

comfort; regional passenger transport; methodology

**Vladislav ZITRICKÝ, Jozef GAŠPARÍK\*, Lumír PEČENÝ**

University of Zilina

Univerzitná 1, 010 26 Zilina, Slovakia

\*Corresponding author. E-mail: [jozef.gasparik@fpedas.uniza.sk](mailto:jozef.gasparik@fpedas.uniza.sk)

## THE METHODOLOGY OF RATING QUALITY STANDARDS IN THE REGIONAL PASSENGER TRANSPORT

**Summary.** Quality has a fundamental influence to the services in passenger transport. The main objective of transport is to satisfy customers' (passengers') requirements on the qualitative, flexible, fast and safe carriage of people and goods. Organisers of transport (public authority), providers of transport services and their customers have a different view on the perception of quality. This fact is influenced by unsystematic assessment to the quality measurement as well as by ignorance of the interaction of the transportation the peoples with the transport system.

The paper is focussed on the quality evaluation of performance in regional passenger rail transport in relation to other modes of public transport. Hereby it is necessary to research the perception of quality services as well its value for the client (passenger) as well to on scientific approach. In this point of the technological process of transport, the main bearer of the quality of transport services are the vehicles and the transport infrastructure. Consequently it is needed to set a permanent process of quality evaluation of the provided transport services. The paper is based on the premise that the customer interests present the public ordering body (authority) of the public transportation services.

## METHODIK FÜR DIE BEWERTUNG VON QUALITÄTSSTANDARDS IN DEN REGIONALEN PERSONENVERKEHR

**Zusammenfassung.** Die Qualität hat einen wesentlichen Einfluss auf die Dienstleistungen im Personenverkehr. Das Hauptziel der ÖPNV ist, die Anforderungen der Kunden an die qualitative, flexible, schnelle und sichere Beförderung zu befriedigen. Die Organisatoren des Verkehrs (die Verkehrsverbunden), Anbieter von Verkehrsdienstleistungen und deren Kunden haben einen anderen Blick auf die Wahrnehmung der Qualität. Diese Tatsache wird durch eine unsystematische Messung der Servicequalität sowie durch der Interaktion des Personenverkehr mit dem Transportsystem beeinflusst.

Dieser Beitrag ist an die Schienenpersonenverkehr im Bezug auf andere Arten des öffentlichen Verkehrs gezielt. Hierbei ist es erforderlich, die Wahrnehmung der Qualität der Dienstleistungen als auch seinen Wert für den Kunden auf wissenschaftlichen Ansatz zu erforschen. In diesem Punkt des technologischen Prozess der Transport, die Hauptträger der Qualität der Verkehrsleistungen sind die Fahrzeuge und die Verkehrsinfrastruktur. Folglich ist es notwendig, einen permanenten Prozess der Bewertung der Qualität der angebotenen Verkehrsdienste festlegen. Der Beitrag basiert auf der Prämisse, dass die Interessen der Kunden die öffentliche Organisator der Verkehrssystem repräsentiert.

## 1. INTRODUCTION

The task of quality standards for services in the regional rail passenger transport is intended to establish a uniform level of provided services, while drawing inspiration from EN 13816 [8]. The quality standards have to be set according to the strategic needs of passengers, so that they can be set as a basis of a contract with a customer to a minimum uniform level of quality of service provided. Measuring and evaluating the quality of services in regional passenger rail transport also needs to be compared in relation to other modes of public transport. It is necessary to know the perception of the quality and value of provided services for the customer (passenger) and set its functioning with a permanent process of evaluation provided services. Important is the view on the quality of provided services in passenger transport according to the subject under the transport market. The role of public authorities is regulation given the impact of the transport process on the society and environment. The main aim of clients of public services is established on a mutually intertwined, customer quality and sufficiently simple comprehensive public transport system while minimising financial claims. The intention of the public passenger transport is to build a competitive system in the face of motorised individual transport. On the support of these aims it is necessary to establish a new methodology on the definition of quality requirements in the regional rail passenger transport. Currently there does not exist an obligatory methodology.

## 2. TASKS OF REGIONAL RAIL TRANSPORT

From the knowledge of the current state of the regional rail transport in the European Union and the definition of legal documents of the European Commission in the quality services area we can define the regional rail transport. The main goal of the definition of regional rail transport is its specification.

We define these following assumptions:

- The role of regional transport is to fulfil the transport needs of people in the region, which is defined by geographic, demographic and economic realities.
- Limitation of regional transport by borders of self-governing regions; these borders fragment the transport service.
- Regional trains are operated within the borders of the self-governing region only (starting and final station of train is located in the same region). This fact is advantageous in terms of financing the regional transport.
- Regional transport system must be a part of integrated transport systems as well of cross-border transport relationships.

Regional transport is defined in the Directive 2012/34/EU [10], as: ‘urban and suburban services means transport services whose principal purpose is to meet the transport needs of an urban centre or conurbation, including a cross-border conurbation, together with transport needs between such a centre or conurbation and surrounding areas’.

We propose a new definition of regional passenger rail transport:

Regional rail passenger transport provides transport services between a sub-region of urban centres within the natural, demographic and geographically bounded areas with exact transport relations, and in some cases may also act on cross-border transport.

