THE EVALUATION OF SERVICE QUALITY IN FORWARDING

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Summary: The article deals with problem of service quality in forwarding, quantification of the level of quality and evaluation of service quality. For the quality evaluation it is necessary to apply an appropriate method. The article includes also practical application of multi-criteria evaluation of quality.

Key words: Quality, Methods, Forwarding, Services, Evaluation

INTRODUCTION

The meaning of the word "Quality" is used like marks of excellence of services and goods in community without knowledge in this field. It is evaluation of the services or goods. The quality is a sum of subjective opinions at the object. The quality is expressed in quality characteristics and its level is expressed through a measured or assigned value.

There are a lot of definitions of the word "quality". Every sector or department understands something different under the term.

In the standard STN EN ISO 9000:2005 Quality management systems. Fundamentals and vocabulary, the quality is defined as a "degree with which a set of own characteristics fulfills requirements" (1).

1. THE QUALITY IN ROAD FREIGHT TRANSPORT AND FORWARDING

Requirements are not much different in freight and forwarding services. The differences may be caused by different defining priorities with respect to final destination. This priority can be transformed to the mathematical formulation of quality evaluation.

The **external quality** is the quality which a customer can see. This quality is mainly in places of contact with a customer.

In the **internal quality**, from a transport operator perspective, the price is important for provision of services quality or higher level of services quality. From a technological perspective, the emphasis is mainly on the operation of the organization and ensuring the economical, safe and environmentally friendly method of the transportation process technology. The suitability of technological process may be shown also in the external quality of services. (2)

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The most important quality criteria in forwarding are:

- reliability,
- accuracy,
- safety,
- speed,
- protection of shipments,
- delivery time,
- politeness of employees,
- qualification of employees,
- technical condition and appearance of the vehicle,
- communication,
- credibility,
- flexibility.

The perception of the quality movement is characterized by two views: external and internal quality (3).

2. THE IMPORTANCE OF MEASUREMENT AND QUALITY ASSESSMENT

The quality evaluation and measurement represents a tool for objectification and quantification of quality level of provided services level. The most important economic reason for measurement and evaluation of quality is checking of the requirements for the quality of transport services.

The organization can establish its own methods of evaluation, adopt or edit methods adopted by importance of selected requirements. There are two methods for measurement and evaluation of quality criteria: one-criteria and multi-criteria.

In the **one-criteria evaluation of quality**, the result is a quality value based on monitoring and measurement of one from the selected quality characteristics.

The advantage of this method is simplicity in monitoring only one characteristic, which was selected.

The disadvantages are:

- showing a lower meaning of quality service character,
- possibility of obtaining positive results of the evaluation also for non-compliance certain quality requirements (hidden poor quality).

The result of **the multi-criteria evaluation of quality** is the value based on monitoring and measurement of a group of quality characteristics which are characteristic for freight transport quality.

This method shows us more clearly characteristics of transport quality. Monitoring of criteria group allows a complex view at the transport services provided. It respects interrelationships among selected characteristics.

Each of importance weights must respect priorities of an individual criterion. The total evaluation of importance is measured based on arranged pairs, which are importance weights of the specific criterion and level of requirements fulfillment for the specific criterion.

$$VQ = \sum_{i=1}^{n} w_i . s_i \qquad (1)$$

Where: VQ is the total value of quality,
w_i is the weight importance of i- quality criteria,
s_i is the level of requirements fulfillment; i- quality criterion from a supplier perspective.

An evaluator determines weights importance of criteria, the values can be determined applying a number of methods, such as:

- point scale: an evaluator assigns to each criterion a score according to their relevance,
- 100 points: an evaluator assigns 100 points to each criterion,
- ranking method: criterions are ranked from at least to the most important,
- **method of pairwise comparisons: the number of preferences is determined for each criterion** with regard to all other criteria,
- Saaty´s method (this method will be explain in the next part of article).

An evaluator sets the importance weights of criteria. It is possible to specify those values in many ways which are defined in publication (1). The fulfillment level of the specific quality criteria is measured based on a really measured fulfillment or not fulfillment of criteria directly in a services provision process. An evaluator determinates the level of fulfillment. Technical resources or measurement by a supervisor can be used for measurement of the level of fulfillment. Due to the objectification of a supplier quality assessment, where the suppliers provide services in different range, it is appropriate to calculate the level of fulfillment in a relative way for positive quality criteria.

The fulfillment of quality criterions is calculated according to formula (2) for positive quality criterions and according to formula (3) for negative quality criterions.

Fulfillment calculation for positive criterions (appropriate vehicle, compliance of time of loading, compliance of place of loading etc.):

$$s_i = \frac{X_{mpos}}{X_n} \tag{2}$$

where: X_{mpos} is the number of shipments, which ***were done positively*** in i quality criteria during the evaluation period,
X_n is the total number of shipments during the evaluation period.

