

Methodology for Measuring the Customer Satisfaction with the Logistics Services

Metodologija mjerenja zadovoljstva logističkim uslugama

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Summary

The article deals with the proposal of methodology for measuring the customer satisfaction with the logistics services. The methodology reflects mostly the subjective quality evaluation which is based on the directly and indirectly measurable characteristics. Researched characteristics result from the customer feelings, wishes, requirements and the experiences of experts which studied the answers from the questionnaire survey. Answers from the questionnaire survey evaluate the quality of logistics services and the importance of evaluation criteria. Objective quality evaluation is verified by the methods for measuring the customer satisfaction. These methods for determining the weights of selected criteria were verified on the basis of proposed flowchart as well.

KEY WORDS

logistics
customer
methodology
criteria
evaluation
measuring

Sažetak

Članak uključuje prijedlog metodologije mjerenja zadovoljstva kupaca logističkim uslugama. Metodologija odražava većinom subjektivnu procjenu kvalitete koja se izravno i neizravno temelji na mjerljivim karakteristikama. Istraživane osobine proizlaze iz osjećaja kupaca, želja, zahtjeva i iskustava eksperata koji su proučavali odgovore iz upitnika istraživanja. Odgovori iz preglednog upitnika procjenjuju kvalitetu logističkih usluga i važnost postavljenih kriterija. Objektivna evaluacija kvalitete verificira se metodama za mjerenje zadovoljstva kupca. Ove metode koje trebaju odrediti kriterij selekcije također su verificirane na temelju predloženog nacrtu.

KLJUČNE RIJEČI

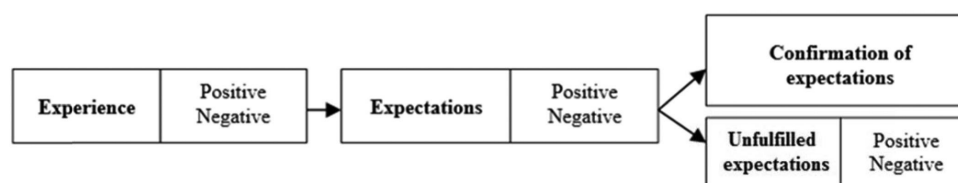
logistika
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1. INTRODUCTION

When needs and expectations of customer of logistics services are satisfied over their duration, we can speak about the customer satisfaction. The level of customer satisfaction is assessment of how the customer understands the business activities of logistics companies as their supplier. Customers have satisfaction with the logistics services when their expectations are confirmed. Otherwise, the customers are dissatisfied. The expectations of customers are based on their experiences with the level of logistics services. Based on the fulfilment of customer expectations, we can speak about the positive or negative confirmation of customer requirements (Figure 1). The greater the differences between expectations and actual perceived performance of logistics services are, the

stronger the customer satisfaction or dissatisfaction is [1-3].

Aim of the proposed methodology is to increase the efficiency of supply chain management. The proposed methodology enhances the reactions on the new situations within the logistics processes and also increases the customer satisfaction with the services of logistics companies. The methodology is designed based on the analysis of customer satisfaction with the provided logistics services. Selection of the related criteria for evaluation of customer satisfaction is realized based on the expert methods (depth interviews) with the professional community. Verification of the selected criteria is based on the created flowchart. For the setting to relevance of the criteria, it is used the comparative method (as subjective



Source: [2]

Figure 1 Customer expectations in relation to their confirmation

measurement). For the designation of the customer satisfaction, it is used the Sperling method. And the efficiency of logistics services is measured by the Avedis Donabedian's model [1].

The methodology of measuring the customer satisfaction with the provided services in logistics enterprise is proposed by the several steps. The proposal of methodology utilizes the customer questionnaire survey as well [1-3].

2. THE SELECTION OF CRITERIA FOR DETERMINING THE LEVEL OF CUSTOMER SATISFACTION

Currently, companies use different criteria for customer ratings with the provided services. For selecting the set of criteria, the questionnaire method (it is one of the methods that can guarantee the accuracy of the selected criteria) and discussion with several experts from logistics companies were utilized. Based on the received information, the particular set of criteria was created. These criteria are showed in Table 1 [1], [4], [5].

