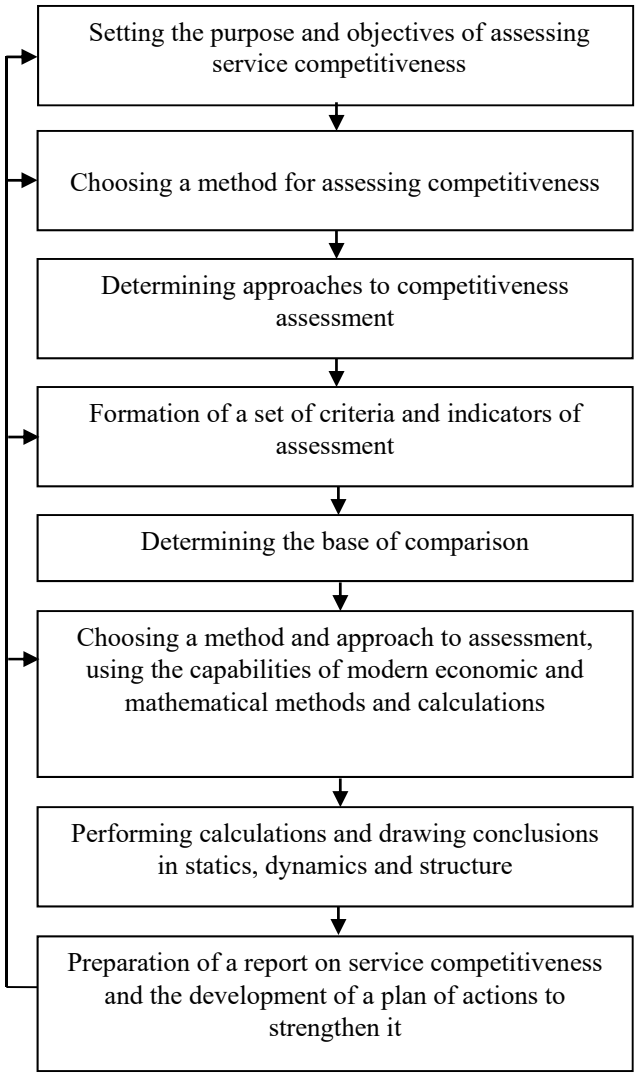

Figure 1. Conceptual sequence of the assessment of service competitiveness of the motor transport enterprises specializing in municipal passenger transportation (author's development)

The calculations were performed using the method of principal components – factor analysis in statistics, which uses the orthogonal transformation including a set of observations with possibly related variables into a set of variables without linear correlation called principal components.

$$C=F\begin{Bmatrix} E\uparrow\left(E_1\downarrow;E_2\uparrow;E_3\uparrow;E_4\uparrow;E_5\uparrow\right) \\ OP\uparrow\left(OP_1\uparrow;OP_2\uparrow;OP_3\uparrow;OP_4\uparrow;OP_5\uparrow\right) \\ N\uparrow\left(M\downarrow;N_2\downarrow;N_3\uparrow;N_4\uparrow;N_5\uparrow\right) \\ R\uparrow\left(R_1\uparrow;R_2\uparrow;R_3\uparrow;R_4\uparrow;R_5\uparrow\right) \\ S\uparrow\left(S_1\uparrow;S_2\uparrow;S_3\uparrow;S_4\uparrow;S_5\uparrow\right) \\ ES\uparrow\left(ES_1\uparrow;ES_2\uparrow;ES_3\uparrow;ES_4\uparrow;ES_5\uparrow\right) \\ IT\uparrow\left(IT_1\uparrow;IT_2\uparrow;IT_3\uparrow;IT_4\uparrow;IT_5\uparrow\right) \end{Bmatrix}, \quad (1)$$