Fulfillment calculation for negative criterions (failure to comply with the delivery time, damage shipments etc.):

$$s_i = \frac{1 - X_{mneg}}{X_n} \tag{3}$$

where: X_{mneg} is the number of shipments, ***which were done negatively*** in i- quality criteria during the evaluation period.

It is necessary to solve following question during proposal of method of measuring and evaluating the quality:

- time interval realization of measurement and evaluation quality,
- the number of quality criteria included in the method,
- the ways of measuring,
- persons trained and responsible for the measurement and evaluation,
- purpose of the use of the results and its distribution by the rated entity.

In business, an objective of the methods is to ensure the required service quality, selection of quality suppliers and elimination of low-quality suppliers of transport services. The unified methods and their results can be used in the future by the associations of carriers and shippers to compile objectively supplier charts of transport services in terms of services quality (3).

AHP- approach (Analytic Hierarchy Process)

Methods of determining the quality criteria are considered to be subjective if they are evaluated by respondents or experts. This approach allows the researchers to determine the weights of the criteria of the same hierarchical level with respect to higher level criteria or to determine hierarchically unstructured criteria weights. Experts compare all the evaluated criteria R_i a R_j (i,j= 1,..., n), where n is the number of the compared criteria.

The method described above is easy to use because it is easier to compare pairs of criteria than all of them at a time. In this case, it is much more important a particular criterion which is compared to another. It is also possible to transform qualitative criteria estimates elicited from experts into the quantitative ones. The matrix of the comparison of evaluation criteria (aji =1/ aij) is as follows:

$$A = \begin{bmatrix} 1 & a_{12} & a_{12} & \dots & a_{1n} \\ \frac{1}{a_{12}} & 1 & a_{23} & \dots & a_{2n} \\ \frac{1}{a_{13}} & \frac{1}{a_{23}} & 1 & \dots & a_{3n} \\ . & . & . & \dots & . \\ . & . & . & \dots & . \\ . & . & . & \dots & . \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} & \frac{1}{a_{3n}} & \dots & 1 \end{bmatrix} \quad (4)$$

Let us find the eigenvector which may (4) be calculated in four ways (Шикин, Чхартишвили 2000). We will use the 4-th method:

1. The elements of each row are multiplied together and the results obtained are written as follows:

$$\omega_i'' = \prod_{j=1}^{n} a_{ij} \quad (5)$$

2. n-th root is extracted from the element of each row (since the number of the criteria compared is n = 6, the 6-th root is extracted). The results obtained are written as follows:

$$\omega_i' = \sqrt[n]{\prod_{j=1}^{n} a_{ij}} \quad (6)$$

3. Let it adds together the elements of this row:

$$\sum_{i=1}^{n} \omega_i' = \sum_{i=1}^{n} \sqrt[n]{\prod_{j=1}^{n} a_{ij}} \quad (7)$$

4. Let us divide each element of this row by the sum obtained, i.e. the evaluations normalization:

$$\omega_i = \frac{\sqrt[n]{\prod_{j=1}^{n} a_{ij}}}{\sum_{i=1}^{n} \sqrt[n]{\prod_{j=1}^{n} a_{ij}}} \quad (8)$$

5. Thus, the eigenvector ω is found (step 4). The sum of its elements is equal to the unity:

$$\sum_{i=1}^{n} \omega_i = 1 \quad (9)$$

(14)

3. APPLICATION OF THE AHP- APPROACH IN PRACTICE

The AHP- approach is considered one of the most complex and the most suitable for the quantitative assessment of quality in a multicriteria evaluation.

For the purposes of AHP approach and the possibility of applying this method in practice, a questionnaire was created. The questionnaire consists of 12 quality characteristics whose performance is assessed. This questionnaire was sent to customers of a forwarding company. For the questionnaire of the quality criteria was used point scale from 1 to 5. The measurement was carried out with 42 customers.

To obtain the values of quality characteristics formula (10) was used. This formula calculates a "score" of the one question and serves for a better overview of the level of services fulfillment where the "perfect" service has the value of 100%.

$$Q_s = \frac{P_1 x\, Q_{P1} + P_2 x\, Q_{P2} + P_3 x\, Q_{P3} + P_4 x\, Q_{P4} + P_5 x Q_{P5}}{P_5 x\, 42} \quad (10)$$

Where: P_i the number of points (1, 2, 3, 4 a 5)
Q_{pi} the number of respondents who gave the points to the corresponding value
42 the total number of responses
Q_s score of the question

According to the results of the questionnaire the quality criteria in a forwarding company were ranked from the best valuates and are shown in Table 1 according to the valuation of customers.

