

Keywords: EN ISO 9001; quality management systems; transport company; quality; performance

Ivana ŠIMKOVÁ*, Vladimír KONEČNÝ, Štefan LIŠČÁK

University of Žilina, Department of the Road and Urban Transport and Communications
Univerzitná 8215/1, 010 26 Žilina, Slovak Republic

Ondrej STOPKA

Institute of Technology and Business in České Budějovice, Department of Transport and Logistics
Okružní 517/10, 370 01 České Budějovice, Czech Republic

*Corresponding author. E-mail: ivana.simkova@fpedas.uniza.sk

MEASURING THE QUALITY IMPACTS ON THE PERFORMANCE IN TRANSPORT COMPANY

Summary. The paper deals with the problem of service quality, quantification of the level of quality and evaluation of service quality in freight road transport companies. The impact of the transport service quality on the performance of road freight transport is necessary to quantify a level of service quality but also define and objectively evaluate the performance of road freight transport with the help of an appropriate set of performance indicators and methods. For examining relation and quantification of the transport service quality impact in road freight transport it is necessary to apply the appropriate method. This paper includes practical application of particular method, as well.

POMIAR WPŁYWU JAKOŚCI NA WYDAJNOŚĆ FIRMY TRANSPORTOWEJ

Streszczenie. W artykule zajęto się problemem jakości usług, kwantyfikacji poziomu jakości i oceny jakości usług w towarowych przewoźnikach drogowych. Określenie wpływu jakości usługi transportowej na wydajność drogowego transportu towarowego jest niezbędne do wyznaczenia poziomu jakości świadczonych usług, ale również zdefiniowania i obiektywnej oceny wydajności drogowego transportu towarowego za pomocą odpowiedniego zestawu wskaźników i metod działania. Do badania relacji i kwantyfikacji wpływu jakości usługi transportowej w drogowym transporcie towarowym konieczne jest zastosowanie odpowiedniej metody. Artykuł ten zawiera również opis praktycznego użycia określonej metody.

1. INTRODUCTION

The evaluation of transport service quality should be objective assessment of the quality on the basis of real parameters. The evaluation results should be a qualification of quality with respect to each quality criteria or set of criteria. On the basis of transport service quality, it is possible to examine the relation between transport service quality and demand.

The level of criteria impact on service quality will also be expressed. The growth of the quality level affects behaviour of customers and can stimulate their demand for service, which in turn promotes the growth performance and competitiveness.

Implementation of the EN ISO 9000 defined as a set of quality standards that are determined as being necessary for manufacturers and service organizations to be effective competitors can be used by management of the companies to improve performance and higher quality output.

For the quantification of transport service quality, it is necessary to know quality criteria. Nowadays, there is not any set of quality standard which deals with the service quality in the freight road transport. The general quality criteria and also specific criteria for each kind of goods will be proposed on the basis of standards in the urban transport and data of Police Department in Slovak Republic (PPZ SR) in the future research.

The research identified benefits which had been claimed as products of certification by EN ISO 9001. The research results in the Slovak companies confirm the certificate's impact indicators of effectiveness and the weakest effect on economic indicators.

2. PERFORMANCE OF ROAD FREIGHT TRANSPORT

The performance of road freight transport may be established through Key Performance Indicators, also known as KPIs or Key Success Indicators (KSI), help an organization define and measure progress towards organizational goals. Key Performance Indicators are quantifiable measurements, agreed to beforehand, that reflect the critical success factors of an organization. They will differ depending on the organization. The transport KPIs and their description were proposed.

Whatever Key Performance Indicators are selected, they must reflect the organization's goals, must be key to its success, and must be quantifiable (measurable). Key Performance Indicators usually are long-term considerations. The definition of what they are and how they are measured, do not often change. The goals for a particular Key Performance Indicator may change as the organization's goals change, or as it gets closer to achieve the goal [1].

The starting point for any performance improvement program should be to understand the current performance of the operation. This means to collect the data on key aspects of the operation, and turn this information into specific measures that can help to identify fields for improvement - for instance, how much it costs to deliver the products to the customers, how many miles the vehicles run empty or the number of late deliveries are made. These measures are known as key performance indicators or KPIs [2].

