# THE QUALITY STANDARDS IN SUBURBAN BUS TRANSPORT AND THEIR MEANING

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*Summary: The article deals with the possibilities of standardizing the quality level of public passenger transport. The procedures respect the legislative requirements which are valid in the Slovak Republic. Quality requirements in other countries can help as an inspiration for settings of standard. The article deals the possibilities of settings the standard with help of integrated transport systems too.*

*Key words: Quality, Norm, Standard, Passenger transport, Services*

## INTRODUCTION

The service quality is most often mentioned with the customers' expectations and customers' satisfaction. Therefore it is very subjective factor and factor that significantly affects passengers' demand. Therefore there is necessary to deal with passengers' requirements on service quality. Passenger view is not the only condition but it is certainly very important. The company has to deal with political, technical, financial and other restrictions.

## 1. LEGISLATION RELATED TO SERVICE QUALITY

### 1.1 Valid legislation in Slovak Republic

First for standardization the quality level is necessary to research valid legislation related to quality because it defines its possibilities of implementing. Slovak Republic has become the one from member states of European Union on the first of May 2004. It has obligate to apply and to implement the EU law in its territory. The issue of service quality in public passenger transport in Slovakia is dealing with following legislation:

- ***Law No 56/2012 collection of Laws about road transport*** (§21 Service contract- the purpose of a service contract is to ensure to public safe, effective and quality services. In article 9 this law adds that part of this contract are the requirements for quality standards i.e. STN EN 13816 and STN EN 15140. for determined basic tariff and in adequate performance based on needs the transport serviceability of region; it is also necessary to consider the social and environmental factors and the objectives of regional development); [8]

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- ***Regulation (EC) No 1370/2007 on public passenger transport services by rail and by road*** (the purpose of this Regulation is to define how (in accordance with the rules of Community law) competent authorities may act in the field of public passenger transport to guarantee the provision of services of general interest which are among other things more numerous, safer, of a higher quality); [5]
- ***STN EN 13816*** (the purpose of this Standard is to promote a quality approach to public transport operation and focus interest on customers' needs and expectations; the quality system is described with the service quality loop that represents the assessment of provided service from passenger view and operator's view); [6]
- ***STN EN 15 140*** (the objective of this standard is provided guidelines and recommendations for measuring the quality criteria defined by standard STN EN 13816); [7]
- ***Strategy of development of public passenger transport and non-motorized transport of Slovakia 2020*** (it includes Annex A "*Strategy of development of public passenger transport in SR 2020*"). [9]

## 1.2 Legislation in abroad

Research of service quality was performed in abroad even in non-European countries. There was the effort to obtain the information about Australia and Japan but this effort failed.

**Quality requirements in European Union**

- EN 13 816
- EN 15 140
- Regulation (EC) No 1370/2007

**Quality requirements in USA**

In USA, there are no mandatory standards for measurement and evaluation of service quality. There are applied 3 Transport Cooperative Research Programs (TCRP) for the area of measurement and evaluation the service quality. These programs have recommended character and they are intended for providers of transportation services. These are:

- TCRP 88 *(A Guidebook for Developing a Transit Performance Measurement System);* [11]
- TCRP 100 (*Transit Capacity and Quality of Service);* [10]
- TCRP 47 (*A Handbook for Measuring Customer Satisfaction and Service Quality);* [12]
- Guide for passenger comfort on ships. [13]

## 1.3 Quality criteria in selected regulations

Quality criteria that are established in selected countries (they were researched above) are compared in the table 1. We want to define no one norm but to show the diversity of applying the quality criteria in different countries of world.

Table 1 – Quality criteria in selected regulations

| | STN EN 13 816 | TCRP 88 | TCRP 47 | Guide for passenger comfort on ships |
|---|---|---|---|---|
| **availability** | x | availability, capacity, service delivery, maintenance and construction, travel impact | reliability | |
| **accessibility** | x | | access | |
| **information** | x | | communication | |
| **time** | x | travel time | | |
| **customer care** | x | | understanding (knowing) the customer, responsiveness, competence, courtesy, credibility, communication | |
| **comfort** | x | service delivery | | accommodations and ambient environment (vibration, noise, indoor climate, lighting) |
| **security** | x | safety and security, maintenance and construction, travel impact | security | |
| **environmental impact** | x | travel impact | | ambient environment |
| **economic** | | x | | |
| **tangibles** | | | x | |

Source: elaborated by authors on the basis of [6, 10**,** 11, 12, 13]

*Note: the sign x means that the criterion has the same name as in the regulation. TCRP 100 is not in the table because quality criteria in this Guidebook are the same as in Handbook TCRP 47.*

In the table we can see the correlation between individual quality criteria. The individual regulations have a lot of common aspects. There is mentioned the quality criterion comfort (elements that are introduced for feeling of pleasantness and passenger´s comfort). Criteria that are in the all analyzed regulations are availability, security and environmental impact.