Regional rail transport is realised by the regional trains. For regional trains is considered local train or regional express train (or related kind of train). These trains ensure regional transport needs.

This new definition can support the rational planning of transport services considering transport relationships in a region, setting up new transport integrated systems and better financing of the transport service [7].

In parallel, defining the regional transport should be defined as a suburban transport. We can accept the definition from directive 2012/34/EU as above. Organisation of a suburban transport may be a part of a regional transport.

### 3. QUALITY OF REGIONAL PASSENGER RAIL TRANSPORT

A basic element of transport service is movement of rolling stock from the start point (boarding station of passenger) to the end station (get off station of passenger). In this case of technological processes, the rolling stock in interaction with the infrastructure is the main holder of the quality of transport services [6]. From the perspective of rolling stock both the operational-technical and transport-technical characteristics are important. From the perspective of infrastructure its operating conditions and contribution (capacity, bottleneck congestions and incidents) are necessary.

Currently in EU, for public passenger transport two standards for quality are used: EN 13816 and EN 15140 [9]. The purpose of these standards is to support the qualitative approach to the operation of public transport by carriers [3]:

- sharpen stakeholders' focus on matters to be considered,
- relevant and evidence-based decisions, particularly with regard to responsibilities,
- enable the comparison of the quality of service requirements by customers with alternative suppliers.

The standard EN 13816 specifies the requirements for defining the goal and measuring quality of services in the public passenger transport. It is based on the principle of quality service. The general principles are shown in Fig. 1.

The relationship between four different views on the quality of services in the public passenger transport is important. Neglecting differences between relationships can defend the provider to know the parity between the quality of services provided (as perceived by the service provider) and the expected quality of service (as perceived by the customer-service users).

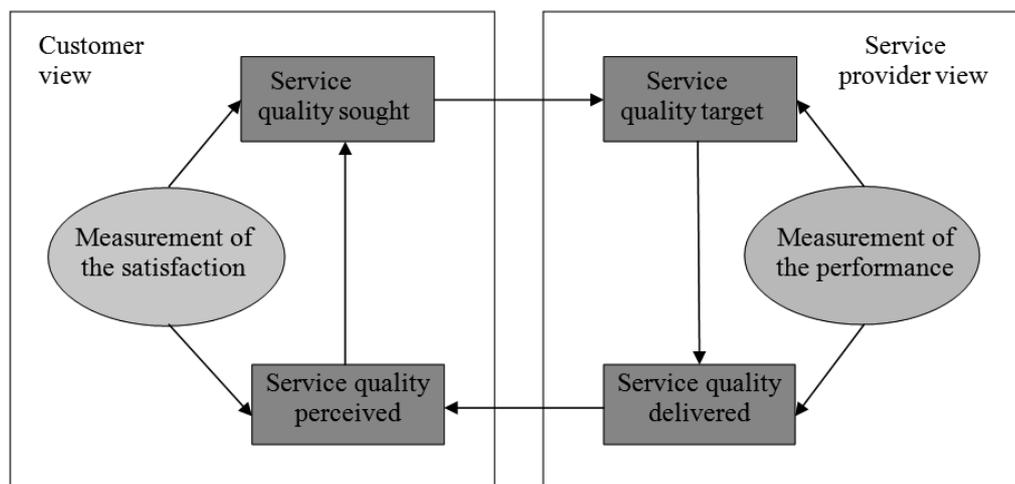


Fig. 1. Service quality loop according to EN 13816

Abb. 1. Servicequalitätskreis nach EN 13816

The quality of service can thus be divided into the following levels [2]:

- Service quality sought – explicitly or implicitly required by customers. Level of quality can be defined as the sum of the number of favourable quality criteria. The relative severity of the above criteria can be considered by the qualitative analysis.
- Service quality target – level of quality seeks to provide service provider.
- Service quality delivered – level of services achieved in the daily praxis. Offered quality of service is measuring by customer view. In measuring we can use statistical and observational methods (direct measuring of performance).

- Service quality perceived – level of quality perceived by customers. The perception of the quality of delivered services depends on the customers' personal experiences with the service or ancillary services and the information about service.

The difference between 'expected quality of service' and 'perceived quality of service' can be regarded as the degree of customer satisfaction. The difference between 'expected quality of service' and 'target quality of services' expresses the degree of fulfilment of the customer requirements by the provider of service. The difference between 'target quality of services' and 'provide quality services' expresses the degree of effectiveness of the service provider towards the objectives set [1].

Using the principles of quality loop system for any quality control programme means [11]:

- Defining and establishing detailed and anticipated customer expectations.
- Specifying a viable and deliverable service, taking these expectations into account (for instance specifying a reference service, a level of achievement and a threshold of unacceptable performance), and, if appropriate, letting customers know about it.
- Producing a service that complies with the specifications (including measurement of performance and corrective action).
- Communicating the results to the customers where appropriate.
- Measuring customer satisfaction.
- Analysing the results and taking appropriate corrective action.

