The Quality of Service in the Public Transport and Shipping Industry

Kvaliteta usluge u javnom prijevozu i pomorskoj industriji

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Summary

This paper deals with the quality system in public transport and the shipping industry. The quality in transport is a significant determinant of the demand. It is an important tool for customer retention and it also has effects on the performance and economic results of the organization in the competitive environment. The increasing level of satisfaction must be one of the main objectives of each organization. The purpose of quality standards in public transport and the shipping industry implementation, as well as the example of measuring customer satisfaction in public transport,will be shown in this article. The questionnaire will be used and those results will be compared with the real value (the measurement of quality criteria in real conditions).

Sažetak

U radu se govori o sustavu kvalitete u javnom prijevozu i pomorskoj industriji. Kvaliteta prijevoza je značajna odrednica potražnje. Ona je važan alat za zadržavanje korisnika usluge i također utječe na izvedbu i ekonomske rezultate organizacije u konkurentnom okruženju. Porast razine zadovoljstva mora biti jedan od glavnih ciljeva svake organizacije. U ovom radu izložit će se svrha primjene normi kvalitete u javnom prijevozu i pomorskoj industriji, kao i primjer mjerenja zadovoljstva korisnika usluga javnog prijevoza. Koristit će se upitnik i rezultati će se usporediti sa stvarnim vrijednostima (mjerenje kriterija kvalitete u stvarnim uvjetima).

INTRODUCTION

The meaning of the word "quality" is used like a mark of excellence of service and goods in community without knowledge in this field. It is the evaluation of the service or goods. The quality is a sum of subjective opinions regarding the object. The quality is expressed in the 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 that term. In the STN EN ISO 9000: 2005 Quality management systems norm- Fundamentals and Vocabulary, the quality is defined as a "degree with which a set of its own characteristics fulfills requirements".

There are two main management systems in the transport: *The Quality Management System (QMS)* by STN EN ISO 9 000 series standards and *The Environmental Management systems (EMS)* by STN EN ISO 14 000 series standards. Those norms should be a guarantee of quality.

For department of public transport, it is known as the *STN EN 13816 – Transportation: The Logistics and services, Public* passenger transport, Service quality definition, targeting and measurement. This will be mentioned in a next part of the article [1].

THE QUALITY OF SERVICE

The quality in transport field is a significant determinant of demand. In the competitive environment, it is an important tool for customer retention and it also has effects on the performance and economic results of the organization.

THE QUALITY OF SERVICE IN SHIPPING INDUSTRY

Many ports are unable to provide potential customers with the right mix or standard of services because they do not have the right mix of infrastructure. The common complaints from shipping lines and other port users relate to [1-3]:
- Insufficient depth of water;
- Lack of quay space, resulting in vessels having to wait for a berth;

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- Lack of storage space behind the quay, often caused by the "city center" locations of older ports;
- Insufficient (or outdated) mechanical equipment:
  - For container ships, the most common problems are too few cranes (preventing the ship from working as many holds as the operator would like) or the absence of ship-to-shore gantry cranes (resulting in slower handling rates). Yard congestion caused by lack of space can also slow down crane handling rates on the berth;
  - The most common problem for bulk ships is lack of automation (ship loaders and pneumatic or screw discharge equipment linked to high speed conveyor systems to the storage area or plant); and
- Poor interface arrangements for rail and inland waterway transport.

The *International Maritime Organization (IMO)* exists in the shipping industry. This is the United Nations specialized agency that has the responsibility for the safety and security of shipping and the prevention of marine pollution by ships. As a specialized agency of the United Nations, the IMO is the global standard-setting authority for the safety, security and environmental performance of international shipping. Its main role is to create a regulatory framework for the shipping industry that is fair and effective, universally adopted and universally implemented [1] - [4].

THE QUALITY OF SERVICE IN PUBLIC TRANSPORT

The primary objective is to define a standard of the service quality level as a requirement for the public procurement in public passenger transportation. Another equally important objective is to guarantee the level of quality requirements set down in contracts between the public authority and the operator throughout the duration of the contract. For each quality criterion included in the system that measures and evaluates the quality, the evaluation side (the public authority and the operator) have to define the standardized parameters of the evaluation of the criterion. The results of this standardization are a necessary basis for the measuring and assessment of the quality level.