## 2. QUALITY STANDARD OF TRANSPORT SERVICES IN SUBURBAN BUS TRANSPORT IN SLOVAK REPUBLIC

The main objective is to define a standard of the service quality level as a requirement for public procurement in suburban bus transport. Another 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. Now, in the Slovak Republic in transport organizations and organizations of public authority this approach does not apply.

## 2.1 The analysis of quality requirements in public service contracts in SR

For the standardization and evaluation of quality requirements is important to specify these requirements in the contracts. The quality requirements are defined in the part "*Rights and obligations of operator*". Sanctions of these requirements are specified in the part "*Tariff for contractual penalties*". [15]

Public service contracts were analysed in May 2014. In public service contracts were most mentioned these criteria: security, comfort for passengers during the transport, information for passengers, identification of bus and of bus line, transport of handicapped and visually impaired people, fluency and regularity of bus, clean facilities for customers, information about change of bus line, electronic check- in system of passengers and omitting of bus links. The most of criteria are set in Žilina self-governing region ((ZA), 24 criteria), then in Banská Bystrica self-governing region ((BB), 14 criteria), in Košice self-governing region ((KE), 13 criteria), in Prešov self-governing region ((PO), 11 criteria), in Trnava self-governing region ((TT), 10 criteria), in Nitra self-governing region ((NR), 10 criteria) and at least of criteria is specified in Bratislava self-governing region ((BA), 10 criteria). In Trenčín self-governing region (TN) were not analyzed the quality criteria because this self-governing region not provided its contract. The detailed analysis of these contracts is shown below.

Table 2 – Quality criteria in public service contracts and sanctions for their nonfulfillment

| self-governing region | quality criterion | sanction |
|---|---|---|
| ZA, TT, PO, KE, BB, BA | safety, comfort, peaceful transportation (active safeguarding by staff in an accident) | to 300 € (ZA), to 6,638 € (PO,KE) |
| ZA, TT, PO, KE, BB, BA | identification of bus, information about a bus in the bus stops | to 300 € (ZA), to 6,638 € (PO,KE) |
| ZA, TT, PO, KE, BB | clean and operational facilities for customers | to 300 € (ZA), to 6,638 € (PO,KE) |
| ZA, TT, PO, KE, BB, BA | provision and disclosure of information | to 300 € (ZA), to 6,638 € (PO,KE) |
| ZA, TT, PO, KE, BB, BA | skills of staff | to 300 € (ZA), to 6,638 € (PO,KE) |
| ZA, TT, PO, KE, BA | transport of handicapped and visually impaired people | to 300 € (ZA), to 6,638 € (PO,KE) |
| ZA, TT, PO, KE, BA | bigger comfort for mother with children, old people and pregnant women | to 300 € (ZA), to 6,638 € (PO,KE) |
| ZA, TT, NR, KE, BB, BA | fluency, regularity, quality and safety of services, vehicle load factor | to 300 € (ZA) |
| ZA, TT, PO, KE, BB, BA | information about modification of timetable, street direction, change and removing of bus lines | to 300 € (ZA), to 6,638 € (PO,KE) |
| ZA, NR, KE, BB | electronic check-in system of passengers | to 300 € (ZA) |
| ZA | omitting over 6% bus lines from overall number of bus lines | the end of contract (ZA) |
| ZA, PO, NR, KE, BB | the end of public interest for services | the end of contract (ZA,PO,KE) |
| ZA, BB | use of other buses than of contracted buses | |
| ZA, BB, BA | improve the security and culture of traveling | |
| ZA, NR | buses maximum 16 years old | |

Source: elaborated by authors on the basis of [15]