The quality criterion represents the customer view on the provided service. The EN 13816 divided this criterion into eight categories:

- *Availability* – extent of the service offered in terms of geography, time, frequency and transport mode
- *Accessibility* – access to the public passenger transport system including interface with other transport modes
- *Information* – systematic provision of knowledge about a public passenger transport system to assist the planning and execution of journeys
- *Time* – aspects of time relevant to the planning and execution of journeys
- *Customer care* – service elements introduced to effect the closest practicable match between the standard service and the requirements of any individual customer
- *Comfort* – service elements introduced for the purpose of making public passenger transport journeys relaxing and pleasurable
- *Security* – sense of personal protection experienced by customers, derived from the actual measures implemented and from activity designed to ensure that customers are aware of those measures
- *Environmental impact* – effect on the environment resulting from the provision of public passenger transport

Annex C of standard EN 13186 contains some methods for performance and satisfaction measurement in common use in public passenger transport. These include particularly:

- For satisfaction measurements: Customer Satisfaction Surveys (CSS)
- For performance measurements: Mystery Shopping Surveys (MSS) and 'Direct Performance' Measures (DPM).

Criteria of satisfaction and performance measurements are contained in Table 1.

Standard EN 15140 'Public passenger transport' specifies the basic requirements and recommendations on the measurements of system of quality, which are applied in Standard EN 13186. These requirements and recommendations apply for measurement by strangers as well as providers of service.

Table 1

## Some examples of satisfaction and performance measures

Criteria	Measures of Satisfaction	Measures of Performance
Availability	CSS – access to modes Suitable to meet customers' need	Targeted performance: Availability appropriate modes in all areas Quantification of performance: % of people having access to each mode within defined criteria % of people having access to a mode suitable for their needs within defined criteria % of customers living within a specific distance of a B/A point
Operation	CSS – frequency	Targeted performance: Minimum frequency of service Quantification of performance: % achievement if minimum of frequency
Dependability	CSS – confidence in network	Targeted performance: Network that instils confidence in users Quantification of performance: % of delay of all connections

Standard EN 15140 includes the following definitions:

- Continuous measurement – data collection, carried out throughout the year
- Grid – table, which is used for data collection and assessment of different items of quality criteria
- Indicator – a quantitative indication of the quality criteria resulting from the measurement process
- Item – measured component of a comprehensive quality criteria
- Measuring process – a set of operations to determine the value of the measured quality criteria
- Quality criterion – see the perspective of the customer of the service provided.

Each criterion to be measured must refer to a list of eight categories listed in the standard EN 13816.

The basic principle of quality policy of services in regional passenger transport is to satisfy the customer's requirements, also focusing on compliance with the established quality standards. The role of the order body of the transport services is to ensure optimal transport accessibility of regions with the effective use of resources and to implement the principles of transport policy. The task of the coordinator is to fulfil the requirements of standard EN ISO 9001:2009 and EN 13816. Based on the above, the coordinator shall establish and maintain a quality management system. Next it is necessary to apply the principles of improvement of all processes affecting the quality of services provided in the public passenger transport. The effective providing of quality services requires introducing control processes for any activity, which affects the fulfilment of customer requirements.

The task of the provider of the service is to ensure all activities associated with the provision of transport services in the appropriate quality to meet all established standards of service quality. The carrier (i.e. railway undertaking) must ensure the safe, convenient, fast and affordable transport for the passenger (customer) at a maximum fulfilment of their requirements. The carrier must provide the services for passengers in accordance with approved quality standards at the European level in order to retain existing customers and potentially increase the demand for transport services [5]. The carrier must also ensure the high quality standard of its staff and technical resources. The most valuable assets of the company are the professional qualifications and skill of staff. For this reason it is necessary to monitor constantly the increasing proficiency as well as career development of employees and in relation to the fulfilment of defined quality criteria relating to staff and their approach to customers.

#### 4. SOME ASPECTS OF STATE OF ART IN REGIONAL TRANSPORT

In the provision of services in the regional rail passenger transport is more preferred a qualitative view of their ordering and financing. The quality of service is more often monitored and evaluated systematically. This leads to enhance the quality of transport services. The evaluating of the level of application of quality standards in regional rail passenger transport is significantly different in the individual EU Member States what depends on the organizational structure of ordering of the train performance. Even within individual countries are in contracts with railway undertakings enshrined different standards. For this reason, there is no methodology for standardization of the level of service quality.

For example, in Slovakia, the order body of regional rail passenger transport is the Ministry of Transport, while in the bus sector is the order body the region. The public transport modes are not coordinated, what results in a high proportion of parallel running the train and bus services as well inefficient spending of public funds. The problems are fleet renewal, relatively low travel speed, poor connections between trains and buses. Currently is there no such competition in order to contractor services (railway undertaking) select by public procurement from number of bidders. Therefore, in accordance with Regulation (EC) No. 1370/2007 for public rail and road transport is the railway transport provided by direct appointment. The ordered amount of transport services is evaluated by determining the average price per train kilometre for all trains without distinction of long-distance trains and regional services, irrespective of the composition of the train sets or traction. In Slovakia do not work any developed integrated transport systems with the role of coordinator as intermediaries between the customer and the railway undertaking. In terms of quality there are incorporated into the transportation rules the minimum requirements of the quality standards and the provisions of EU directives only. In Slovakia, there is problem of variability treaty to establishing the quality criteria for the national and for the private rail undertaking. The majority railway operator Zeleznicna spolocnost Slovensko Inc. realizes transport on the basis of the direct award contract for a period of nine years (2011-2020). The contract laid down certain quality in the area of connectivity, reliability, degree of accuracy, the behaviour of staff to customers, providing information to customers, ticketing, passenger transport safety, temperature and lighting indoor, comfort and recognition the travel documents. One regional line is operated by private company RegioJet Inc. under contract with the direct award to nine years. Contract is reflected similar requirements as a national railway undertaking, but the quality standards are defined at a different level. One of the criteria is the delay that is assessed at the destination only. The train, which is delayed to 5 minutes, is considered as on time, the train that is delayed by 6 minutes or more is considered as a delayed.