The total quality of public transport affects many of the criteria. The measurement of the quality of public transport is not simple as at first sight. According to *STN EN 13 816 –Transportation, Logistics and Services, Public Passenger Transport, the Service quality Definition, Targeting and Measurement* define some processes of the measuring service quality, but their application is quite difficult. This European Standard specifies the requirements to define, target and measure the quality of service in public passenger transport and it provides guidance for the selection of the related measurement methods. The standard defines a set of eight quality criteria for public passenger transport [5]:

1. Availability: the availability of escalators, lifts and moving walkways, 2. Accessibility: the availability of ticket machines, availability of validation devices, 3. Information: permanent information in stations, permanent information in vehicles, client information in case of planned traffic disturbance, 4. Time: travel time, punctuality, regularity, 5. customer care: the availability of personal, competence, assistance, a website,

written replies to complaints, 6. comfort: the cleanliness and neatness of stops and vehicles, passenger comfort in vehicles, 7. security: the avoidance of criminal attacks and of accidents, 8. environmental impact: pollution, resources.

Each criterion standard classifies into sub-criteria into more details. These services are determined by the quality loop.

MEASURING THE SERVICE QUALITY IN PUBLIC TRANSPORT

Considering that transportation is one of the most sensitive of all passenger services (passenger safety, punctuality of departures) which are mostly subsidized by the taxpayers, a key role is played by the quality management system that every common carrier should implement, and thus to secure the same level of services for each passenger. The process of measuring service quality in public transportation is stated in [5], [6].

The measurement was carried out in three main steps [5]:
1. The selection of the most important quality criteria (QC) by customers,
2. The measurement of quality criteria in real conditions,
3. The comparison of satisfaction and importance.

THE SELECTION OF THE MOST IMPORTANT QUALITY CRITERIA STATED BY THE CUSTOMERS

The bus line between Slovakian cities Žilina and Čadca was chosen for the measurement. The quality criteria are defined STN EN 13 816 that was mentioned in previous paragraph.

A questionnaire was created with regard to STN 13 816 for the purpose of examining the quality criteria. The objective of the survey was to determine the most important quality criteria.

The importance of quality criteria was measured with the Likert Scale. The Likert Scale is an able way to express and measure opinion of respondents the most easily. The Likert Scale assumes that the strength/intensity of the experience is linear, i.e. on a continuum from one strong agreement to another stronger disagreement, and it makes the assumption that attitudes can be measured. The 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.

The Likert Scale is used to allow the individual to express how much he or she agrees or disagrees with a particular statement [7].

The questionnaire is divided into the following parts: general information about passenger and quality criteria.The questionnaire was distributed at the bus stops of the line. There was problem with definition of customer sample. There is not any database of passengers for the line. Based on this fact, the sample size was calculated from population of cities Žilina and Čadca 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 106 012; the result of those parameters is that 383 samples are needed. The results of survey are shown in *figure 1*.
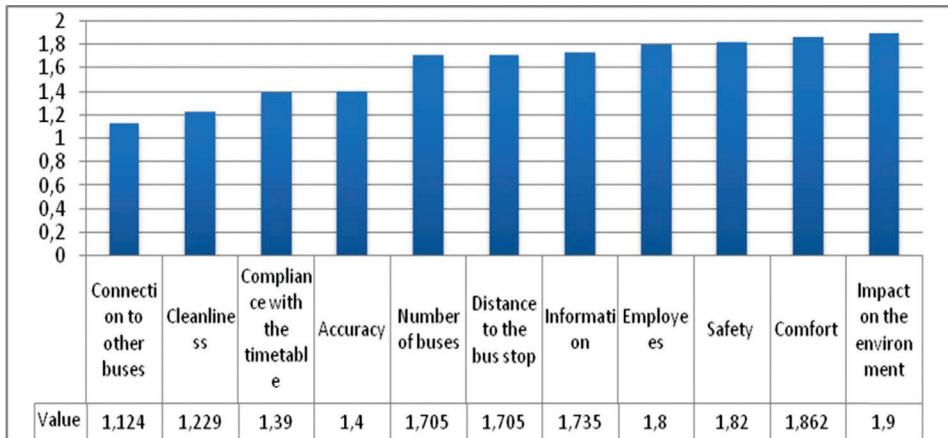
Figure 1 Results of the survey