2.1. Transport Key Performance Indicators

There are many different KPIs that can be used to measure the performance in a freight transport operation and it can be difficult to know which ones might be right for enterprises. A KPI should be relevant and SMART - Specific, Measurable, Achievable, Realistic and Timed, as well.

KPIs should be specific, simple to use and easy to understand. Complicated statistics and formulae can lead to the confusion and uncertainty about what is actually being measured in the first place. If KPIs are specific and kept simple, they can be easily communicated across the business and there is no need for staff to have an in-depth knowledge of the area being measured.

KPIs can show changes in performance over time. For this to happen, it is inevitable to compare like-with-like data. It is easy to fall into the trap of comparing two drivers on different routes for time utilisation or km per litre. If one route is more demanding than the other, this could be misleading. Similarly, comparing the drivers when they drive vehicles of substantially different age or vehicle type can also be deceptive. However, there are ways that you can get around these problems, such as rotating drivers onto different vehicles and different routes and then monitoring both driver and vehicle performance, to spot consistently high and poor performers.

The frequency of monitoring is an important consideration. Weekly or monthly monitoring is recommended for many KPIs but this can depend on the measure and the needs of a particular enterprise. If certain measures are not recorded and presented to the agreed timescales, the risk of changes in performance going unnoticed rises.

The size, type and management structure of a company is likely to influence the range and type of KPIs that might be used. KPIs can be used to help managers develop strategy, plan and make decisions, while at the operational level they can show clearly the areas that need improvement, or a change in approach [2].

The transport KPIs are designed to be relevant and appropriate to small and medium – sized operations and focus on the most important aspects of the vehicle operation. The transport KPIs cover six core areas: (1) costs, (2) operational, (3) service, (4) compliance, (5) maintenance.

There were found three studies abroad that estimated KPIs in freight transport area. The KPIs were compared and made intersection of all the KPIs. The transport KPIs and their description for each area are shown in following Tab. 1 and the results are used in chapter 3 [3].

Table 1

List of KPIs for six areas

Area	KPI	Data Required
Cost	Average cost per unit delivered (£)	Rent cost/depreciation, road fund license cost, O License cost, no own driver costs, agency driver costs, fuel costs, tire maintenance costs, maintenance cost planned/unplanned, number of trips, units carried, distance travelled/number of trips
	Average running cost (p per mile)	Own driver costs, agency driver costs, fuel costs, tire maintenance costs, maintenance cost planned/ unplanned, distance travelled/number of trips
	Average standing cost (p per mile)	Rent cost/depreciation, road fund license cost, O License cost, annual insurance cost, number of A/C periods, distance travelled/number of trips
	Average driver cost (p per mile)	Own driver cost, agency driver cost, distance travelled/number of trips
Operational	Total miles run ('000s)	Odometer opening, odometer closing
	Total empty miles run ('000s)	Number of empty miles, distance travelled/number of trips
	Average vehicle fill	Capacity, distance travelled/number of trips, units carried
Service	Percentage of late deliveries total	Number of deliveries, number of collections, number of late deliveries, distance travelled/ number of trips
	Percentage of damages total	Number of deliveries, number of collections, number of damages, distance travelled/number of trips
	Percentage of complaints total	Number of deliveries, number of collections, number of complaints, distance travelled/number of trips
Compliance	Total number of overloads	Number of overloads, distance travelled/number of trips
	Total number of vehicle traffic infringements	Number of traffic infringements, distance travelled/ number of trips
	Total number of drivers' hours infringements	Number of driver infringements, distance travelled/ number of trips
	Total number of traffic accidents	Number of blameworthy accidents, number of non-blameworthy accidents, distance travelled/number of trips
Maintenance	Percentage of failed inspections total	Number of inspections due, number of inspections overdue/failed, distance travelled/number of trips
	Percentage of defects rectified in 24 hours total	Number of defects, number of defects rectified in last 24 hours, distance travelled/number of trips

3. QUANTIFICATION OF SERVICE QUALITY LEVEL

For the quantification of transport service quality, it is necessary to know the quality criteria. Nowadays, there is not any standard which deals with the service quality in the freight road transport as is the case in the urban transport which is defined in publication [4].

3.1. Quality criteria

The general quality criteria and also specific criteria for each kind of goods will be proposed on the basis of standards in urban transport.