In other EU member states it occurred more progress in economic terms to the quality standards already by establishing the process of tendering for the provision of regional rail passenger transport. Similarly is very important the establishing of the coordinator of integrated transport system that is also responsible for the quality of provided services.

Coordination is ensured by the creation of integrated transport systems, for example in Germany, Austria or the Czech Republic. The coordinator accepts the principle that regional rail passenger transport is an supporting system of public passenger transport. The task of coordinator is to distribute the services according to the tender so that a uniform transport system with different types of transport modes meets the quality standards of services. The coordinator monitors and evaluates the specified quality standards regularly. In the case the operator do not meet the level of quality, the coordinator is entitled to grant the railway undertaking contractual sanctions or even above-average performance bonus for quality standards.

In Germany, the example of developed integrated transport system is region of Bavaria. The coordinator body is company BEG (Bayerische Eisenbahngesellschaft mbH). The main project was introduction of so-called "Bayern-Takt", that offers a hourly connections to the whole region of Bavaria. In frame of the liberalization of rail market are selected the railway undertakings on the basis of tenders. That fact succeeds the undertaking that offers the best price and quality of services. The main criteria are punctuality, comfort, cleanliness, services and information for passengers. The BEG assign in their contracts certain minimum standards such as the minimum number of seats or a

minimum number of train crew. Furthermore, it is already the job of railway undertaking, how he reach out to their potential customers [4]. The focus is on that railway undertaking acted in the interest of the passenger as a customer and a quality of service. For this reason, the BEG concludes with the railway undertakings so called "netto contracts" where the incomes remains to the undertakings. The sales risk is entirely on the side of the railway undertaking. This is motivation to reach as many customers as possible. Currently, the ten-year concept called "Regionalzug Ostbayern" was started. Impact of the competition on prices is quite evident, undertakings compete by offering their services cheaper and better quality compared to services that are entered directly. This may occur more effective train ordering or improve the service quality or the acquisition of new vehicles. The BEG also performs the quality inspection, using several tools. For example the accuracy of the trains is examined in the 80 measuring stations regularly. Also there is used "mystery shopping" too, where the functional equipment, passenger information, service and cleanliness is inspected. In case of irregularities the BEG examines together with the railway undertaking causes for this situation and calls for correction. Subsequently, the sanctioning follows.

## 5. THE DETERMINATION OF QUALITY EVALUATION CRITERIA

The evaluation criteria are factors of quality, which will be verified by using a questionnaire survey among users of transport services. The criteria could be set:

- Based on interviews with transport specialists.
- Based on the preliminary survey.

Selection of appropriate criteria of quality is a demanding and constantly repeating process, because we take into consideration meeting customer needs. This process is especially complicated in the regional rail transport.

For determination and selection of evaluation criterion of quality provided services in regional rail passenger transport, the preliminary survey was used. Hereby were used some direct measurable criteria of quality obtained during questioning of the customers (passengers) in the marketing survey and during conversation with transport specialists.

A preliminary survey realised by the authors shows the main criteria, which are most important for customers (passengers):

*Price* – the level of price influences the demand of services in the public passenger transport. Price is depending on the distance that the passenger passes by the public passenger transport.

*Time* – the time of transfer from the start to end point and transportation speed is an important factor of the demand side.

*Safety* – the level of safety depends on the number of incidents in monitoring period and number of crimes, occurring during the transport process (or short time after its end).

*Dependability* – keep the timetable, guarantee the accuracy of connections.

*Information* – quality information about connections, about possibilities of the transfers between connections, actual information about delays.

*Comfort* – the level of comfort depends on the technical characteristic of rolling stock, possibility of relaxing during the travel.

*Traceability* – the temporal and spatial continuity of the connections in rail passenger transport or in other transport modes.

*Additional services* – services that may not be provided directly while driving the vehicle.

## 6. PRINCIPLES OF QUALITY ASSESSMENT BY A TRANSPORT SURVEY

To achieve the goal - finding quality of services provided by the customer side - the implementation of the questionnaire survey should contain:

- establish frequency questionnaire survey;

- appropriate selection of respondents – that means to determine the appropriate size of the respondents group according to the region largeness, number of operating trains, including pattern of all lines (in selected trains at peak times and in the saddle)
- set the questionnaire focussed to the quality criterion defined in the preliminary survey
- set the scale of measurement for customer evaluation of request fulfilment

The first step in the customer survey is to identify the criteria that are most important for the passenger. These criteria are evaluated at first. After realisation this first step it is possible to evaluate others' criteria.

The customer's attitudes can be influenced by various factors, for example the level of the quality of services of competitors. Therefore using the customer satisfaction measurement is necessary for setting goals in comparison with the direct performance measurement.