Continuation of the table 2

| self-governing region | quality criterion | sanction |
|---|---|---|
| ZA, NR | early bus departure from bus stops | to 500 € (ZA,NR) |
| ZA | delay of bus over 15% from overall travelling time from not objective causes | to 500 € (ZA) |
| ZA | repeated and substantial complaints of passengers (mainly no heating in the winter, dirt, etc.) | to 500 € (ZA) |
| ZA, PO, NR, KE | omitting of bus lines (without reason) | to 1,000 € (ZA),to 6,638 € (PO,KE), to 700 € (NR) |
| ZA | repeated and essential violation of contractual commitments, mainly omitting of bus lines (more than 3% from overall number) | to 30,000 € (ZA) |
| ZA | operator does not meet of travel performance (buses do not drive) for 5 consecutive days (failure to ensure 80% bus lines) | to 300,000 € (ZA) |
| ZA, PO, KE | repeated violation of contractual commitments | the end of contract (ZA), 6,638 € - 16,596 € (PO, KE) |
| PO | other violations | to 165 € (PO, KE) |
| NR, BB | heating | 1,000 € (do not meet minimum 90% from overall half year travel performance)- NR |
| NR, KE, BB | meeting of standards EN 13 816 and EN 15 140 | |
| ZA, TT, PO, NR, KE, BB, BA | coverage area | |

Source: elaborated by authors on the basis of [15]

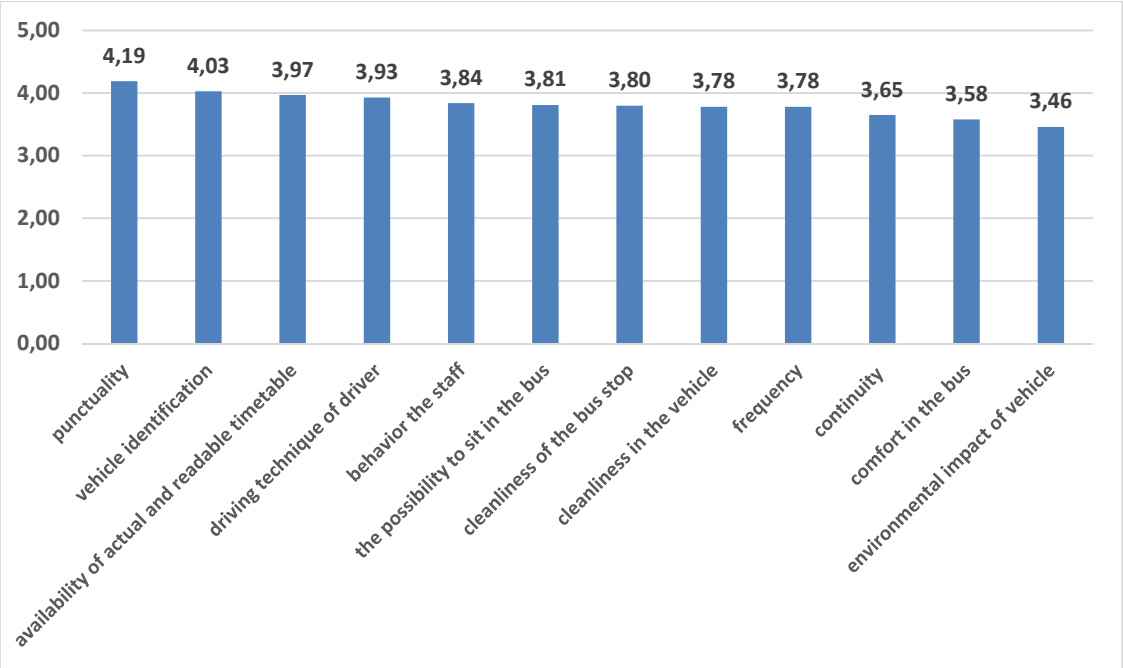
## 2.2 Analysis of the relationship between expected and perceived service quality in suburban bus transport

In the autumn of 2014 was carried out an extensive research of passenger requirements and their satisfaction with the provision of transport services (left side of service quality loop). There also were performed the objectified measurements realized by controllers in the area a provision of transport services. This part of the research, given the scale of data still under development, it is a right side the loop quality. The researches were carried out in the months October and November 2014 on a sample of 1,971 respondents. The research was realized in the region and the city of Žilina.

To identify the passenger requirements and to determine their level of satisfaction were applied standardized questionnaires for suburban bus transport. As an evaluation tool of respondents view was used the point scale with a range of 0-5 points, 0 - minimal importance, 5 - maximum importance.

