

## IMPACT OF QUALITY MANAGEMENT SYSTEMS ACCORDING TO ISO 9001 ON PERFORMANCE OF TRANSPORT ORGANIZATIONS

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### ABSTRACT

*The article deals with the impact of quality management systems according to ISO 9001 on the performance of transport organizations. Key performance indicators (KPIs) in the transport sector are defined. There is a research into the impact of implementing quality management systems on a set of key performance indicators. The impact of quality management systems on KPIs before and after the introduction of quality management systems is being evaluated. The results can serve as a basis for decision-making of transport organizations in connection with the introduction of quality management systems.*

**Keywords:** performance indicators, management system, transport organizations

### 1. INTRODUCTION

The basic interest of any business entity is to assert themselves on the market, whether through the sale of products or the provision of services. This goal is not just the interest of transport and freight forwarding organizations, but of the business of each type. Management systems are focused on defining processes and manufacturing processes. It means a guide and a guarantee that all products or services have the qualities of a defined quality. It is important to realize that management systems are a necessity today, especially in a competitive struggle. Today, the customer has a choice of many service providers and daily increases in such businesses. Therefore, it is really important to take this into account and provide quality services.

### 2. THE IMPORTANCE OF BUILDING AND INTRODUCING MANAGEMENT SYSTEMS IN TRANSPORT ORGANIZATIONS

The intense growth of domestic and foreign competition in some way forces the organization to assert itself on the market and persuade buyers to use the services or build a public image. [1] One of the most important tasks of quality managers is to deal with the stability and quality of processes, good management and continuous improvement, to be able to meet the needs of their customers and, importantly, at a reasonable price. [2] The certified system guarantees the potential customer the ability to deliver products and provide the required quality services and according to his requirements in the long term. When implementing management systems the

organizational structure is clarified, the responsibilities and responsibilities of middle and lower management are clearly defined, this ultimately leads to greater production expansion, cost reduction, elimination of shortfalls, resource efficiency and time efficiency. [3] Following the adoption of the Public Procurement Act in 1999, the ISO 9001 certificate became a proof of the tenderer's eligibility, which in particular encouraged smaller companies to take care of obtaining the certificate. A well-motivated employee, a satisfied supplier, a customer and at the same time the environment are the best preconditions for the smooth development of the company. [4]

## **2.1. Basic characteristics of STN EN ISO 9001: 2016**

Currently, the following system standards can be applied in the area of quality management:

- STN EN ISO 9000: 2016 "Quality Management Systems. Basics and Dictionary. "
- STN EN ISO 9001: 2016 "Quality Management System. Requirements. "
- STN EN ISO 9004: 2010 "Management of the permanent success of the organization. Quality Management Approach. "
- STN EN ISO 19 011: 2012, "Instructions for auditing the quality management system and / or the environmental management system."

***The STN EN ISO 9001: 2016 standard specifies requirements for the quality management system if the organization:***

- a) needs to demonstrate its ability to permanently provide products and services that meet customer requirements, applicable regulatory requirements and regulatory requirements;
- b) aims to enhance customer satisfaction through the efficient use of the system, including processes to improve the system and ensure compliance with customer requirements, applicable regulatory requirements and regulatory requirements. All requirements of this international standard are general and intended to be applied by any organization, regardless of type, size or products and services provided.

## **2.2. Analysis of existing performance indicators**

Performance indicators also referred to as key performance indicators (KPIs). It is a set of quantifiable measures that an organization uses to measure its performance over time. They are used to determine the company's progress in achieving its strategic and operational goals, as well as to compare the company's financial performance and performance with other companies in its industry. [5] Key performance indicators need to be measurable, so they should not talk about activities but about results. They must be comprehensible and equally understood for all. KPIs should be defined by a team of people. KPIs results are conditioned by teamwork in the organization. [6]

### ***KPIs used in logistics abroad***

According to a survey conducted in 2012 under the auspices of Die Bundesvereinigung Logistik (BVL), which was attended by 1,757 organizations, these logistical indicators are the most common: customer satisfaction (25%), timeliness of delivery (17%), green logistics (12.5%) , delivery time (11.5%), innovations (11%), costs (6.5%), quality (4%), planning (2.5%), other indicators (10%). The percentages illustrate which KPIs are considered the most important. [7]

### ***KPIs used in transportation abroad***

KPIs are useful also in transport sectors. In the following subchapter I would like to mention examples of KPIs used in transport abroad, commonly used also in the Slovak Republic. These are like:

- delivery time,
- transport costs,
- order accuracy,
- storage costs. [6]

### 3. MEASUREMENT AND EVALUATION OF THE IMPACT OF THE IMPLEMENTATION OF MANAGEMENT SYSTEMS IN TRANSPORT ORGANIZATIONS ON THEIR PERFORMANCE

For this contribution, we will focus on performance indicators for transport and logistics companies. The implementation of the management system is being monitored. Furthermore, it is observed how the introduction of this element has affected their performance.