Customer surveys should be performed periodically so the quality of provided services meets the needs and priorities of users of transport services. Also the process of quality measurement is continuous.

Satisfaction of the customer with transport services depends on his/her subjective skills. Based on these skills the customer realises the demand for services in transport. Therefore the provider of the public transport must continuously find out the customer's requirements. Also it is necessary to find out the realistically perceived level of quality services. These factors are found by measurement surveys and based on results, the provider can take corrective actions. After taking such actions, the level of service quality may be closer to the real quality of services.

## **7. PROPOSAL OF THE METHODOLOGY OF EVALUATING STANDARDS OF QUALITY SERVICE**

The proposed methodology is based on the premise to provide the maximum value for customers. Realisation of transport services is the responsibility of the carrier. Ensuring transport service is public service that must satisfy the transport needs of the population in the region. Passenger requirements on their behalf define a subject, which ordered the transport performance. In the proposed methodology the level of provided services in regional passenger transport that are ordered by transport body (state or region) is rated. This body is responsible for evaluating customer requirements and coordinating transport performances.

The methodology integrates the solution for evaluation of quality standards in regional passenger rail transport on three levels [7]:

- relationship between order body of transport services and carrier
- relationship between order body of transport services and customer (passenger)
- relationship between order body of transport services and infrastructure manager

These relationships must be evaluated separately. For drawing up overall evaluation of quality standards in the regional rail passenger transport a flowchart was designed – see Fig. 1. As the first step to create the flowchart it was necessary to define the core of the process. The next step was to define the roles of the process.

### **7.1. Evaluating services of rail carriers**

Evaluation of service of carriers is based on quality standards setting and subsequent evaluation of their fulfilment.

*Selection criteria of quality* – search for measurable quality criteria, which will be part of the contractual obligation of the carrier in providing the ordered transport services. They are oriented on transport processes especially.

*Incorporation of quality criteria in the contract for the provision of transport services* – implementation of the defined quality standard that is measurable in the contract. Defining the standard must be accurate and must contain defined penalties. This activity includes the overall concept of the contractual relationship between the order body and carrier. It comes to the entire agreement and all its terms.

*Periodical control of fulfilment of the quality criteria, which are incorporated into the contract* – submitter checks at regular intervals compliance with the agreed quality standard. Usually physical checks shall be made in the form of ‘mystery shopping’ staff of submitter. The carrier has to tolerate control, which is also enshrined in the contract. The carrier has duties of making traffic statistics, mainly statistics of selling travel tickets, passenger flows and the number of cancelled trains and compliance of timetable.

*Level of services meets the requirements of the order body* – on the basis of audit the order body assess whether the level of provided service correspond to the contracted requirements. In case the submitter finds out failure to comply with the defined quality standards, the submitter can impose the carrier sanctions.

*Order body dissatisfaction* – identified deficiencies can be sanctioned – order body (submitter) shall examine whether it is possible to penalise the unfulfilled quality standards. Deficiencies can be found to control the order body or from the realised quality assessment based on customer surveys.

*Impose sanctions on carriers under the contract* – submitter imposes sanctions based on identified deficiencies that can be sanctioned under the contract.

*Request for correction of deficiencies* – when it is impossible to penalise identified deficiencies, order body invites carrier for remedial action to restore quality standards of provided services.

*Extraordinary control of fulfilment of contractual criteria* – order body shall realise random controls that are oriented on the quality standards provided by railway undertaking.

## **7.2. Evaluation of passenger satisfaction**

Evaluation of passenger satisfaction with provided transport services is based on the realisation of the regular traffic survey, which also includes quality assessment. This process implements the proposed steps according to the proposed methodology for measuring of provided quality services. The proposed methodology for examining the quality of the customer and determines the value of the transport service perceived by transport users.

*Selection for criteria of quality* – search for measurable criteria of quality, which is part of the quality assessment of transport services. It is the most important step that allows evaluator to get perception of service quality and to determine customer expectations. It is realised by the survey.

*Selection of the method quality assessment* – choice of objective assessment methods (Saaty's method, benchmarking etc.). From these methods we can obtain concrete and objective results.

*Set the importance of weights of criteria* – setting the weights for proposed criteria by the chosen approach.

*Evaluating the measurement of quality provided services* – it is necessary to put the accent on the methodically correct procedure when we evaluate the measurement of the quality provided services.

*Level of services meets the requirements of the customer* – there is assessed the perceived satisfaction and maximum value of customer satisfaction. Hereby is often used approach of multi-criteria analysis. In case the quality level of provided services meets the customer's perspective, then a comprehensive assessment is processed. In case a customer is not satisfied with quality level of provided services, there is a need to check the finding dissatisfaction according to the concluded contract. Then the carrier must make remedies for improved standards of quality.

*Identified deficiencies are incorporated in the contract with the carrier* – after finding that the customers are dissatisfied with the criteria of quality standards the procedure continues as in the case of the previous step. There are searching for possibilities how to penalise this deficiencies.