There are many kind of goods which are transported in freight road transport. Each kind requires the determination of specific quality criteria. The assumption is those kinds of goods will have some common criteria of quality. The most common criteria will be named the general criteria. They will be applicable in every type of goods. The following type of goods will be analysed: (1) dangerous goods, (2) food, (3) milk, (4) packages/boxes, (5) liquid goods, (6) wood, (7) oversized/overweight goods, (8) water, (9) concrete, (10) animals, (11) waste, (12) bulk material, (13) metallurgical material, (14) vehicles, (15) construction material.

The types of goods were estimated based on data of Police Department in Slovak Republic (PPZ SR). PPZ sent the database “number of registered trucks by type of body and vehicle category” to the date 31.12.2013 in Slovak Republic. The body of vehicle said which kind of goods is transported in and the type of goods was estimated. The vehicles which are not used for transportation of goods were filtered.

Filtered vehicles by body: (1) semitrailer trucks, (2) trailers for tractor, (3) trailers for special tractor, (4) caravans, (5) trailers for motorbike, (6) loaders.

There is no chance to find out for which kind of transport are the semitrailer trucks used. Based on the previous fact, semitrailer trucks were filtered. Trailers for tractor or special tractor are used mostly on farms and not for transportation. They were filtered, as well. The rest of vehicles cannot be used for transportation as we know it. Filtered vehicles by category of vehicle: (1) N1G, (2) O1, (3) O2, (4) N1- pick up. The categories O1 and O2 are used as trailers for passenger vehicles. For this reason, they were filtered. The category N1G was filtered, as well. From the category N1, “pick-ups” were filtered. Those vehicles are small and can be used for transportation of goods but also for private purpose. It is really difficult to write for which purpose they are use.

The number of specific vehicles which are use for transportation of different kind of goods is shown in Fig. 1.

From the Fig. 1, vehicles with box body were deleted. Number of those vehicles is very high compared to other vehicles and the differences between them would not be much visible, if they were in one graph (figure).

The vehicles with box body and flatbed trucks are shown in the following Fig. 2.

Based on the previous results, the questionnaire for transport, forwarding and logistics companies was created. This questionnaire is going to be sent. The purpose of the questionnaire is to define the most transported kind of goods in freight road transport.

3.2. The proposal of the methodology for measuring the quality impacts on the performance at the sector of freight road transport

QMS is like an indicator of quality for transport service in sector of freight road transport. Improving the service through the implementation of QMS also raises the consumer demand for transport services, which creates the conditions for the growth of performance indicators. On the basis of those facts, the following methodology for measuring the quality impacts on the performance at the sector of freight road transport was proposed (Tab. 2).