Table 1 Criteria for evaluating the customer satisfaction

Criteria	
K_1^{ESC}	attitude and behavior of contact persons
K_2^{ESC}	technical expertise of contact persons
K_3^{ESC}	the response to the customer's order
K_4^{ESC}	delivery times
K_5^{ESC}	transport (speed, reliability, security)
K_6^{ESC}	additional services
K_7^{ESC}	the price
K_8^{ESC}	damaged parcels
K_9^{ESC}	satisfaction with the complaints handling
K_{10}^{ESC}	satisfaction with consignments billing (invoicing)
K_{11}^{ESC}	problems solving during the transportation
K_{12}^{ESC}	webpages

Source: authors

Selected criteria for evaluating the customer satisfaction (ECS) with the provided logistics services are identified as: [1]

- K_i^{ECS} – criterion for evaluating the customer satisfaction, where $i = 1, 2, \dots, k$
- k – Total number of criteria for evaluating the customer satisfaction

3. FLOWCHART REGARDING THE SELECTION OF THE CRITERIA

Determining the set of criteria is based on the proposed flowchart. It is verified with applying the flowchart containing the criteria which are crucial for measuring the customer satisfaction with the provided logistics services.

Flowchart is created based on the real observations of the logistics processes in selected companies. In the flowchart, the consecutive steps of the selection of criteria are shown. Definition of the process (problem) represents the first step of creating the flowchart. Definition of the relevant tasks of the process: monitoring and understanding the accurate records of process represents next step.

Figure 2 shows the graphical representation of selecting the criteria for measuring the customer satisfaction [1], [6-8].

General description of key symbols may be summarized as [1], [8], [9]:

- Symbol entry – includes: Criterion K_i . Decision about the criterion which is relevant for the customer by measuring

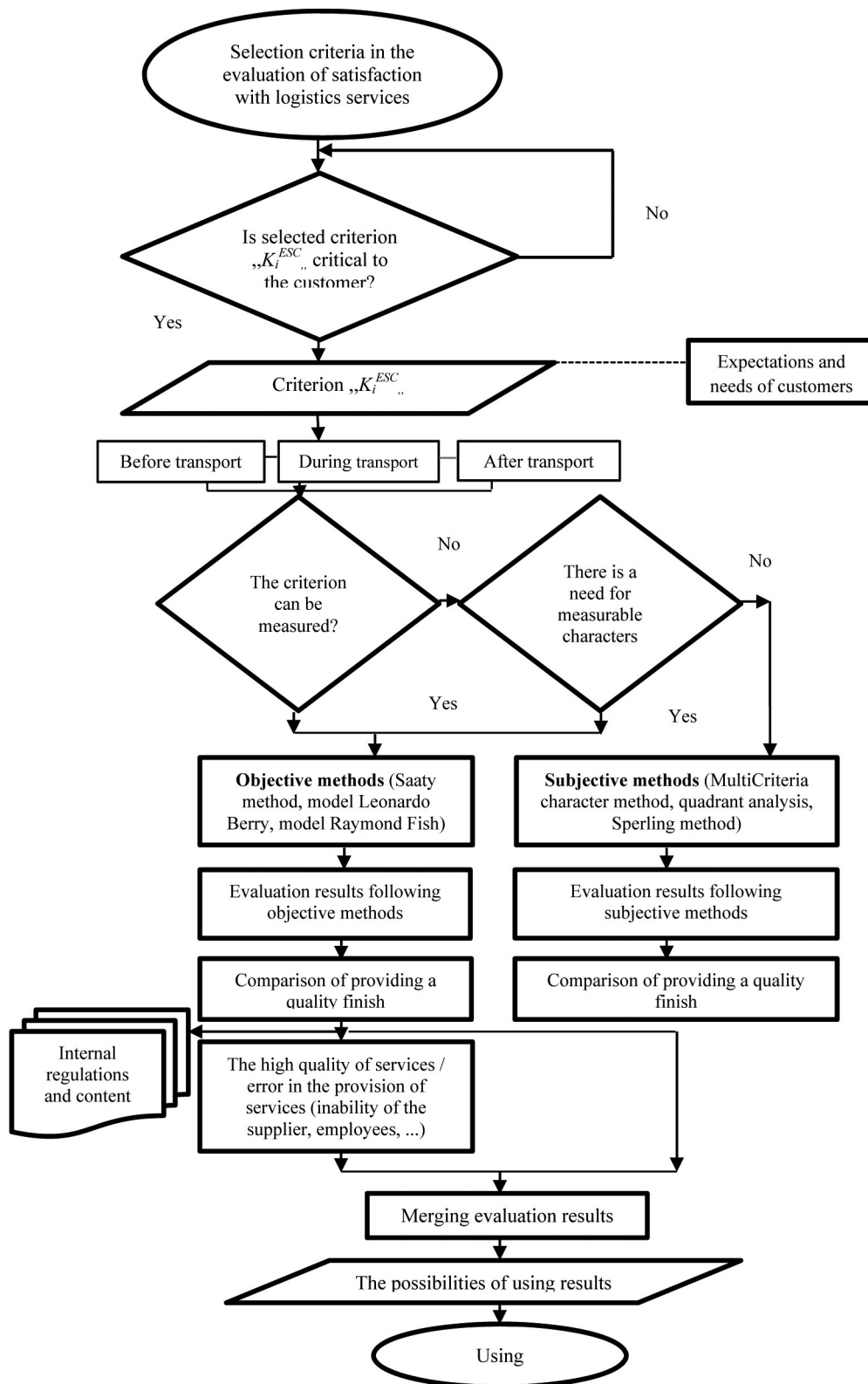
his satisfaction based on the discussion with experts from practice (customers, logistics companies, etc.) and from research resources.