#### 3.1. Case study in the Slovak Republic

In order to assess the impact of implementing management systems in transport organizations on their performance, measurements were made in the Slovak Republic. The measurement was carried out using a questionnaire that was sent directly to individual companies. In order to measure performance, it is important to define some basic concepts.

##### *Selection of respondents*

50 transport organizations were approached. Only companies with a management system implementation certificate were selected. Businesses were divided as follows:

- micro organization – 1 to 9 employees,
- small organization – 10 to 49 employees,
- medium-size organization – 50 to 249 employees,
- large organization – 250 or more employees.

In this case, 50 organizations were addressed in the survey, of which:

- 14 micro organizations,
- 15 medium-size organizations,
- 17 small organizations,
- 4 large organizations.

Total 34 companies actually participated in the survey, which represents a 68% return on questionnaires.

##### *Defining the indicators monitored in the questionnaire*

The monitored indicators are focused on the areas of structure and scope of realized outputs, productivity, efficiency of logistics activities and quality of logistics activities from the perspective of both the employee and the customer. Table 1 shows the performance indicators monitored in the survey.

Table 1. Performance indicators monitored in the survey; Source: Author

<b>Quality management system</b>	<b>STRUCTURAL AND FRAMEWORK INDICATORS</b>	Number of orders
		Number of customers
		Ability to win new customers
		The ability to bring new services to market
	<b>QUALITY AND SATISFACTION INDICATORS</b>	Number of complaints
		Speed of claim handling
		Customer satisfaction rate
		Number of damages on the goods being transported
		Delivery dates
	<b>ECONOMIC INDICATORS</b>	Cost per order
		Repair and maintenance costs
		Cost of customer service
		Overall management of the organization
		Service price change
		Profit

##### *Method of questionnaire evaluation*

The Likert scale was used to measure the impact of implementing management systems on selected indicators listed in the table above. The scale allows respondents to respond in a simple and transparent way. The range of used Likert scale is shown in Table 2.

Table 2. Range of used Likert scale; Source: Author

Degree of assessment	Interval from - to		Verbal assessment
1	1.00	1.49	Significant reduction
2	1.50	2.49	Slight decrease
3	2.50	3.49	No change
4	3.50	4.49	Slight increase
5	4.50	5.00	Significant increase

### Survey results

Table 3 below shows the survey results for all survey organizations.

Table 3. The survey results for all organizations surveyed; Source: Author

Indicator	Scale value	Arithmetic average rating	Median	Median rating
<b>STRUCTURAL AND FRAMEWORK INDICATORS</b>	3.85	Slight increase	3.83	Slight increase
number of orders	4.11	Slight increase	4.14	Slight increase
number of customers	3.93	Slight increase	3.91	Slight increase
new customers	3.89	Slight increase	3.9	Slight increase
new services to the market	3.48	No change	3.36	No change
<b>QUALITY AND SATISFACTION INDICATORS</b>	2.96	No change	3	No change
number of objections	2.22	Significant reduction	2.34	Significant reduction
speed of claim handling	3.33	No change	3.55	Slight increase
customer satisfaction rate	3.74	Slight increase	3.41	Slight increase
number of damages on the goods being transported	2.15	Significant reduction	2.46	Significant reduction
delivery dates	3.33	No change	3.24	No change
<b>ECONOMIC INDICATORS</b>	3.22	No change	3.28	No change
cost per order	2.41	Significant reduction	2.67	No change
repair and maintenance costs	2.69	No change	2.87	No change
cost of customer service	3.3	No change	3.2	No change
overall management of the organization	4.22	Slight increase	3.3	No change
service price change	3.7	No change	3.62	Slight increase
profit	3.6	Slight increase	4.27	Slight increase

On the basis of the overall assessment, it can be seen that there was generally no change after the introduction of management systems. The change is seen in structural and framework indicators even after evaluating the results, when values were not affected by extreme values. The median eliminated calculation deficiencies in the group of environmental indicators, when it is seen that there was in fact no change.

#### 4. EVALUATION OF RESULTS AND FORMULATION OF RECOMMENDATIONS

The introduction of management systems into the organization plays an important role in the acquisition of customers, the handling of orders, the overall running of the organization, and in practice it is proven that the introduction of management systems is of some importance to the running of the company. Although there was a slight improvement in our measurement, it is a positive outcome and no losses were observed after the introduction of one of the management systems.

Table 4 shows the impact of implementing management systems on performance indicators using the median.

Table 4. Impact of management systems on all types of organizations (median); Source: Author

Indicator Group	All organizations	Micro organizations	Small organizations	Medium and large organizations
Structural and framework indicators	3.83	3.79	3.94	3.81
Quality and satisfaction indicators	3	2.96	2.82	2.87
Economic indicators	3.28	2.64	3.19	3.42

Table 5 shows performance indicators. They are divided according to individual management systems. Data are expressed for all organizations using median values to avoid bias in the end result. The Quality Management System has reached value 3.31.