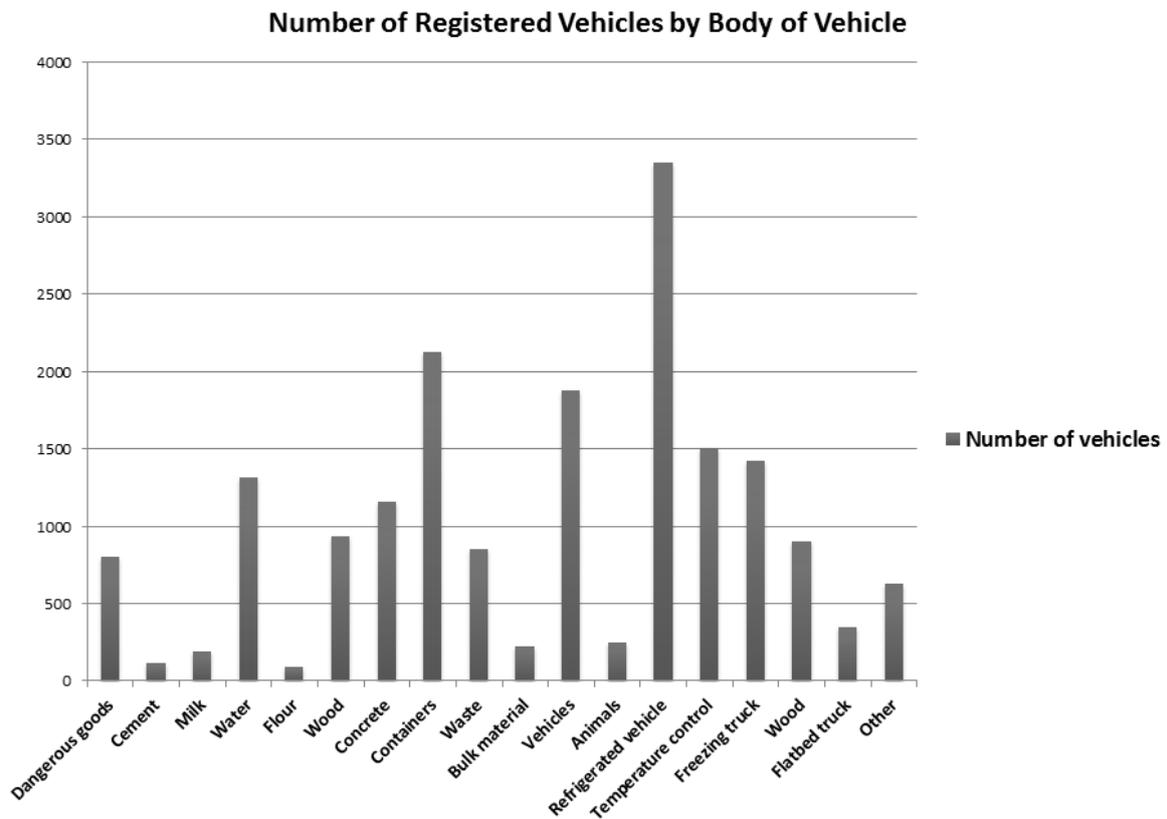


Fig. 1. Number of registered vehicles by body of vehicle to the date 31.12.2013
 Rys. 1. Liczba pojazdów zarejestrowanych przez organ pojazdu do dnia 31.12.2013

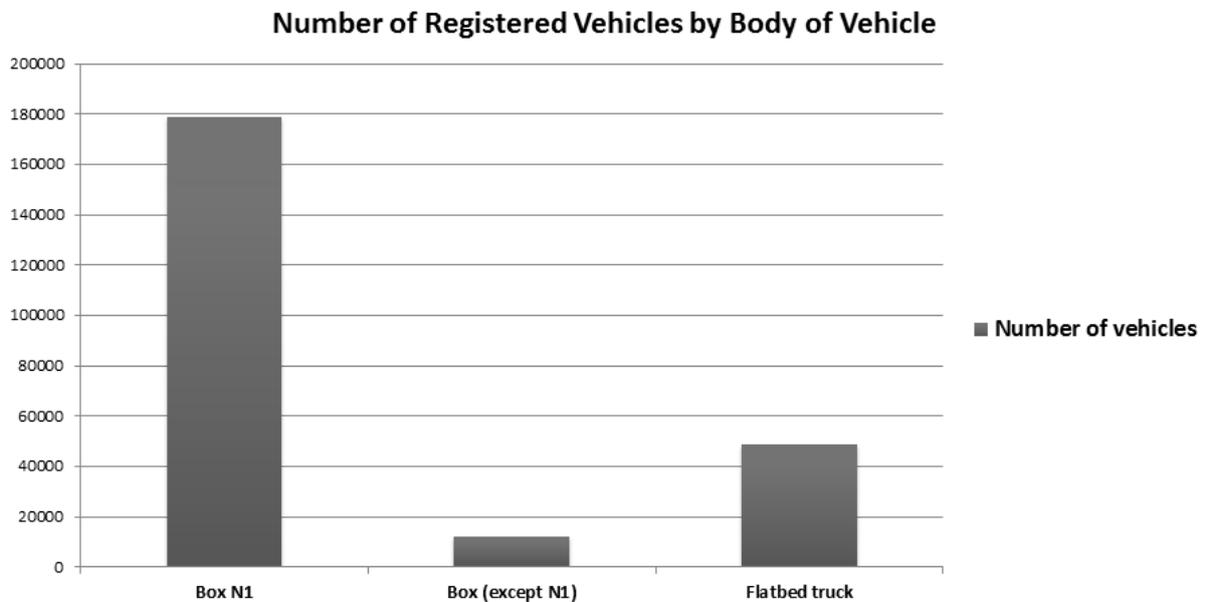


Fig. 2. Number of registered vehicles by body of vehicle to the date 31.12.2013
 Rys. 2. Liczba pojazdów zarejestrowanych przez organ pojazdu do dnia 31.12.2013