where C is an integral assessment of the level within the service competitiveness of motor transport enterprises; E is an integral assessment of the economic component (with indicators ($E_1 – E_5$): cost of services, speed of passenger transportation, availability of price discounts, availability of seats for hand luggage, purchasing power of passengers); OP is an integral assessment of the organizational and process component (with indicators ($OP_1 – OP_5$): route optimality, regularity of transportation, absence of additional time losses, quality of communication organization, efficiency of the organization of a service payment system); N is an integral assessment of the regulatory component (with indicators ($N_1 – N_5$): availability of traffic rule violations, frequency of the manifestations of traffic rule violations, level of technical serviceability of the vehicle, compliance with service rules, lack of psycho-physiological fatigue of the driver); R is an integral assessment of the ergonomic component (with indicators ($R_1 – R_5$): comfort of entry and exit, convenience and ergonomics, comfort of passengers, optimality of the vehicle design, pleasant appearance); S is an integral assessment of the social component (with indicators ($S_1 – S_5$): transportation of specific categories of passengers, availability of seats for specific categories of passengers, professional and qualification characteristics of the staff, availability of additional social costs, holding social events); ES is an integral assessment of the aesthetic component (with indicators ($ES_1 – ES_5$): attractiveness of the vehicle appearance, attractiveness of the vehicle interior, noise insulation level of the passenger compartment, comfort and cleanliness of the atmospheric background, driving skills); IT is an integral assessment of the innovation and technological component (with indicators ($IT_1 – IT_5$): use of technical and technological innovations, availability of the technologies of electronic payment for services, introduction of technical means of monitoring, availability of additional services for passengers, environmental innovations).

As a result of the conducted analysis, the conclusions were drawn regarding the overall service competitiveness of the analyzed enterprises, as well as the problem areas comprising their functioning and development.

Results

According to the fixed indicators – the characteristics of service competitiveness of the motor transport enterprises specializing in municipal passenger transportation the surveys of service consumers were conducted. The sociological researches were conducted 6 times – including January and June 2017, 2018 and 2019.

The respondents assessed the activities of the leading motor transport enterprises in Lviv – Mira ltd., Motor Transport Enterprise № 1, Fiakr Lviv ltd., Uspih BM ltd., Motor Transport Enterprise 14630.

The service consumers were able to rate each indicator by a ten-point scale, where 10 is the highest possible rating of customer satisfaction with the relevant parameter, 0 – total inconsistency or dissatisfaction with the relevant parameter of the service.

To perform the integral estimation, the method of principal components was applied, namely, a multiplicative (non-linear) form of obtaining the integral index with simultaneous normalization of initial indicators and their optimal values was used, which provides adequate diagnostics of the level of service competitiveness and its components with the possibility of comparison with optimal values.

The analysis was conducted for each of the enterprises separately. Further, based on the calculations, weighted coefficients and normalized values of the main indicators of service competitiveness were obtained. The values of integral indicators for the analyzed enterprises and the dynamics of their changes are presented in Fig. 2.

It can be concluded that from January 2017 to January 2019 the level of service competitiveness of the analyzed enterprises increased, which is a positive trend. At the same time, in June 2019 the integral index of service competitiveness decreased slightly, moreover, for all of the analyzed enterprises.

However, at the end of the period under study, Motor Transport Enterprise № 1 had the highest level of service competitiveness, which was – 0.52, while Mira ltd. had the lowest level of service competitiveness – 0.44.

However, the main conclusion lies in a different concept. These general low values of the integral indicator of service competitiveness were characteristic of all the motor transport enterprises. 0.53 was the highest value among all the enterprises in the whole analyzed period. Obviously, this indicator value cannot be considered high and it is a proof of weak competitive positions of the enterprises and, accordingly, a satisfactory value of consumer content with the quality of services of the motor transport enterprises specializing in municipal passenger transportation.