Table 5. The importance of implementing management systems on the proposed indicators; Source: Author

Quality management system	STRUCTURAL AND FRAMEWORK INDICATORS	Number of orders	4.14	3.31
		Number of customers	3.91	
		Ability to win new customers	3.9	
		The ability to bring new services to market	3.36	
	QUALITY AND SATISFACTION INDICATORS	Number of objections	2.34	
		Speed of claim handling	3.55	
		Customer satisfaction rate	3.41	
		Number of damages on the goods being transported	2.46	
	ECONOMIC INDICATORS	Delivery dates	3.24	
		Cost per order	2.67	
		Repair and maintenance costs	2.87	
		Cost of customer service	3.2	
		Overall management of the organization	3.3	
		Service price change	3.62	
		Profit	4.27	

The last factor that has been important in implementing management systems to the organization is time. The changes took place within 12 to 24 months after the introduction of management systems. Respondents reported almost all indicators that the change was already in the preparatory phase. We focused on the most important indicators that every business entity aims to increase or decrease.

For the indicators that were monitored as an increase, the change was most abundant in the 12 months of the introduction of management systems. Table 6 shows the time shift data for the most significant increases in the selected performance indicators.

Table 6. Time shift of the most significant increases in selected performance indicators; Source: Author

	Number of orders	Management efficiency	Getting new customers	Delivery dates	Total
Change did not show	7	5	7	15	34
In the preparatory phase	6	3	6	3	18
Until 12 months	10	13	7	6	36
Until 24 months	1	3	5	2	11
Until 60 months	2	2	0	0	4
Over 60 months	0	0	1	0	1

For indicators that were monitored as a decrease, the change was also manifested in the 12th month as well as in the group of indicators that followed the increases. The following Table 7 shows the time shifts of the most significant decreases in selected performance indicators.

Table 7. Time shift of the most significant decreases in selected performance indicators; Source: Author

	Number of objections	Number of complaints	Cost of eliminating deficiencies	Total
Change did not show	9	9	12	30
In the preparatory phase	0	2	1	3
Until 12 months	13	12	6	31
Until 24 months	2	3	7	12
Until 60 months	2	0	0	2
Over 60 months	0	0	0	0

## 5. CONCLUSION

The contribution was focused on freight transport companies and freight forwarding companies, which have the provision of transport services in the subject of business. The problem was when it was necessary to compile a table of companies that have a valid management system certificate. There is no source for the public to see if the company has a certificate. The only way to verify that transport and logistics companies are certified to ISO 9001 was through their website. Some companies have owned a certificate but have not been posted on their website. From our point of view, it is incomprehensible that an organization will make efforts to obtain a certificate, incur costs and, after all phases and preparations for the audit, is unable to publish its certificate and prove it.

The implementation of management systems was, according to the results, beneficial for organizations. The performance indicators monitored showed a slight improvement, whether it was an increase in economic indicators or structural and framework indicators. On the other hand, the number of complaints decreased. Among the monitored indicators were not found to which the introduction of one of the management systems would have a negative impact. Based on this finding, it is advisable to introduce a management system to organizations, regardless of the number of employees. If a transport company or freight forwarding company decides or introduces a QMS, it can provisionally determine whether it is in the area it needs to improve. It is also worthwhile introducing this system and interpreting costs and efforts to obtain a certificate.

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## 6. REFERENCES

- [1] Paulová, I.: Comprehensive quality management, Bratislava, 2013. ISBN 97-8808-078-574-1
- [2] Increasing importance of quality management system [cit 21-3-2018 ] Available on: <https://www.etrend.sk/trend-archiv/rok-/cislo-M%C3%A1j/rastuci-vyznam-systemu-manazmentu-kvality>.
- [3] Meteides, A., et col.: History, concepts, methods, Bratislava, Epos 2006. ISBN 80-8057-656-4
- [4] Ubrežiová, I.: International management and business, Nitra: Slovak university of Agriculture, 2008. ISBN 978-80-552-0069-9
- [5] KPI [cit 27-3-2018] Available on: <https://www.investopedia.com/terms/k/kpi.as>
- [6] KPI [cit 27-3-2018] Available on: <https://www.klipfolio.com/resources/articles/what-is-a-key-performance-indicator>
- [7] Survey BVL [cit 07-04-2018] Available on: [https://picsbelgium.be/wp-content/uploads/2013/07/BVL\\_TrendsandStrategies\\_SCM\\_Logistics\\_2013\\_pdf.pdf](https://picsbelgium.be/wp-content/uploads/2013/07/BVL_TrendsandStrategies_SCM_Logistics_2013_pdf.pdf); 19. 2. 2018
- [8] Konečný, V.: Quality Management. Systems, principles, procedures. Žilina 2017. ISBN 978-80-554-1406-5., p. 105-106
- [9] Dyson, J.: Accounting: For Non-Accounting Students, p. 454