### *2.2.1 Identification of passengers requirements for quality transport services*

It is an expected quality level. The indicator says about the level of customer requirements which should be on the basis of their legitimacy. This specified level should respect the opinion of the majority, i.e. have to be set the mean value. In our case, it is the weighted arithmetic average.




Source: elaborated by authors

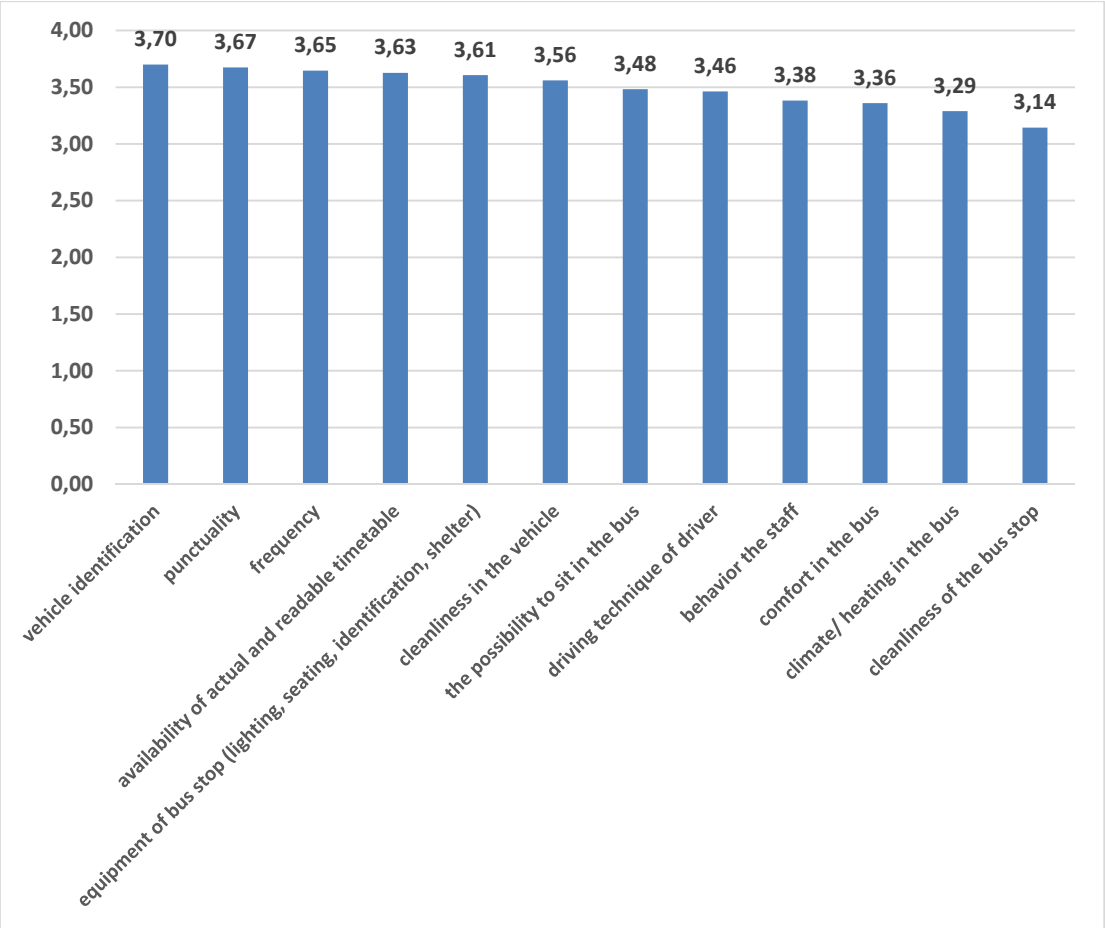
Fig.1 - Importance of selected passenger requirements (expectations) for the quality in suburban bus transport

As we can see, the most important quality criteria for passengers are punctuality, vehicle identification and availability of timetable. The least important quality criterion for passengers is impact on the environment.

### *2.2.2 Perception of the service quality level by passengers*

At the same time the survey of passenger requirements was conducted the passenger satisfaction survey with the implementation of selected quality criteria by the operators. The survey was carried out on a sample of 1,273 respondents.

Figure 2 depicts a comparison the operator´s perception level compliance of selected quality criteria by operators in suburban bus transport.