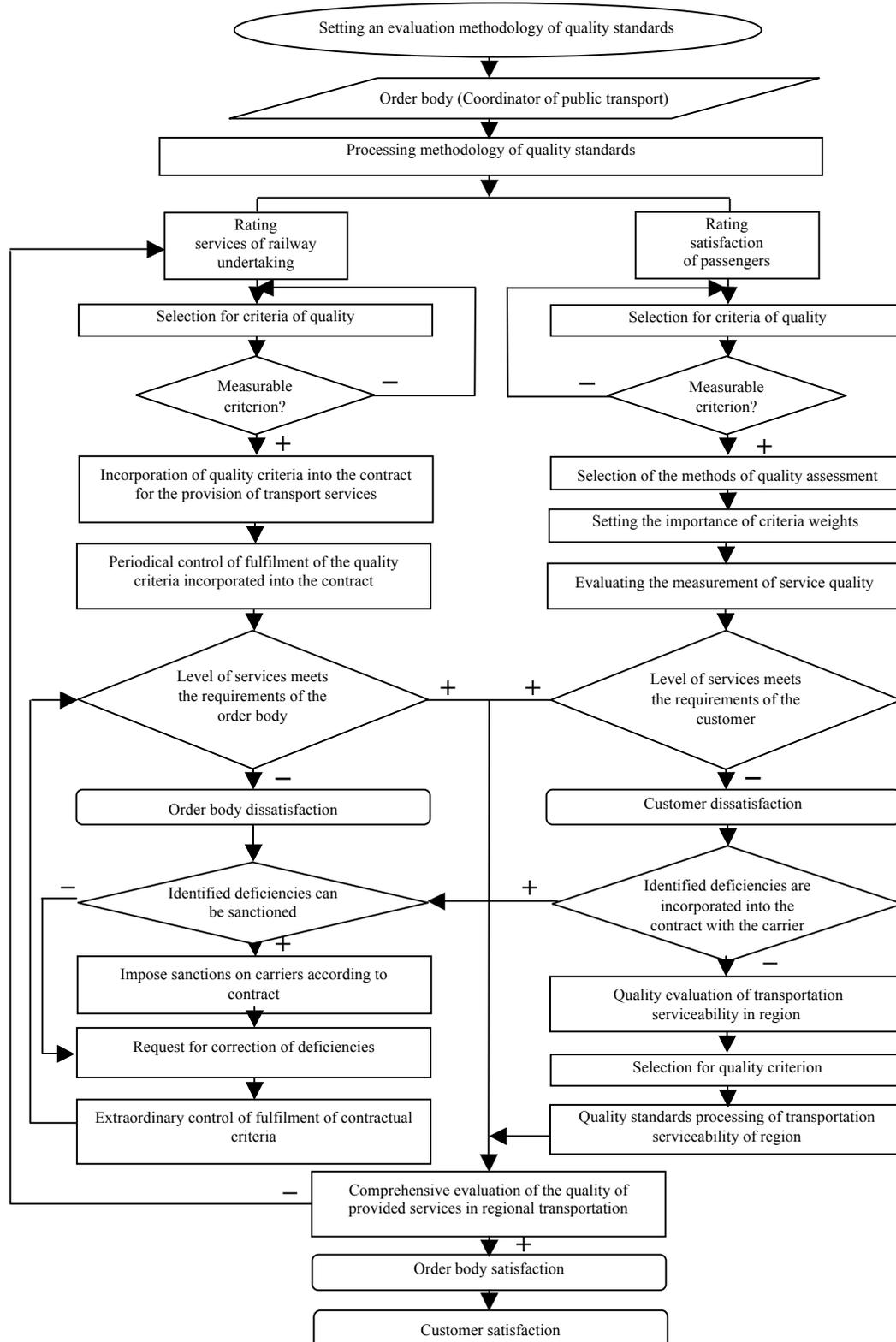


Fig. 2. Methodology of quality standards in regional passenger transport  
 Abb. 2. Methodik der Qualitätsstandards im regionalen Personenverkehr

*Quality evaluation of transportation serviceability in region* – the task of this activity is quality evaluation of rail transport and its impact to transportation serviceability assessment of the region. It is an activity of the order body who responds to the transport needs of the population. The transport needs of the population come up from order body's surveys and also from customer transport surveys.

*Selection for quality criterion* – the task of this activity is to set the quality criterion of rail transportation serviceability in the selected region. Selection comes out from previous activities and from basis assessment results. There are selected a relevant quality standards which are measurable.

*Quality standards processing of transportation serviceability of region* – the task of this activity is a concretisation of a detailed elaboration of quality standards processing in regional transport.

## **8. THE PROPOSAL STANDARDS OF QUALITY IN THE REGIONAL PASSENGER RAIL TRANSPORT**

The proposal standards of quality are part of the proposed methodology for rating standards of quality in the regional passenger rail transport. Indicators are particular specifications of measurements criteria of quality in the regional rail transport.

On the basis of the proposal indicators a range of measurements and quality measurements of provided services can be set up. Detected results eliminate risk of undesirable situations and help to increase quality of public passenger rail transport. Distribution indicators of quality in relationship to railway undertaking and infrastructure manager are shown in Fig. 3.

Standards of quality in the regional passenger rail transport aim to establish a uniform level of quality of services provided. They are designed according to the standards EN 13816. The proposed standards allow to monitor, to evaluate and to compare each criterion of services. Therefore it is needed to see the criterion as systemic and comprehensive. The standards are needed to be updated once a year, after the consultation between all interested subjects.