- Symbol decision – includes: selected criterion "information" crucial for the customer within the evaluation process. Company increases the trust and confidence from the customers' point of view by providing the high quality information.
- Symbol note – includes: expectations and needs of customers. This information was found from the questionnaire survey (written and oral form).
- Symbol processing – includes: objective methods (Saaty method, Christian-Grönroos model and benchmarking). Objective methods within the process of measuring the services quality utilize the directly measurable indicators. The advantages of objective methods consist in the possibility to obtain the specific and precise results. Implementation, incompleteness, long duration, the high costs and complexity of the evaluation represent the disadvantage of these methods.
- Symbol processing – includes: subjective methods (Sperling's method, method of comparison). Subjective methods within the process of measuring the services quality utilize the indirectly measurable criteria which result from the feelings, wishes and requirements of customers. These methods reflect the customers' psychological perception of services quality or level of directly measurable criteria that are evaluated subjectively from the customers' point of view. The perception of quality from the customers' point of view has a short duration, is constantly changing and depends on diversity.
- Symbol written record, document – includes: This information is acquired from provided business plans and internal software of logistics companies.

4. CHARACTERISTICS OF CRITERIA FOR MEASURING THE CUSTOMER SATISFACTION

These criteria include [1]:

- ATTITUDE AND BEHAVIOR OF CONTACT PERSONS ($K1^{ESC}$) – respect and support of interests of the logistics companies. Goodwill of company depends on the relationships between the specific employees and customers. Especially, the attitude and behavior of employees are very important. Courteous and fair negotiation with the customers creates a background for good cooperation. Each of the employees can make a mistake, however, it is necessary to admit it and search or offer the optimal solution for remedy.
- TECHNICAL EXPERTISE OF CONTACT PERSONS ($K2^{ESC}$) – high level of employees' expertise allows to use the newest knowledge from logistics branch: providing the professional information for customer, immediate assessment of the situation, proposal of the most appropriate solution, etc.
- THE RESPONSE TO THE CUSTOMER'S ORDER ($K3^{ESC}$) – urgent response to the customer's order, easy control of order execution, phone or e-mail confirmation and processing the orders.
- DELIVERY TIMES ($K4^{ESC}$) – fulfilling the delivery times based on the deals or agreements between the customer and enterprise. Fulfilling the delivery time expects the compliance with all the business and technical conditions.