Table 2

Description of the applied methodology

Statistical sample	Database of certified carriers of freight road transport according to EN ISO 9001
Statistical unit	Transport company with implementation of QMS according to EN ISO 9001
Sample size	200 – 250 sample size
Determination of sample	Random selection from a group of certified transport companies
Method of data collection	Structured questionnaire to detect an influence of implementation of QMS by norm EN ISO 9001 on the performance Application of Likert scale Combined form of survey (through guided dialogue in combination with telephone interviews and the use of e-mail)
Interval of data collection	June – July 2014
Methods of data processing and results	Transformation of Likert scale into numerical values of performance Defining changes in performance and quality of services through the method of characteristics Testing of statistical hypotheses
Outputs	Impact of the Implementation of Quality Management System on the Performance of transport company Confirm / refute of hypotheses

3.3. Methods of quantification

The quality evaluation and measuring 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 measuring and evaluating the quality criteria: one-criteria and multi-criteria.

In the one - criteria evaluating the quality, the result is a quality value based on monitoring and measuring 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 the quality service character,
- possibility of obtaining the positive results of the evaluation also for non-compliance certain quality requirements (hidden poor quality).

The result of the multi-criteria evaluating the quality is the value based on monitoring and measuring the group of quality characteristics which are characteristic for freight transport quality.

This method shows us more clearly characteristics of transport quality. Monitoring the criteria group allows a complex view at the transport services provided. It respects the 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 fulfilment for the specific criterion (formula 1) [4, 5].

$$VQ = \sum_{i=1}^n w_i \cdot s_i \quad (1)$$

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

An evaluator determines the weights importance of criteria, the values can be determined applying a number of methods, such as [6, 7]:

- 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: criteria 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 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 [5, 6]. The fulfilment level of the specific quality criteria is measured based on a really measured fulfilment or not fulfilment of criteria directly in a services provision process. An evaluator determinates the level of fulfilment. Technical resources or measurement by a supervisor can be used for measurement of the level of fulfilment. 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 fulfilment in a relative way for positive quality criteria [5-8].

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

Fulfilment calculation for positive criterions (appropriate vehicle, compliance of time of loading, compliance of place of loading etc. – formula 2):

$$s_i = \frac{X_{mpos}}{X_n} \quad (2)$$

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

Fulfilment calculation for negative criterions (failure to comply with the delivery time, damage shipments etc. – formula 3):

$$s_i = \frac{1 - X_{mneg}}{X_n} \quad (3)$$

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

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

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

In enterprise, 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 [9, 10].

3.4. Presumption of transport service quality

There is main management system in the freight road transport; Quality Management System (QMS) by STN EN ISO 9000 series. This set of standards should be a guarantee of the quality [9, 10].

Quality Management System (QMS) by STN EN ISO 9 000:

The QMS specifies the requirements for quality management system in companies. The QMS specifies the requirements for quality management system in companies which wants to and need to show ability to provide products in accordance with the relevant regulations and requirements of

customers. Basic requirement: implement, document and maintain the quality management system and continually improve it [9,10].

Benefits of implementing the QMS:

- increased efficiency,
- increased revenue,
- employee morale,
- international recognition,
- factual approach to decision making,
- supplier relationships,
- clearness of documentation,
- consistency,
- customer satisfaction,
- improvement processes.

More about benefits of implementing QMS is defined in publication [3].

4. EXAMINATION OF THE QMS IMPACT ON THE PERFORMANCE IN FREIGHT ROAD TRANSPORT

For the purpose of examining the QMS impact on the performance in freight road transport, the questionnaire was created. Objective of the survey was to determine an effect of QMS on performance indicators but also to determine the time which is necessary to see a QMS impact.

The effect of QMS was measured with Likert scale. Likert scale is very easily able to express and measure opinion of respondents. Likert scale assumes that the strength/intensity of experience is linear, i.e. on a continuum from strongly agree to strongly disagree, and makes the assumption that attitudes can be measured. Respondents may be offered a choice of five to seven or even nine pre-coded responses with the neutral point being neither agree nor disagree [10-12].

The Likert scale is used to allow the individual to express how much they agree or disagree with a particular statement [12].

The questionnaire is divided into the following parts: (1) general information about company, (2) structural indicators, (3) operational indicators, (4) indicators of quality and service, (5) economic indicators, (6) indicators of effectiveness and time.