Implementation of quality standards of transport services according to the contract between coordinator and provider of transport service (carrier) obliges the subjects to measure as well as evaluate the standards. Every standard is necessary to define and set up sanctions or bonuses for level of fulfilment.

## **9. COMPREHENSIVE EVALUATION OF THE QUALITY OF PROVIDED SERVICES IN REGIONAL TRANSPORTATION**

The methodology of evaluation quality standards in the regional rail passenger transport assesses from the point of view of the order body (coordinator of transport performances) and at some time evaluates the request for the carrier and includes evaluating the measurement of quality provided services. The generalised methodology is based on successive steps. The task of this methodology is searching measurable quality criteria.

Quality standards allow monitoring, evaluating and comparing single criteria of provided services. Evaluating of quality of provided services helps to continuously improve the quality. Quality standards of the regional rail passenger transport shall be binding for all railway undertakings that provide rail passenger services. The infrastructure manager must participate in fulfilling the same standards. An update of quality standards should be implemented as a rule once a year, after consultation with all stakeholders.

Methodology for evaluating must respect requirements of the multi-criteria background, for example if customers demand from carrier fulfilment a number of quality characteristics at once.

By providing the transport service it is necessary to define service specifications, evaluation process and then regularly measure and control the process of providing services.

Part of the methods evaluation of quality must also be creating a rating scale. A rating scale gives the possibility to compare measured values and then reconsider the quality of provided services.

Task of comprehensive evaluation is the harmonised assessment quality of services from the customer's perspective as well as from the perspective submitter. Customer satisfaction is achieved if the level of quality of service provided meets the requirements of the customer and also corresponds to the required level of perceived quality from the customer's perspective. At this point we can declare that the customer (order body) is satisfied.

In the event that the quality of provided services does not satisfy the requirements of the customer, it is necessary to take corrective measures to improve quality standards. It is necessary to repeat the evaluation process of quality services on the part of the carrier.

The task of the order body as a key player in the assessment of quality standards, measuring the quality of services and controlling contract standards, is to represent the interest of customers by providing the public transport services.