Source: authors

Figure 2 Graphical representation of selecting the criteria for measuring the customer satisfaction

- TRANSPORT (SPEED, RELIABILITY, SECURITY) (K5 ESC) – unauthorized delay from the company side, safety of consignments transportation and reliability of consignments delivery at the time, volume and quality.
- ADDITIONAL SERVICES (K6 ESC) – offer of the high quality additional services for the customer with aim to increase his satisfaction (consignments insurance, packing, customs declaration, sms confirmation, etc.).
- THE PRICE (K7 ESC) – certainty of the fixed prices, arranged time and review of how much the customer has to pay and in what periods. Price represents the purchase price of service per unit of delivered quantity. The statement of required price for the provided services is important information. The price must be clearly recognizable.

- DAMAGED PARCELS (K8 ESC) – damage, loss, destruction or failure of delivering the entire content of the consignments caused by the logistics company.
- SATISFACTION WITH THE COMPLAINTS HANDLING (K9 ESC) – Satisfaction/dissatisfaction with the outcome of the complaints, immediate acceptance and processing the claims for the satisfaction of the customer.
- SATISFACTION WITH CONSIGNMENTS BILLING (INVOICING) (K10 ESC) – invoicing just in time, correctness and accuracy of the data, cash on delivery options, transport charges payments choice, etc.
- PROBLEMS SOLVING DURING THE TRANSPORTATION (K11 ESC) – quick problems solving that may appear during the transportation, continuous communication with the customer, ensuring the full support of problems solving before, during and after the transportation for the benefit of the customer.
- WEBPAGES (K12 ESC) – fast page loading, clear and transparent information for the customer, continuous updating pages.

4. DETERMINATION OF THE IMPORTANCE OF CRITERIA LEVEL

To determine the level of importance of selected criteria, one of the expert methods is utilized. These expert methods are the most efficient; therefore they are relatively low-cost and their application is quick. To determine the criteria weights and evaluate the experts' opinions, the paired comparison method is utilized.

Selected experts compared all the criteria between each other. When experts compared all the criteria pairs in the table, they put a value 1 by the preferred criterion in a row. When they preferred criterion in a column put a value 0. After counting the preferences for each criterion, weights coefficients were calculated (see Figure 3) [1], [5], [8], [10].

Sum of criteria weights is 1 (100%); it means the complexity of evaluating the selected criteria.

5. DETERMINATION OF THE LEVEL OF SATISFACTION WITH THE PROVIDED SERVICES

To determine the level of customer satisfaction, the subjective measurement based on the Sperling's method is utilized. Within the process of determining the weights of importance, the scoring method (1-5 points) is created. Value 5 means the maximum importance of criterion and 1 means the minimum importance of criterion (see Table 2) [1], [8], [9], [11].

The value of quality of provided services is determined based on the weights of importance of the evaluation criteria and the level of satisfaction according to the formula (1):

$$V = \sum_{i=1}^n v_i \cdot s_i, [-] \quad (1)$$

Where:

V – The resulting value of quality of provided services for the monitored period,

v_i – Weight of importance of the i -criterion, $i = 1 \dots n$,

s_i – Level of fulfilment of the i -criterion, $i = 1 \dots n$,

n – Number of criteria.

The maximum value (MV) that customers expect can be determined as follows (2):

$$MV = \sum_{i=1}^n v_i \cdot s_{i\max}, [-] \quad (2)$$

Where:

$S_{i\max}$ – The maximum level of customer satisfaction with the fulfilment of i -criterion,

v_i – Weight of importance of the i -criterion, $i = 1 \dots n$,

n – Number of criteria.