The questionnaire was sent to companies which have the certificate EN ISO 9001. There was a problem with definition of customer sample. In the Slovak Republic, list of freight road transport companies does not exist. Ministry of Transportation, Construction and Regional Development of the Slovak Republic (MDVRR) made available electronic database of companies in road transport. The name of database is European Register of Road Transport Undertakings (ERRU) and through the database, it is possible to find a transport company by name or identification number of organization.

Based on ERRU, association of road transport operators of the Slovak Republic (ČESMAD) and European databank more than 3 000 companies of road transport was checked. The results showed that only 74 companies have QMS and only half of them have valid certificate EN ISO 9001 to March 2014.

The minimum sample was determined with help of "Sample size calculator". Where the confidence level was 95 %, confidence interval was 5% and population was 74; the result of those parameters is that 62 samples are needed.

The survey was attended in total by 33 organizations:

- 6 micro companies (up to 19 employees),
- 10 small companies (from 20 up to 49 employees),
- 16 medium companies (from 50 up to 249 employees),
- 1 big company (more than 250 employees).

During the survey, it has been found that a lot of companies do not have the certificate even though they say that they have the certificate. A lot of companies have invalid certificate EN ISO 9001. "Why

the companies did not restore QMS?" The most common answer was that QMS has not fulfilled expectations with regard to increase the number of orders.

4.1. Determination of the time shift

Objective of the survey was to determine the time which is necessary to see a QMS impact, as well.

First, it is necessary to assess if the companies have the certificate for a long time or no. The companies with a long history of the certificate are able to evaluate an impact of QMS more properly. The meaning of the "impact of QMS" is evaluation when the most significant changes happened after the implementation of QMS.

The scale for determination of the time which is necessary to see a QMS impact includes following time periods: (1) no change, (2) during implementation, (3) in the 1st year, (4) in the 2nd year, (5) in the 3rd year, (6) in the 4th – 5th year, (7) after 5th year.

In case that performance indicators were changed, it happened during the 1st or the 2nd year after implementation of QMS. The indicators of effectiveness was changed sooner; during the implementation of QMS.

4.2. The effect of QMS on performance indicators

The performance indicators were measured by Likert scale. That means it is necessary to transfer the scale to numbers (Tab. 3).

Table 3
The range of Likert scale

Likert scale	Value	
	From	Up to
Very significant decrease	1	1,49
Significant decrease	1,5	2,49
Slight decrease	2,5	3,49
No change	3,5	4,49
Slight increase	4,5	5,49
Significant increase	5,5	6,49
Very significant increase	6,5	7

The standard deviation (SD) (formula 4) measures the amount of variation or dispersion from the average. A low standard deviation indicates that the data points tend to be very close to the mean (also called expected value); a high standard deviation indicates that the data points are spread out over a large range of values [12, 13].

$$\sigma = \sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2} \quad (4)$$

where: σ - standard deviation, n - number of items, x_i - value of i - item, \bar{x} - arithmetic average of items

The average values of statistical data are calculated on the basis of the arithmetic average by formula 5.

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n} \quad (5)$$

where: n - number of items, x_i - value of i - item, \bar{x} - arithmetic average of items

The results of survey in road transport companies are shown in Tab. 4.

From the results in Tab. 4, it is possible to see that QMS has a positive effect at companies of road transport. The QMS has the greatest effect on indicators of effectiveness and the weakest effect on economic indicators.

QMS has no bad impact on the indicators of performance in transport companies. The research shows that QMS does not have any effect on the timeliness and also on the most of economic indicators. QMS has positive effect on profit of the transport companies, though.