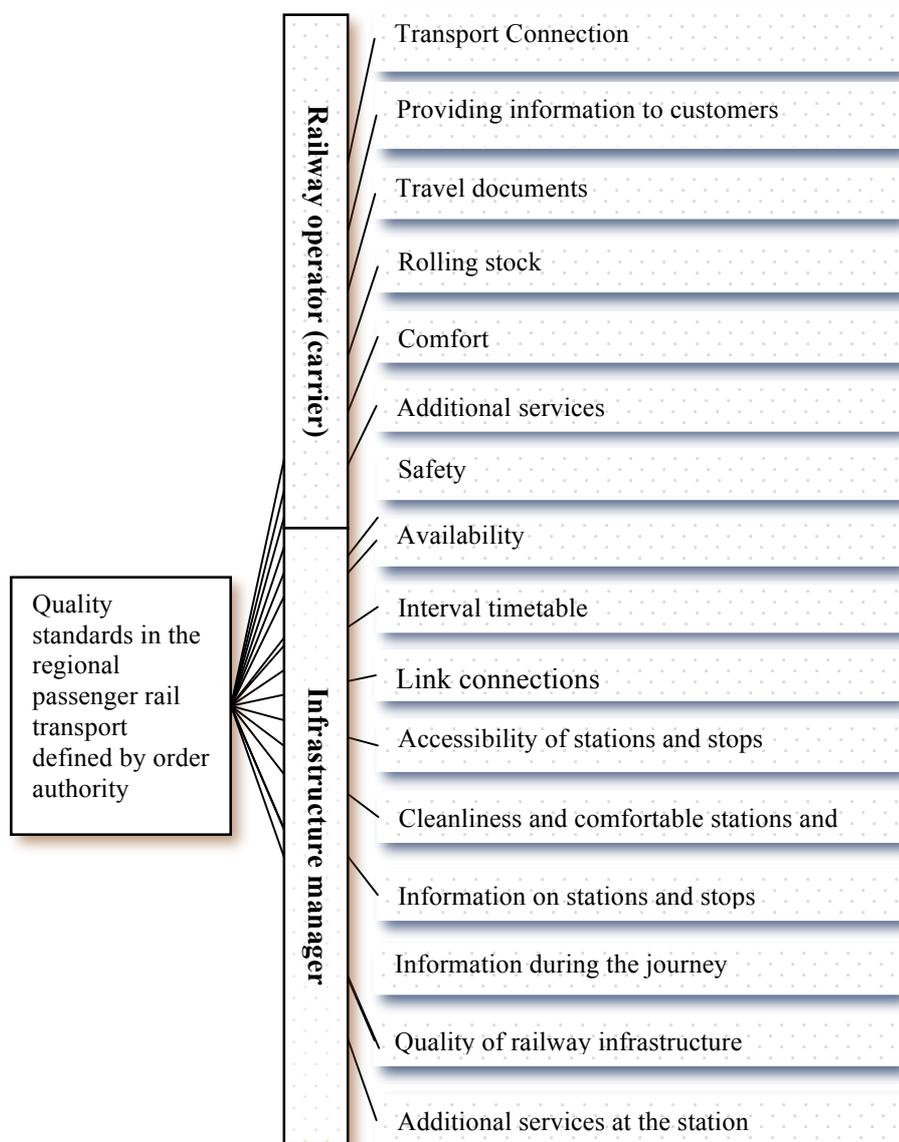


Fig. 3. The proposal of quality standards defined by order authority

Abb. 3. Der Vorschlag von Qualitätsstandards im Auftrag von Transportorganisator

## 10. CONCLUSION

At present the offer of provided services in the regional rail passenger transport is oriented on their ordering and financing only. It represents the quantitative view. Quality of provided services is not monitored and evaluated systematically. This fact causes inadequate quality level of provided services. The aim is creating a transport system with a high quality of provided services. A high quality of provided services not only fulfils the expectation of present customer, but could get new customers.

Quality standards of a regional rail passenger transport are intended for one level of quality. These standards are based on European norms – especially EN 13 816 – and respect strategic requirements of customers. Their direct applicability is possible in the submitter's contract. The introduction of quality standards to praxes should done a new subject – coordinator. The coordinator will order the transport performances in the public services. Then it is necessary to accept the new contract between the submitter, coordinator and provider of transport services (carrier).

The proposed methodology of quality assessment can be used for comparing integrated transport systems by the quality level. The methodology can be used also for evaluating provided services in the relationships between the submitter and supplier (railway undertakings, infrastructure manager). The methodology does not exactly define the role and mission of the submitter from the coordinator of an integrated transport system – it perceives their same level.

The proposal of methodology fully accepts the transport policy of EU, specifically the White Paper 2011 - Roadmap to a Single European Transport Area - Towards a Competitive and Resource Efficient Transport System, and also the quality norms and transportation operational programme in horizon 2020. These facts create a space to meet the objective of promoting the development of a public railway passenger transport by increasing its quality level.

## Announcement

This paper is supported by the VEGA Project 1/0188/13, Quality factors of integrated transport system in the effective provision of public transport services in the context of globalisation, that is solved at Faculty of Operations and Economics of Transport and Communication, University of Žilina.

## References

1. Mateides, A. *Spokojnosť zákazníka a metódy jej merania – koncepty a skúsenosti*. Bratislava: EPOS. 1999 [In Slovak: *Customer satisfaction and its measurement methods - concepts and experiences*].
2. Cyprih, O. & Konečný, V. & Kilianová, K. Short-term passenger demand forecasting using univariate time series theory. *Promet – Traffic & Transportation: Scientific Journal on Traffic and Transportation Research*. 2013. Vol. 25 (6). P. 533-541.
3. Drahotský, I. & Průša, P. Faktory ovlivňující kvalitu přepravních procesů a služeb. *Kvalita Dopravních a Přepravních Procesů a Služeb*. Pardubice: University of Pardubice. 2003. P. 38-44. [In Czech: Factors affecting the quality of transport processes and services. *Quality of Transportations Services and Processes*].
4. Benediktová, M. Konkurence na trhu regionální železniční dopravy v Bavorsku. *Konkurence na evropských železnicích – ekonomické, právní a regionální faktory*. Proceeding. Brno: Masaryk university. 2010. P. 76-84 [In Czech: Market competition of regional rail services in Bavaria. *Competition on European railways - economic, legal and regional factors*].
5. Mašek, J. & Kendra, M. Skúsenosti s poskytovaním prepravných služieb v regionálnej železničnej doprave súkromným dopravcom. *Regulated and Unregulated Competition on Rails Telč*. 7th – 8th November, 2013. Brno: Masaryk University. P. 117-129 [In Slovak: The experience with the provision of transport services in regional rail services by private carrier].

6. Průša, P. & Kampf, R. & Gottfried, M. Specifika poptávky v dopravě a zjišťování faktorů jenž ji ovlivňují. *Aktuální Problémy v Dopravě*. Pardubice: Institut Jana Pernera v Praze a Přepravní laboratoř DFJP. 2006. P. 50-53 [In Czech: Specifics of transport demand and identifying factors that affect it. *Actual Transport Problems*].
7. Pečený, L. *Štandardy kvality poskytovaných služieb v regionálnej osobnej železničnej deprave*. Doctoral thesis. Žilina: University of Žilina. 2014 [In Slovak: *Standards of quality of provided services in regional passenger rail transport*].
8. European Committee for Standardization. EN 13816:2002. *Transportation - Logistics and services - public passenger transport - Service quality definition, targeting and measurement*.
9. European Committee for Standardization. EN 15140:2006. *Public passenger transport - Basic requirements and recommendations for systems that measure delivered service quality*.
10. European Parliament and of the Council. 2012/34/EU. *Directive establishing a single European railway area*. 21 November 2012.
11. Nedeliaková, E. & Sekulová, J. & Nedeliak, I. *Railway passenger transport quality evaluation taking into account the aspects of queuing theory*. *Perner's Contacts*. Vol. 9(4), P. 139-149. Available at: [http://pernerscontacts.upce.cz/34\\_2014/Nedeliakova.pdf](http://pernerscontacts.upce.cz/34_2014/Nedeliakova.pdf).

Received 03.02.2015; accepted in revised form 26.11.2015