Internal value (IV) can be determined according to the formula (3):

Evaluation criteria \ Evaluation criteria	1. attitude and behavior of contact persons	2	3	4	5	6	7	8	9	10	11	12	Pi	Wi	Order
1. attitude and behavior of contact persons	x	0	1	0	0	0	0	0	1	0	0	1	3	0,05	6
2. technical expertise of contact persons	1	x	0	0	0	0	0	0	1	0	0	1	3	0,05	6
3. the response to the customer's order	1	0	x	0	0	0	0	0	1	0	1	1	4	0,06	5
4. delivery times	1	1	1	x	1	1	0	1	1	1	0	1	9	0,14	2
5. transport (speed, reliability, security)	1	1	1	0	x	1	0	1	1	1	0	1	8	0,12	3
6. additional services	1	0	1	0	0	x	0	0	1	1	0	1	5	0,08	4
7. the price	1	1	1	1	1	1	x	1	1	1	1	1	11	0,17	1
8. damaged parcels	1	1	1	0	0	1	0	x	1	1	1	1	8	0,12	3
9. satisfaction with the complaints handling	0	0	1	0	0	1	0	0	x	1	0	1	4	0,06	5
10. satisfaction with consignments billing	0	0	0	0	0	0	0	0	0	x	0	1	1	0,02	7
11. problems solving during the transport	1	1	1	0	0	1	0	1	1	1	x	1	8	0,12	3
12. webpages	0	0	0	0	0	0	0	0	0	1	0	x	1	0,02	7
													65	1,00	

Source: authors

Figure 3 Determining the criteria weights using the paired comparison method by first expert

Table 2 Determining the level of satisfaction

Determining the level of satisfaction	5	4	3	2	1
	maximum satisfaction	less satisfaction	average	less dissatisfaction	dissatisfaction

Source: [1]; authors

$$IV = \sum_{i=1}^n v_i \cdot s_{i\text{real}}, [-] \quad (3)$$

Where:

$S_{i\text{real}}$ – The real level of customer satisfaction with the fulfilment of i -criterion,

v_i – Weight of importance of the i -criterion, $i = 1 \dots n$,

n – Number of criteria.

The overall level of the satisfaction of surveyed customers (S) with the services can be expressed according to the formula (4):

$$S = \frac{IV}{MV} \cdot 100, [-] \quad (4)$$

Where:

S – The overall level of the satisfaction of surveyed customers,

IV – The resulting value of quality of the provided services for the monitored period,

MV – The maximum value that costumers expect.

5. APPLICATION OF THE AVEDIS DONABEDIAN'S MODEL USING THE ANALYSIS OF THE CUSTOMER SATISFACTION

Avedis Donabedian's model is based on the scheme and has three phases. Based on these phases, the evaluation of costumer services within the logistics processes can be performed. In the model, three basic phases (structural, process and resultant) are defined [3], [4].

The assessment of overall quality of the provided logistics services from the customer point of view is defined by the activities in all the phases. The importance of selected criteria (in individual level) affects the overall impression of the provided logistics services. The importance of criteria is based on the skills and needs of customers.

Figure 4 shows the model of quality evaluation with defined three phases for the logistics companies [3], [4], [9].

Avedisa Donahedian's model points to one significant fact. The quality evaluation might be incomplete, if the customer feeling will be measured by the end of the whole evaluation process. During applying the model, it is important that the customer evaluates not only the activities of logistics company, but also other important parts of logistics process [3], [4], [12].

Structural level (phase) of quality evaluation includes determining the criteria of provided services that are important for creation and retention of flexibility of the logistics performance from the company side. This level must respect the criteria

(personal qualification, organizing condition and others) with the customer requirements [3], [4].

Process level (phase) of quality evaluation includes determining the criteria that are based on the customer requirements for providing the logistics services. The customer evaluates the deficiencies of logistics services as well, for example the delay in delivery time during the transport process [3], [4], [10].

Resultant level (phase) of quality evaluation represents the fulfilment of logistics performance and shows whether the customer requirements are satisfied [3], [4].

Avedisa Donahedian's model is also available in the phase of planning the logistics service by the evaluation of realized logistics services [3], [4], [10].