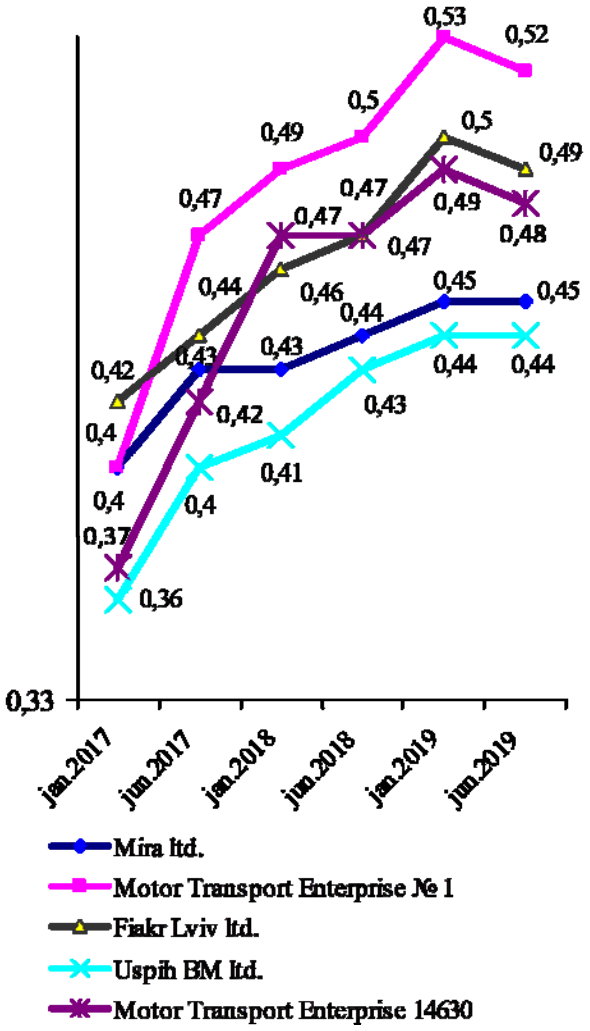

Figure 2. Values of the integral coefficients of the level of service competitiveness of the motor transport enterprises specializing in municipal passenger transportation in Lviv in 2017-2019 (calculated by the author)

In the process of analysis, it was found that the aesthetic component determines the most service competitiveness of the motor transport enterprises specializing in municipal passenger transportation (Table 1). Thus, for the enterprises such as Mira ltd., Motor Transport Enterprise № 1 and Motor Transport Enterprise 14630, this component was 0.19 and 0.18, respectively.

Such a component of competitiveness as the organizational and process one was characterized by high values – from 0.15 to 0.19, which can be considered a high value.

There are reasons to believe that much lower values of contribution to the service competitiveness of motor transport enterprises are characteristic of economic and social components. However, this may be due to over-regulation of these aspects in the enterprise activity. Accordingly, business entities cannot significantly change the cost of services and take a number of special measures.

Table 1. Assessment results of the criteria impact on ensuring service competitiveness of the enterprises providing passenger transport services in Lviv, as of June 1, 2019 (drawn up according to the author's calculations)

Criteria for service competitiveness	Coefficients of the share in the integral value of the state of service competitiveness at the enterprises				
	Mira ltd.	Motor Transport Enterprise № 1	Fiakr Lviv ltd.	Uspih BM ltd.	Motor Transport Enterprise 14630
Economic	0.12	0.10	0.12	0.15	0.15
Organizational and process	0.19	0.18	0.18	0.15	0.16
Normative	0.17	0.17	0.17	0.12	0.13
Ergonomic	0.17	0.19	0.15	0.14	0.15
Social	0.12	0.10	0.14	0.14	0.15
Aesthetic	0.20	0.20	0.18	0.17	0.20
Innovative and technological	0.10	0.10	0.10	0.06	0.07

Some changes also occurred in the dynamics of service competitiveness of the motor transport enterprises. Thus, in 2017-2019, there was a characteristic increase in the level of influence of the aesthetic, innovative and technological factors (Table 2). Instead, the impact of the economic and ergonomic components of service competitiveness has been diminishing in recent years.