Source: elaborated by authors

Fig. 2 - Perception level compliance of selected quality criteria in suburban bus transport

As we can see, passengers are the most satisfied with vehicle identification and with cleanliness in the vehicle. The passengers are the least satisfied with air condition in the vehicle and with cleanliness at the bus stop.

### *2.2.3 Customer Satisfaction Index*

Correlation between what the customer perceives and what he expects we can express by *Customer Satisfaction Index:*

$$\text{ISZ} = \frac{\bar{x}_{VK}}{\bar{x}_{OK}} \qquad (1)$$

***Where*** $\bar{x}_{VK}$ *is the average value of quality perception by passengers and*

$\bar{x}_{OK}$ *is the average value of expected quality by passengers.*

If a value is more than 1 the level of quality perception by passenger is higher than his expectations. If a value is less than 1, there are not met the customer expectations by operator.

The equation (1) is used to calculate the degree of passenger satisfaction if there is tolerated no deviation from the mean value of the expected.

Based on the research of passengers expectations and their perceptions of the quality level has been performed the relational analysis of the results by the equation (1). The calculated values of customer satisfaction index are shown in Table 3.

Table 3 - CSI for selected quality criteria in suburban bus transport

| quality criteria | suburban bus transport |
|---|---|
| cleanliness of the bus stop | 0,83 |
| cleanliness in the vehicle | 1,01 |
| availability actual and readable timetable | 0,91 |
| frequency | 0,96 |
| the possibility to sit in the bus | 0,91 |
| vehicle identification | 1,04 |
| comfort in the bus | 0,95 |
| punctuality | 0,88 |
| behavior the staff | 0,88 |
| driving technique of driver | 0,88 |

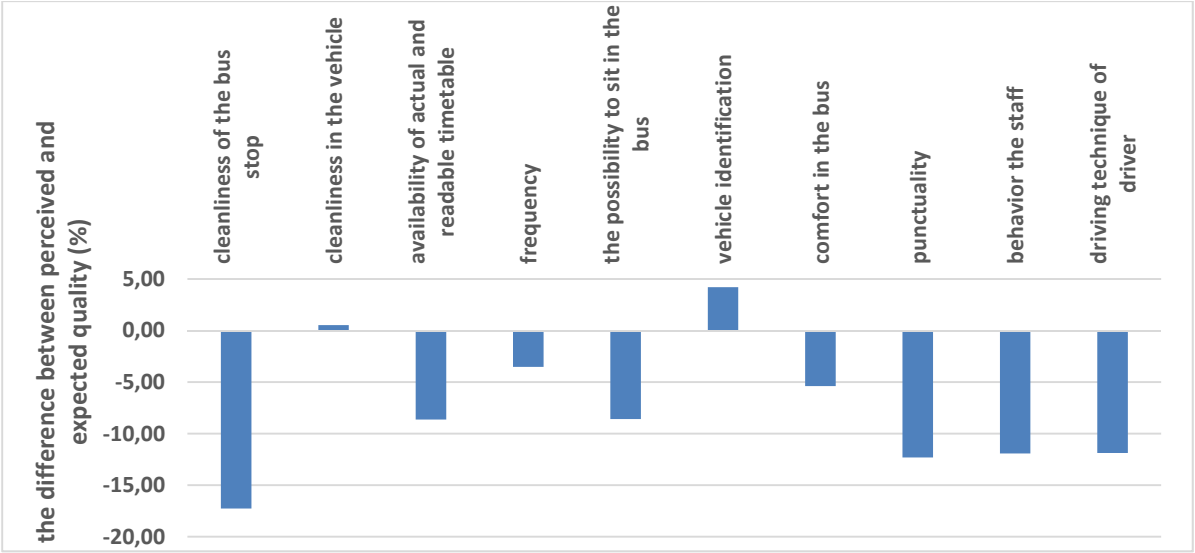
Source: elaborated by authors

*Note: The red fields represent the values where passengers have higher expectations than their actual performance by operators. Green fields represent the opposite when the fulfillment of quality criteria from operators is higher than the passenger requirement.*

As we can see the fulfillment of quality criteria by operators is higher only in 2 cases (vehicle identification, cleanliness in the bus) and even it is only closely. The level of passenger satisfaction is the lowest for quality criterion cleanliness of the bus stop.