6. APPLICATION OF THE PROPOSED METHODOLOGY

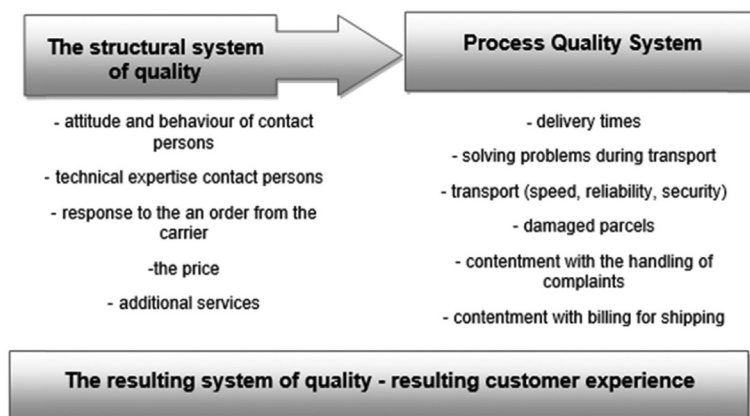
The methodology of evaluating the logistics services was implemented in the particular market conditions. To determine the weights of criteria by paired comparative method for the purpose of the paper, it was carried out by five experts from the fields of logistics and transport. Determining the level of customer satisfaction with the provided logistics services was realized by Sperling's method.

Within the questionnaire survey, 50 customers of logistics and transport services were called. Based on their recommendation, the selection of quality criteria was performed (see Table 3) [1], [10].

Table 3 contains the short review of the results obtained from the quality evaluation of the provided services, i.e. file of criteria that is expressed by the weights of importance, level of satisfaction with the selected criteria, ideal quality value (that costumers expect) and real quality value is shown [1], [11-13].

7. CONCLUSION

Implementation of advanced approaches for measuring and evaluating the quality is one of the most important steps for the logistics companies. The business success of the logistics companies depends on the application of these methods of quality evaluation. The most methodologies, used for the measuring and evaluating the quality level, are not complex. Incomplete methodology of quality evaluation causes that many factors that are important to influence the management of supply



Source: [3], [4]

Figure 4 Model of quality evaluation of provided services with defined three phases

Table 3 Results obtained from the quality evaluation process

	CRITERIA	Weight of importance (w_j)	Level of satisfaction (s_{jreal})	The ideal value of quality ($v_j \cdot s_{jmax}$)	The real value of quality ($v_j \cdot s_{jreal}$)
1	attitude and behavior of contact persons	3.5	4.4	17.5	15.4
2	technical expertise of contact persons	4.5	4.1	22.5	18.45
3	the response to the customer's order	4.7	4.4	23.5	20.68
4	delivery times	4.6	4.2	23	19.32
5	transport (speed, reliability, security)	4.8	4.3	24	20.64
6	additional services	4.7	3.4	23.5	15.98
7	the price	3	3.7	15	11.1
8	damaged parcels	4.6	4.3	23	19.78
9	satisfaction with the complaints handling	4	4.6	20	18.4
10	satisfaction with consignments billing (invoicing)	3.6	4.2	18	15.12
11	problems solving during the transportation	4.6	4.6	23	21.16
12	webpages	2.7	3.2	13.5	8.64
	Total			246.5	204.67

Source: [1]; authors

chains remain undetected in most of the cases. Therefore, the selection of the suitable quality management for monitoring and evaluating the provided services from top to bottom is necessary.

The proposed methodology for measuring the customer satisfaction with the logistics services may provide the considerable task in the supply chain management as a whole. The important role of the supply chain management is to involve the operation, especially in the process of gaining the competitiveness and process of the provided services quality improving. Then, we are able to create the new complex process that consists of the elements: supplier – company – customer, i.e. definition of the supply chain. Generally, we can speak about the controlled cooperation which exceeds the area of the company. The suppliers can be defined as the input and customers can be considered as the output. They are coordinated by the development of business processes. This mentioned view within the logistics is called supply chain management (SCM). For the improvement of SCM and logistics operations in companies, it is necessary to include the proposed methodology within their processes.

The rapid and comprehensive strengthening the company's position on the market represents the main objective of implementing the proposed methodology. Efficiency of the logistics chain management could help to transform a linear supply chain of individual companies into adaptable system. Implementation of the methodology improves the access to information and sources of partners and can help to adapt to market condition and can enhance the customer orientation. The methodology offers the competitive advantages of companies on the market. Applying the proposed methodology, companies can achieve the sustainable development and efficiency and can increase the productivity and quality. These facts make logistics companies more profitable [1], [14-18].