Table 2. Assessment results of the dynamics of the level of criteria impact on ensuring service competitiveness of the enterprises providing passenger transport services in Lviv, as of June 2019 to January 2017 (drawn up according to the author's calculations)

Criteria for service competitiveness	Absolute deviations of the coefficients of the share in the integral value of the state of service competitiveness at the enterprises				
	Mira ltd.	Motor Transport Enterprise № 1	Fiakr Lviv ltd.	Uspih BM ltd.	Motor Transport Enterprise 14630
Economic	-0.03	-0.01	-0.02	-	-
Organizational and process	-	-	-	+0.04	+0.03
Normative	-	-	+0.01	+0.03	+0.02
Ergonomic	-0.02	-0.03	-0.04	-0.02	-0.01
Social	-0.02	-0.04	-0.02	-0.02	-
Aesthetic	+0.03	+0.03	+0.03	+0.04	+0.04
Innovative and technological	+0.05	+0.06	+0.08	+0.05	+0.06

It should be noted that it is insignificant, but also the influence of the organizational, process and normative components of service competitiveness of the motor transport enterprises specializing in municipal passenger transportation is increasing.

These and other trends should be taken into account in the formation and further implementation of the enterprise policy regarding ensuring the competitiveness of their motor transport services. Particular importance should be attached to the factor of innovation and modern technologies that will increasingly determine the competitiveness of services and enterprises that provide them in the nearest future.

It should be pointed out that of all the characteristics among service competitiveness of the motor transport enterprises, the highest level of influence is inherent in the use of technical and technological innovations (0.047), the comfort of entry, exit and the movement of passengers inside the vehicle (0.047), the introduction of technical means of distance monitoring and control of a motor vehicle running (0.046), the availability of additional services for passengers (0.046), the attractiveness of the interior of fixed route taxis (0.042), the sound insulation level of the passenger compartment and sound-noise background (0.041) (Table 3).

Table 3. Assessment results of the weight of the criteria and indicators of service competitiveness of the motor transport enterprises, on average for 2017-2019 (drawn up according to the author's calculations)

Criteria and indicators of competitiveness	Factors of weight
Economic	**0.118**
Cost of services	0.015
Passenger transportation speed	0.035
Price discounts available	0.037
Availability of seats for hand luggage	0.013
Purchasing power of passengers	0.018
Organizational and process	**0.135**
Optimization of transportation routes	0.028
Regularity and timeliness of transportation	0.035
No additional wastage of time	0.033
Quality of communication organization	0.021
Efficiency of the payment system organization	0.018
Normative	**0.132**
Availability of cases of the violation of passenger transportation rules	0.017
Frequency of violations	0.036
Level of the technical service	0.031
Measure of compliance with the service rules	0.030
Absence of psycho-physiological fatigue	0.018
Ergonomic	**0.131**
Comfort of passenger moving	0.047
Convenience and ergonomics	0.037
Comfort of passengers	0.012
Optimization of the interior space design	0.016
Pleasant appearance	0.018
Social	**0.133**
Transportation of certain categories of passengers	0.037
Availability of seats for the transportation of specific categories of passengers	0.031
Professional qualification characteristics of the personnel	0.015
Availability of additional social costs	0.012
Holding social events	0.038
Aesthetic	**0.142**
Attractive external appearance	0.008
Attractive internal appearance	0.042
Sound insulation level of the compartment	0.041
Comfort and cleanliness	0.038
Driving skills	0.012
Innovative and technological	**0.209**
Using innovations	0.047
Availability of electronic payment technologies	0.028
Introduction of technical remote means	0.046
Availability of additional services	0.046
Ecological innovations	0.042

Accordingly, these parameters need to be taken into account when forming the policy to strengthen the service competitiveness of motor transport enterprises specializing in municipal passenger transportation.