Table 4

The results of survey in road transport companies

Number of question	Indicator	Value	Likert scale	Standard deviation
5	Number of orders	4,91	Slight increase	0,712
6	Number of customers	4,82	Slight increase	0,672
7	Number of contracts	4,82	Slight increase	0,625
8	Volume of orders	4,70	Slight increase	0,521
9	Ability to satisfy customers	4,97	Slight increase	0,577
	Structural indicators	4,84	Slight increase	
10	Total number of km by your fleet	4,79	Slight increase	0,591
11	Number of km per one vehicle	4,82	Slight increase	0,575
12	Transport performance (total)	4,82	Slight increase	0,575
13	Transport performance per vehicle	4,82	Slight increase	0,575
14	Percentage average vehicle fill	4,73	Slight increase	0,617
15	Percentage average time utilization	4,70	Slight increase	0,577
16	Emission CO2	4,52	Slight increase	0,557
	Operational indicators	4,74	Slight increase	
17	Number of damages on goods	4,73	Slight increase	0,617
18	Timeless	4,45	No change	0,656
19	Other weaknesses	4,67	Slight increase	0,636
20	Number of adverse events	4,67	Slight increase	0,586
21	Number of satisfied customers	4,58	Slight increase	0,740
22	Numbers of complaints	4,79	Slight increase	0,591
	Indicators of quality and service	4,65	Slight increase	
23	Costs per unit delivered	3,64	No change	0,643
24	Costs to correct deficiencies	4,42	No change	0,552
25	Costs for fees	4,42	No change	0,552
26	Price	4,27	No change	0,509
27	Profit	4,79	Slight increase	0,686
	Economic indicators	4,31	No change	
28	Effectiveness of management	5,21	Slight increase	0,686
29	Competitiveness	5,15	Slight increase	0,657
30	Effectiveness of marketing	5,18	Slight increase	0,869
	Indicators of effectiveness	5,18	Slight increase	
	Average value	4,74	Slight increase	

Comparison of QMS impact by size of company is shown in Tab. 5.

Table 5

Comparison of QMS impact by size of company

Indicator	All companies	Micro companies	Small companies	Medium companies
Structural indicators	4,84	4,77	4,98	4,71
Operational indicators	4,74	4,40	4,80	4,77
Indicators of quality and service	4,65	4,22	4,68	4,71
Economic indicators	4,31	4,30	4,30	4,34
Indicators of effectiveness	5,18	5,11	5,33	5,06
Average value	4,74	4,56	4,82	4,72

Tab. 5 shows the average effect of QMS in each kind of companies by size. The most significant effect of QMS is in small companies and medium companies (highlighted numbers).

The fastest effect of QMS is possibly to see in small companies (20 - 49 employees); the most significant effect is in structural indicators, operational indicators and indicators of effectiveness.

The medium companies (from 50 up to 249 employees) have the fastest and significant effect in indicators of quality and service and economic indicators.

The QMS does not have any effect in the micro companies (up to 19 employees).

The QMS has the greatest effect on effectiveness of management, effectiveness of marketing and competitiveness. It has the weakest effect on costs.

Benefit of QMS implementation in transport companies is shown in Fig. 3.

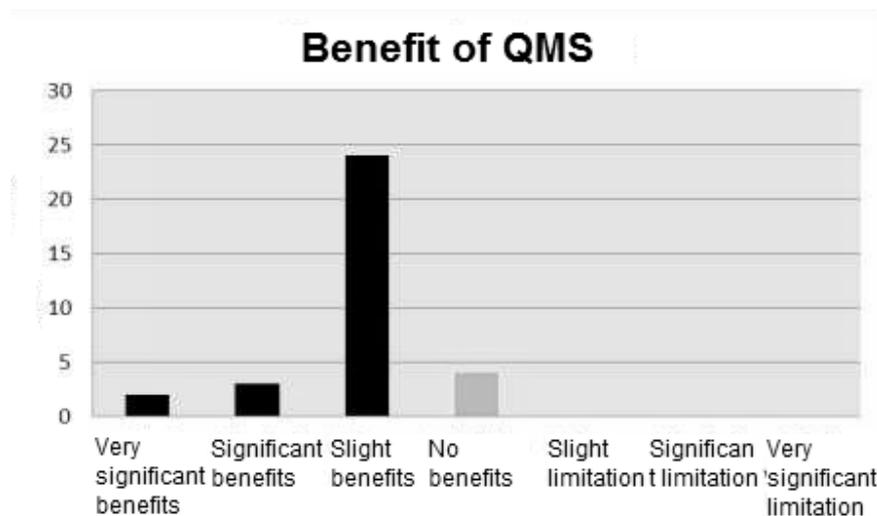


Fig. 3. Benefit of QMS in transport companies

Rys. 3. Korzyści z QMS w firmach transportowych

“Was the implementation of the QMS a benefit for your company?” The most common answer of the experts for this question was: “slight benefits”.

It can be said that QMS has a positive effect on all companies of road transport. From the results, the QMS implementation in each kind of transport companies by size can be recommended. QMS implementation has a positive effect in companies.