REFERENCES

[1] Černá, L. 2012. SCM in the logistics business. Dissertation thesis, Slovak Republic, University of Žilina, 2012.

- [2] Krížanová, A., Valášková M. 2007 Customer satisfaction with the qualitative elements of the transport services, In: Marketing and Trade 2007 = Marketing and Trade 2007: the impact of globalization on external trade policy: Proceedings of the International Scientific Conference, Zvolen, 2007. ISBN 978-80-8093-026-4.
- [3] Nedeliaková, E., Sekulová, J., Nedeliak, I. Application of dynamic models as a new trend in quality management, In: Procedia - Economics and finance, 2015, Vol. 34. ISSN 2212-5671.
- [4] Nedeliaková, E., Mašek, J., Čamaj, J. Dynamic model conception of improving services quality in railway transport, In: International journal of social, behavioral, education, economics and industrial engineering, 2015, Vol. 9, No. 11. ISSN 1307-6892.
- [5] Blašková, M., Škultéty, F. U.S. intra-industry trade in air transport services: Measurement and results. Transport Problems, 2015, Vol. 10, Issue 2, pp. 15-22. ISSN 1896-0596.
- [6] Matejko, P., Černá, L., Majerčák, J. The evaluation methodology logistic processes, involving key logistics indicators, In: VI. International scientific conference «Diagnostics business and controlling logistics, Slovak Republic, University of Žilina, 2012. ISSN 1336-7943.
- [7] Corsten, D., Gabriel, Ch. Supply Chain Management erfolgreich umsetzen, Publisher: Springer-Verlag, 2002, SPIN 10915523. ISBN 3-540-67525-6.
- [8] Hitka, M., Zavadská, Z., Jelačić, D., Balážová, Z. Qualitative indicators of employee satisfaction and their development in a particular period of time. Drvna industria, Univerzita Zagreb, 3/2015, Vol. 66, No. 3. ISSN 0012-6772.
- [9] Jacoby D., Guide to Supply Chain Management, New York 2009, ISBN 978 1-5760-345-1.
- [10] Kremenova, I., Bader, T. Definition of customer expectations and complete customer satisfaction in the service. Ekonomicko-manazerske spektrum, 2010, Vol. 4, No 1, pp. 5-9. ISSN 1337-0839.
- [11] Nedeliaková, E. Approaches to measuring and evaluating the quality of services in rail transport. Habilitation thesis. University of Žilina, 2010.
- [12] Pernica, P. logistics (supply chain management) for the 21st Century, 1-3 works Radix Publishing, 2005. ISBN 80-86031-59-4.
- [13] Šimková, I., Konečný, V., Liščák, S., Stopka, O. Measuring the quality impacts on the performance in transport company. Transport problems, 2015, Vol. 10, Issue 3, pp. 113-124, ISSN 1896-0596.
- [14] Stopka, O., Kampf, R., Kolar, J., Kubasakova, I., Savage, C. Draft guidelines for the allocation of public logistics centres of international importance. Komunikácie, 2014, Vol. 16, Issue 2, pp. 14-19, ISSN 1335-4205.
- [15] Zitrický, V., Gašparik, J., Pečený, L. The methodology of rating quality standards in the regional passenger transport. Transport problems, 2015, Vol. 10, Sp. Issue, pp. 59-72. ISSN 1896-0596.
- [16] Skrucany, T., Sarkan, B., Gnap, J. Influence of aerodynamic trailer devices on drag reduction measured in a wind tunnel. Eksploatacja i niezawodnosn-Maintenance and reliability, 2016, Vol. 18, Issue 1, pp. 151-154. ISSN 1507-2711.
- [17] Poliakova, A. Analysis of the quality of services in the transport of flowers and plants transport modes. Ekonomicko-manazerske spektrum, 2010, Vol. 4, No 2, pp. 73-79. ISSN 1337-0839.
- [18] Škrinjar, J.P. The first logistic practicum. Promet - Traffic - Traffico, 2015, Vol. 27, Issue 5, pp. 453-455. ISSN 0353-5320. <http://dx.doi.org/10.7307/ptt.v27i5.1987>