In addition, it can be argued that, today, a number of economic factors have weakened their own weight, which affirms the fact that service consumers are increasingly in need of comfort and new innovative technological solutions.

There are reasons to argue that it is the investment and innovation activity of motor transport enterprises specializing in passenger transportation that will affect the competitiveness of their services in the nearest future. In view of this, the analysis regarding the current state of investment and innovation activity of the Ukrainian motor transport enterprises analyzed in the study was carried out (Fig. 3).

It is found that the state of service competitiveness of the motor transport enterprises is to a great extent influenced by: (1) faults of the system of state regulation of the motor transportation market, (2) the state of the competitive environment, and (3) other external factors.

The faults of regulation are primarily due to indicative pricing of services, the difficulty of obtaining new licenses and patents, the low level of the development wuthin the financial and credit system in Ukraine, the lack of reliable accounting of data on the number of passengers transported.

Ukraine's competitive environment in the field of passenger transportation remains unequal. There are present enterprises, significantly outperforming other

entities by financial and resource support, which have the opportunity to lobby for their own decisions in the authorities, and other preferences. This complicates possibilities for fair competition in the market and reduces the competitiveness of services provided by other enterprises.

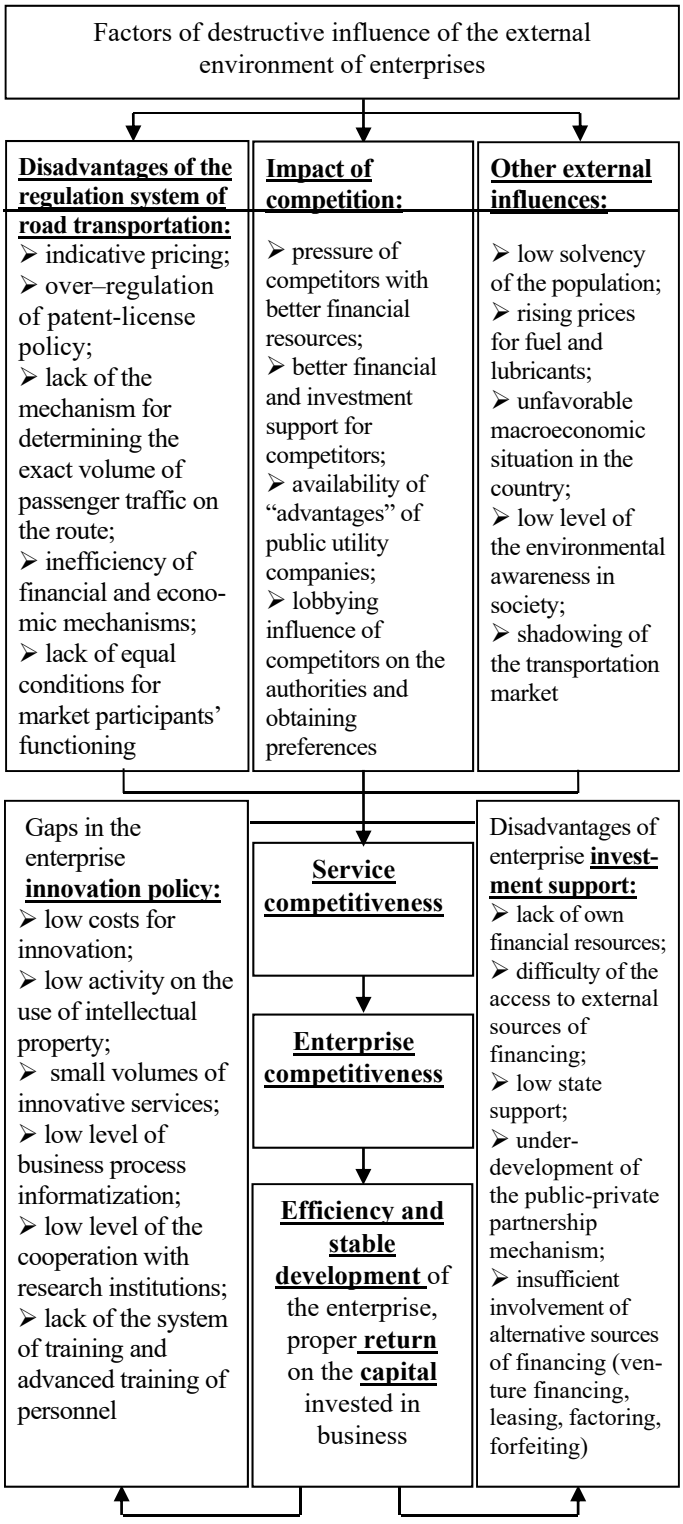

Figure 3. Generalization of the assessment results of the state of investment and innovative activity in the context of its impact on service competitiveness of the motor transport enterprises on municipal passenger transportation in Ukraine (author's development)

There are also a number of other external factors in the passenger transportation market of Ukraine, which weakens the potential of service competitiveness of enterprises. It is still low solvency of the population, high cost of fuel and lubricants, price volatility, etc.

The decrease in the service competitiveness of motor transport enterprises of Ukraine is also caused by their insufficient policy in terms of innovative and investment activity. Enterprises introduce innovations in rather limited amount, especially technological ones, which results in low technological capacity of their services.

One of the key reasons for this is the underdeveloped investment market and investment infrastructure. As a result, the cost of servicing bank loans is high, there are no powerful investors and investment funds in the country with an open transparent access to their capital, public and financial support remains limited, public and private partnership projects are not implemented as well.