5. CONCLUSION

The quality of transport service is also an important determinant of the demand. The transport infrastructure, transport technology, transport and transportation processes, information systems and human resources are the factors that affect the quality of transport services [5, 11].

The quality is very significant tool to keep customers in the company. It affects the performance and economic results of company, as well. When the enterprise has 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. Dissatisfied customer means a loss of revenue, loss of missed opportunity and in the end loss of customers [9-11].

The future of each organization depends on customer behaviour. Increasing the level of satisfaction must be one of the main objectives of each organization [9, 10].

The paper results confirmed that there is a time difference between implementation of QMS and the impact of QMS on performance in company. In general, the impact of QMS was visible between the 1st and the 2nd year after implementation of QMS. The research shows that the time difference is shorter in micro companies, as well. In those companies, the time difference is already in the 1st year

after implementation of QMS. In small and medium companies, the time difference is in 2nd year but the impact of QMS is bigger on performance indicators [10].

It can be said that QMS implementation has a positive effect on road transport companies. In the example, it was shown which indicators are affected by QMS the most. The QMS has the greatest effect on indicators of effectiveness and the weakest effect on economic indicators.

The quality management system does not have any bad impact on the performance indicators. On the basis of this fact, the quality management system by EN ISO 9001 can be recommended to the road transport companies.

Acknowledgement

This paper has been developed under support of project: MŠVVŠ SR VEGA No. 1/0320/14 POLIAK, M.: Increasing the road transport safety through the support of public passenger transport.

References

1. Reh, F.J. *Key Performance Indicators Must be Key to Organizational Success*. Available at: http://management.about.com/cs/generalmanagement/a/keyperfindic_2.htm.
2. *Freight Best Practice - Safety in Freight Transport Operations*. Department for Transport. UK. March 2011.
3. STN-EN ISO 9000:2005. *Systémy manažérstva kvality. Základy a slovník. Slovenský ústav technickej normalizácie*. Bratislava. 2005 [In Slovak: *Quality management systems. Fundamentals and vocabulary*. Slovak Standards Institute. Bratislava. 2005].
4. STN-EN ISO 15140:2006. *Verejná osobná doprava. Základné požiadavky a odporúčania na systémy na meranie poskytovanej kvality služieb*. Slovenský ústav technickej normalizácie. Bratislava. 2006 [In Slovak: *Public passenger transport. Basic requirements and recommendations for systems that measure delivered service quality*. Bratislava: Slovak Standards Institute. 2006].
5. Šimková, I. & Konečný, V. The Evaluation of Services Quality Forwarding. *Perner's Contacts*. 2013. Vol. 8. No. 4. P. 76-85. Available at: http://pernerscontacts.upce.cz/33_2013/Simkova.pdf.
6. Stopka, O. & Kampf, R. & Kolar, J. & Kubasakova, I. Identification of Appropriate Methods for Allocation Tasks of Logistics Objects in a Certain Area. *Our Sea*. 2014. Vol. 61. No. 1-2. P. 1-6. ISSN: 0469-6255.
7. Kampf, R. & Průša, P. & Savage, C. Systematic location of the public logistic centres in Czech Republic. *Transport*. 2011. Vol. 26. No.4. P. 425-432. ISSN: 1648-4142.
8. Konečný, V. *Nástroje a metódy manažérstva kvality*. Zilina: University of Zilina. 2012. ISBN 978-80-554-0601-5 [In Slovak: *Tools and methods of quality management*].
9. Šimková, I. & Konečný, V. The Evaluation of Services Quality in Road Freight Transport and Forwarding. In: *Transcom 2013 - 10th European Conference of Young Researchers and Scientists*. Zilina. 2013.
10. Phillips, T. *Top 10 Reasons to Get ISO 9001:2000 QMS*. Available at: <http://biotech.about.com/od/isocertification/tp/ISOQMS.htm>.
11. Mojžíš, V. & Kyncl, J. & Drdla, P. *The quality of transport and transportation processes*. Pardubice: Institute of Jan Perner. 2003. ISBN 80-86530-09-4.
12. McLeod, S.A. *Likert Scale*. 2008. Available at: <http://www.simplypsychology.org/likert-scale.html>.
13. *ISO - The International Organization for Standardization*. Available at: <http://www.iso.org/iso/home.html>.