Source: authors

The most important quality criteria according to the passengers are the [8], [9]:
- connection to other buses,
- cleanliness,
- compliance with the timetable.

Those three quality criteria will be measured in following part of article.

THE MEASUREMENT OF QUALITY CRITERIA IN REAL CONDITIONS

It is necessary to define the measurement procedures. The measurement means a method of obtaining information on the fulfillment or non-fulfillment of the quality criteria. The "standard" like a tolerated value should be defined for each criterion [8], [9].

The methods of measuring quality are [8], [9]:
- according to the time frame of measurement,
- according to the method of data collection,
- according to the complexity measurement.

On the basis of the methods and their descriptions, it can be said:
- continuous measurement should be carried out by technical means,
- the criteria that cannot be measured with technical means should be measured with inspectors and inspectors, is good to use in random measurement.

In this case, the inspector and random measurement will be used. The number of buses that are used for transportation between the cities Žilina and Čadca was used for the population.

Figure 2 Sample size calculator

Source: authors

The minimum sample was determined with the help of the „Sample size calculator" (*figure 3*). Where the confidence level was 95 %, the confidence interval was 5% and the population was 24; the result of those parameters is that 23measurements are needed.

The Quality criterion: connection to the other buses:

This criterion was chosen as the most important according to passengers. For this criterion was chosen random measurement with inspectors and regulatory table (*table 1*).

Definition of a match/ mismatch:

Match - The time of waiting for another bus at bus stop in cities of Žilina or Čadca cannot exceed 30 minutes.

Mismatch - The time of waiting for another bus at bus stop in cities of Žilina or Čadca will exceed 30 minutes.

Table 1 The Regulatory Table of Measurement (authors)

	Frequency
Match	16
Mismatch	7
Total	23
Date of measurement: 19.3.2014	
Inspectors: Stopka, Šimková	
Time and place: 9:00 – 17:00, Žilina	

$$The\ Level\ of\ Connection = \frac{Number\ of\ match}{Total\ number\ of\ measurement} * 100\ (\%)$$

$$The\ Level\ of\ Connection = \frac{16}{23} * 100 = 69.57\%$$

The connection to other buses can reach a value from 0 % to 100 %. If the connection is more than 70 %, the criterion will be in the match. If the connection is less than 70 %, the criterion will not be in the match and the service provider should make some changes with the line. In this case, the criterion is not in match.

The Quality criterion: cleanliness:

One of the ten people has admitted avoiding public transportation and trips to the cinema because of worries over the cleanliness and general hygiene levels. That means the cleanliness is also a very important criterion. The random

Table 2 The Regulatory Table of One Measurement (authors)

Indicator	Value	Assigned value	Weight	Evaluation
Interior cleanliness	100	-		
Cleanliness of seats	65	60	0.9	81
No garbage on the floor	15	10		
No odor	20	20		
Cleanliness of bus stops	100	-		
No garbage in the bus stops, dirty benches	70	70	0.1	10
No odor or smoke	30	30		
Total	-			91
Date: 12. – 14.3.2014				
Inspectors: Šimková, Stopka				
Time and place: 9:00 – 18:00 bus stops on the line				

$$Average\ cleanliness = \frac{\sum evaluation\ of\ cleanliness}{number\ of\ measurement} = \frac{\sum 2154}{23} = 93.65$$

measurement with inspectors and regulatory table (*table 2*) was chosen for this criterion. One regulatory table can be used only for one measurement. There are two main categories: the interior cleanliness and the cleanliness of the bus stops. Each category can reach a value of 100; this value is divided between the indicators of cleanliness.