Tab. 1: Criteria and percentage of valuation

Criterion	Percentage of valuation
K2 Accuracy	83,33
K6 Delivery time	81,90
K7 Flexibility	81,42
K11 Credibility	81,42
K1 Reliability	80,47
K4 Speed	80,47
K10 Communication	78,57
K9 Technical condition and appearance of the vehicle	78,09
K3 Informed	77,61
K12 Politeness of employees	76,66
K8 Qualification of employees	75,23
K5 Protection of shipments	70,47

Source: Own processing

The results of the questionnaires need to be transformed to the Saaty matrix (table 3). We use Table 1 to determine the weights importance. The table 2 will be used to define the importance of criteria in the Saaty matrix. 1.

Tab. 2: Saaty´s points scale with descriptors

Points	Descriptors
1	Equal importance
3	Weak importance of one over other
5	Essential or strong importance
7	Demonstrated importance
9	Absolute importance

Source: [4]

Tab. 3: Saaty´s matrix

Criterion	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	Gi	vi
K1	**1**	1/3	3	1	9	1/3	1/3	7	3	3	1/3	7	1,52	0,085
K2	3	**1**	5	3	9	3	3	7	5	5	3	5	3,82	0,213
K3	1/3	1/5	**1**	1/3	7	1/5	1/5	3	1/3	1/3	1/5	9	0,63	0,035
K4	1	1/3	3	**1**	9	1/3	1/3	7	3	3	1/3	7	1,52	0,085
K5	1/9	1/9	1/7	1/9	**1**	1/9	1/9	1/5	1/7	1/7	1/9	1/5	0,16	0,009
K6	3	1/3	5	3	9	**1**	3	7	5	5	3	5	3,18	0,177
K7	3	1/3	5	3	9	1/3	**1**	7	5	5	1	5	2,42	0,135
K8	1/7	1/7	1/5	1/7	5	1/7	1/7	**1**	1/5	1/7	1/7	1/3	0,26	0,014
K9	1/3	1/5	3	1/3	7	1/5	1/5	5	**1**	1/3	1/5	7	0,77	0,043
K10	1/3	1/5	3	1/3	7	1/5	1/5	7	3	**1**	1/5	7	0,95	0,053
K11	3	1/3	5	3	9	1/3	1	7	5	5	**1**	5	2,42	0,135

K12	1/7	1/5	1/9	1/7	5	1/5	1/5	3	1/7	1/7	1/5	**1**	0,32	0,018
												∑	**17,97**	**1**

Source: Own processing

Once the questionnaire was transformed into the Saaty´s matrix it can be seen that the ranking criteria according to their relative importance weights is the same as in the original table 1. (11)

Tab. 4: Criteria and weights importance

Criterion	Weights importance
K2 Accuracy	0,213
K6 Delivery time	0,177
K7 Flexibility	0,135
K11 Credibility	0,135
K1 Reliability	0,085
K4 Speed	0,085
K10 Communication	0,053
K9 Technical condition and appearance of the vehicle	0,043
K3 Informed	0,035
K12 Politeness of employees	0,018
K8 Qualification of employees	0,014
K5 Protection of shipments	0,009

Source: Own processing

The value of service quality was determined from the equation (1), which was calculated from the degree of fulfillment of the quality criteria in Table 1 and of the importance weights in Table 4. In this calculation, it was found that the value of service quality in the monitored period is 81.22%.

Tab. 5: Evaluation of the forwarding company based on evaluation results

Category	Evaluation	Evaluation **(%)**
A	Reliable	100- 90
B	Satisfactory	89,9- 80
C	Unsatisfactory	79,9- 0

Source: Own processing

Based on Table 5 and the value of service quality was found that the forwarding organization is satisfactory for the customers.

The measurement of service quality is a continuous and long process, so it is not possible to evaluate it just once. For "survival" of the company it is necessary to monitor changes in customer requirements, significance criteria, a competition and based on the results eliminate customer dissatisfaction, or prevent it.

4. CONCLUSION

The service quality in transport and forwarding is also a significant determinant of demand. In the competitive environment, it is an important tool for customer retention and also it has effects on the performance and economic results of the organization. When you have a competitive advantage it means to satisfy customer requirements but also to overcome their expectations. Dissatisfied customers are able to say their bad experience, which can affect the attitude of other customers. A dissatisfied customer means a loss of revenue, loss of missed opportunity and, in the end, loss of customers. Therefore, companies use a variety of methods for determining the deficiencies of products and services and, thereby, they increase the customer satisfaction.

The future of each organization depends on the customer behavior. Increasing the level of satisfaction must be one of the main objectives of each organization.

The AHP suggested by T. Saaty, and used in evaluation requires highly developed logical thinking of decision- makers. Highly qualified experts are required because the consistency of estimates. The estimate of a single highly competent expert is more important than the estimates provided by several or even tens of inexperienced specialists (not capable of thinking logically). For those reasons the AHP method is very useful way how to find out a customers´ behavior and feelings about product.

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