We cannot talk about any significant higher perceived quality by customers against its specified requirements. In almost all cases we can see that customer requirements are stricter than its actual satisfaction with what he perceives and what he is given. Graph below (Fig.3) shows these described arguments.

The results of identification the passengers' requirements for quality services and of perception level compliance these services are then used to determine the target quality level from public authorities. This quality level should be part of the contractual relationship between the public authority and operator and part of measure the individual quality criteria included in the set of criteria too. This approach respects the recommendations STN EN 15140.




Source: elaborated by authors

Fig.3 – The difference between perceived and expected quality in suburban bus transport for selected quality criteria

## 3. QUALITY STANDARDIZATION OF TRANSPORT SERVICES IN INTEGRATED TRANSPORT SYSTEMS

Now, there is trend of development the integrated transport systems (ITS). Majority of passengers do not travel with a single mode of transport, but they choose different mode of transport. The passengers choose the benefits of individual transport mode. ITS in Slovak Republic is not very developed. It is in the process of planning and formulation of conceptions. There was performed the research in the Czech Republic. Because Czech Republic is very historical, political, geographical relative of country as the Slovakia. In Czech Republic are established the 13 ITS. They are following systems:

- **ITS of South-Moravian region:** transport conditions of disabled persons, mothers with children, baggage and bicycles, information in the vehicle (security systems, audio signals),
- **ITS of Tábor region:** vehicle identification, air condition in the vehicle, cleanliness in the vehicle, technical and software equipment for registration of passengers,
- **Integrated regional transport of Královéhrádecký a Pardubice region:** transport conditions of disabled persons, baggage, % share of low-floor vehicles, the use of contactless smart cards,
- **Východočeský ITS:** disabled friendly transport, transport conditions of mother with children, bicycles, the use of smart cards,
- **ITS of Moravskoslezký region:** disabled friendly transport, transport conditions of mother with children, bicycles, the principles of effectiveness, efficiency and economy of services,
- **Integrated transport of Praha:** disabled friendly transport, punctuality and driving technique of driver, uniform of driver, transport conditions of mother with children, GPS

monitoring, information and terminal system, continuity, cleanliness in the vehicle, vehicle identification, bus stop identification, quality control system,

- **Integrated transport of Plzeň:** vehicle identification, % share of low-floor vehicles, passenger handling in cash or smart cards,
- **ITS of Liberec region:** the use of smart cards, benefits for regular passengers,
- **ITS of Karlovarský region:** % share of low-floor vehicles, punctuality, electronic check-in system,
- **Integrated transport of Zlín:** transport of bicycles,,
- **ITS of Olomouc region:** signalization in the vehicle, the control of temperature in the vehicle, 5 standards of vehicle (number of doors, seats, space for disabled persons), standards of bus stops, the use of smart cards, defining the higher standard,
- **ITS of Ústecký region:** vehicle identification, uniform of driver, impact on the environment (emission classes), air condition in the vehicle, % share of low-floor vehicles. [16]

The all Czech ITS have established the quality criterion related with the age of vehicle (in Czech Republic is valid government regulation that exactly defined minimum age of vehicles and the conditions of their using).

**Transit Alliances:**

In support of building the ITS are built in several countries (for example in Austria, Switzerland, Nederland, Germany) called Transit Alliances. Characteristic of these Alliances is follows:

- exactly defined transport area;
- one timetable, one fare, one ticket, one transport conditions;
- free choice the mode of transport ;
- one face to the customer;
- regularly and recorded measuring the efficiency and service quality;
- Bonus-Malus System;
- safety and customer management (formulation of quality standards, instruments for quality control, incentives and sanctions);
- accessibility of bus stops.

## CONCLUSION

The service quality is characterized by a set of quality criteria. The aim of the carrier should be set quality standards to stabilize and support the demand. If the quality of services has to be measured and evaluated, there is a need to set the quality to contracts. It is not possible to measure and evaluate something which is not define in contracts. When the carrier is setting standards, he is influenced by legal, political, technical, financial and other constraints. The quality criteria set abroad can serve as inspiration for setting standards.

Integrated transport systems represent the future of transport. They combine advantages of several modes of transport. The service quality within ITS should have set an unified standard for all modes of transport within ITS or individual standards of quality for these modes of transport. Research has shown that integrated transport systems characterize the criteria of quality as a whole. They serve to total cover, having on mind various modes of transport of which they consist, to highlight and support the quality of provided services and finally to satisfy of passengers.

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