Indicators of cleanliness [8] - [10]*:*
- the interior cleanliness:
  - seats,
  - garbage,
  - odor,
- the cleanliness of bus stops:
  - garbage in the bus stops, dirty benches
  - odor or smoke.

The cleanliness criterion can reach a value from 0 to 100. The match will be if the criterion reaches at least a 95 value. *In this case, the criterion is in mismatch.* The service providers hould take care more of cleanliness and comfort of passengers.

The Quality criterion: compliance with the timetable:

The compliance with the timetable is one of the most important criterions in the transportation process. The passengers need to be on time in schools, works etc. For this criterion, the random measurement with inspectors and regulatory table (*table 3*) was chosen.

Definition of match/ mismatch:

Match - If the bus arrives at the bus stop 2 minutes or less before departure by timetable.

Mismatch - If the bus arrives at the bus stop 2 minutes or more after departure by timetable.The bus does not arrive at all.The bus's departure is 2 minutes or more before the departure by timetable.

The level of compliance with the timetable can reach a value from 0 % to 100 %. If the criterion is more than 95 %, the criterion will be in match. If the connection is less than 85 %, the criterion will not be a match and the service provider should make some changes with the line. *In this case, the criterion is in match.*

Table 3 The Regulatory Table of Measurement (authors)

Indicator	Frequency
Early bus	0
Delayed bus	3
On time bus	20
Total	23
Date: 12. – 14.3.2014	
Inspectors: Šimková, Stopka	
Time and place: 9:00 – 18:00 bus stops on the line	

$$The\ Level\ of\ Compliance\ with\ the\ Timetable = \frac{number\ of\ on\ time\ buses}{number\ of\ measurement} * 100 (\%)$$

$$The\ Level\ of\ Compliance\ with\ the\ Timetable = \frac{20}{23} * 100 = 86.96\%$$

THE COMPARISON OF SATISFACTION AND IMPORTANCE

A second questionnairewas created for measurement of passenger satisfaction, where number 1 means very satisfied and number 5 means very dissatisfied. The condition of the survey was the same as with the first questionnaire and the results are shown in *table 4*.

Table 4 The Comparison of Satisfaction and Importance

Quality criteria	Satisfaction value	Importance value
Connection to Other Buses	3.57	1.124
Cleanliness	2.53	1.229
Compliance with the Timetable	2.79	1.39
Accurancy	3.87	1.4
Number of buses	3.82	1.705
Distance to the Bus Stop	3.17	1.705
Information	3	1.735
Employees	3.3	1.8
Safety	2.4	1.82
Comfort	3.1	1.862
Impact on the Enviroment	3	1.9

Source: authors

The Connection to the Other Buses: this criterion has a 3.57 value of satisfaction. That means that passengers are not satisfied with connection to other buses and they have to wait a long time other for connection. The criterion was measured even in real condition and the results also said that the criterion does not fulfill the conditions of satisfaction.

The Cleanliness: the results showed that interior cleanliness is more important for passengers than cleanliness of bus stops. The satisfaction of passengers is 2.53. That means mild satisfaction but the result was very satisfied in real condition. Passengers expect even more clear buses and bus stops.

Compliance with the Timetable: this criterion had good results in all measurement. The passengers are satisfied and even measurement in real condition showed that the criterion fulfills the conditions of satisfaction.

CONCLUSION

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 [10]-[14].

Customers always expect excellent service and they do not tolerate mistakes. Even one mistake after several successful services, they can conclude the company cannot be counted upon. Dissatisfied customers are able to talk about their bad experience, which can affect the attitude of other customers. A dissatisfied customer means a loss of revenue, a loss of missed opportunity and a loss of customers in the end. Therefore, companies use a variety of methods for determining the deficiencies of products and services and, thereby, they increase customer satisfaction. The mystery shopper survey and the direct measurement methods are essential tools in order to obtain the reference service and performance target defined within the management system. Service quality is the decisive factor that service companies can use to difference and obtain competitive advantage.

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