Changing the situation and strengthening the service competitiveness of motor transport enterprises of Ukraine requires the intensification of their investment and innovative activities, the creation and introduction of modern advanced technologies. That is the way to the effective and stable development of enterprises, ensuring the proper return on capital invested in business.

3. Conclusion

The methodological approaches available and currently used to assess the service competitiveness of motor transport enterprises allow a comprehensive analysis comprising the quality of services and their competitiveness. However, municipal passenger transportation services have their own peculiarities. First of all, it is a measure of satisfaction by service consumers with the whole complex of parameters – from price to quality, from the speed of movement to convenience, comfort and adaptability of the service.

Due to this, the assessment of the competitiveness of services by comparing their characteristics with a competitor or benchmark is absolutely insufficient. The consumer has to be involved in the assessment process. That is why, a new author's approach, which involves analyzing and calculating the integral level of the service competitiveness of motor transport enterprises by surveying the consumers of services including the key enterprises – competitors is offered and tested in the research.

To ensure the complexity and systematicity of information, the integral assessment was conducted and based on the 5 questions for each of the 7 blocks –components: economic, organizational and process, normative, ergonomic, social, aesthetic, innovative and technological.

As a result of the analysis for the state of service competitiveness of the 5 leading motor transport enterprises of Lviv (Ukraine) – Mira ltd., Motor Transport Enterprise № 1, Fiakr Lviv ltd., Uspih BM ltd., Motor Transport Enterprise 14630 – the average level (0.44-0.52) of their service competitiveness is established with a tendency to worsen in 2019.

In the process of analysis, it was found that the aesthetic component determines the service competitiveness of motor transport enterprises specializing in municipal passenger transportation to the greatest extent possible. Such a component of competitiveness as organizational and process – from 0.14 to 0.18 is characterized by high values.

The largest contribution to the integral level of the service competitiveness of motor transport enterprises is made by the innovative and technological component (0.21), significantly exceeding, for example, the economic component – 0.12. Therefore, the enterprises should intensify their activity in the direction of the creation and introduction of innovations, which encompasses modern technologies. For this purpose it is also necessary to invest funds in the modernization of the road vehicles within motor transport, the development of technical and technological base and material and technical base, as well as to start the practices of cooperation with research institutions, and to develop their own industrial and research clusters.

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