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Quality Management System for Railway Passenger Services: The Case of the Hellenic Railways

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Abstract

The application of a quality management system to railway passenger services is beneficial to railway service providers and to users. The contribution of the EN 13816 (Quality & Quality Management in Public Transport Services) witch is going to be applied to the Hellenic Railway Intercity Services is presented. The objective is to analyse the way the quality system has been developed for monitoring the quality of the services offered in order to achieve a continuous improvement to the services offered and to increase customers satisfaction and consequently company's revenues by increasing sales and minimizing costs. Finally, the quality criteria defined, are presented and the tools used for the measurement of quality delivered and customer satisfaction, fundamental for the operation of a quality management system.

Keywords: EN13816, quality management, railway passenger transport,

1. Introduction

The initial aim of this paper is to present the reasons for the application of a quality management system to railway passenger services, both beneficial to railway services providers and to railway users and the basic parameters considered.
A second aim is to correlate the contribution of the EN 13816 (Quality & Quality Management in Public Transport Services) to the above mentioned aim and to present the way it is applied to the Hellenic Railway Intercity Services.
The objective is to analyse the way the quality system has been developed for monitoring the quality of the services offered in order to achieve a continuous improvement to the services offered and to increase customers satisfaction and consequently company's revenues by increasing sales and minimizing costs.
In order to achieve this aim and to build up a system for monitoring the quality of the services offered, a certain methodology had to be built up, based on the customer needs and perceptions.The methodology was based on the existing bibliography, on available data from continuous market research on trains, and on the practices followed with the application of EN 13816.

2. Quality & Customer satisfaction

It is commonly accepted that a product is considered as a quality product when:

a. is consistent with certain standards
b. is consistent with the needs of the customers

Regarding services, the definition of the quality is quite difficult.
However, it is commonly accepted that customers are satisfied when they get what they want, whenever they want, wherever they want and, as they want. Customers, when they buy services have already drawn up the expected image of the service. The gap between the expected and the received service is the basic reason for the customers' dissatisfaction. In general, services should possess: Accessibility, Communication, Politeness, Reliability, Punctuality, Correspondence, Safety, Understanding. Also, services have intangible nature and it is difficult to measure the output of a service business, to specify and measure objectively the quality offered. The contact between the customer and the service provider is very likely and the customer is a participant in the service process.
Being more specific, the transport service:

- can not be stored to match fluctuations in demand
- there is no such thing as replacement of a bad product
- it is difficult to check the quality of service before the final sale
- delivery of the product cannot always be guaranteed
- usually the service can only be produced in batches as opposed to single units
- in the case of passenger transport the service is usually personalized

3. Monitoring quality

A gap between the expected and the finally attributed quality might cause serious problems. Since services are not tangible products, customers are suspicious in general, and pay particular attention to other customers' experience, and when they are satisfied, they remain loyal to the particular service. This means that a dissatisfied customer will be very concerned to use again the same service and at the same time is delivering a negative message to the potential customers. According to surveys in public passenger transport a satisfied customer informs 3 other persons about his experiences, whereas a dissatisfied customer informs 10 other persons. So, a quality control and management system is of vital importance for a company providing transport services.

Transport companies are adopting several methods in order to monitor the quality of the services offered, such as ghost or mystery shoppers, evaluating parameters, use of indicators, market research, system for monitoring complaints, etc.
The use of the indicators in a satisfaction survey is an attempt to analyze quantitatively the characteristics of the offered quality and the customers' opinion about it. The indicators offer a general view about the adoption of certain standards to the provision of services. Moreover, there is the possibility to calculate the indicators for factors such as cleanness and comfort. But, often, the evaluation of a factor that is up to personal beliefs is quite difficult. For example, the opinion of the users regarding the cleanness of a wagon can be replaced by the frequency of the times that a wagon is cleaned.

3.1 Methodology for measuring customers preferences in TRAINOSE

For the needs of this study, first of all had to be evaluated the perceptions and the interests of the passengers related to the railway trip.About 250 interviews were taken from passengers traveling by train on all the network. Initially were used 42 parameters and they are concerning:general characteristics of the railway transport , the pre-travel stage (buying ticket, information), the time passengers spend at the railway station, the time passengers spend on the train , environmental issues.
Then they were grouped in a list of 20, which finally were grouped in a list of 7 categories of parameters, mentioned in Table1.

Table 1: The categories of parameters

General parameters	Calculated parameters
Timetable punctuality	Timetable punctuality
Safety	Safety on board Safety at stations
Cleanness	Train cleanness Station cleanness General image of installations
Comfort	Temperature Accommodation comfort Wagon comfort
Customer service	Personnel behavior Personnel image Frequency Speed Quality & price of catering Access to sales points Door-to-door services Innovation in sales
Provision of information	Information before traveling Information at stations Information during the trip
Friendliness to the environment	Anti-pollution policy Noise Pollution Controlling emissions Saving energy

3.2 Carrying out the research

The research refers to 3 different passenger categories: Inter City train passengers, simple train passengers, and suburban train passengers on the route Athens-Chalkida- Athens. The passengers interviewed were traveling on the routes: Piraeus- Kyparissia- Piraeus, Athens- Bolos-Athens, Alexandroupoli- Athens, (IC trains) Piraeus - Ormenio- Piraeus (simple trains) and Athens –Chalkida- Athens (suburban trains). The interview was lasting 8 to 15 minutes, while there were some passengers who did not want to answer.Finally, 86 questionnaires were filled in: 41 on the route Athens- Thessaloniki and 45 on the route Athens- Kyparissia. 30 of them were from the A' class passengers and 56 were from B' class passengers.

Table 2: Indicator R correlating the samples of the passenger categories of OSE

R	IC Trains	Simple Trains	Suburban Trains
IC Trains		0.85	0.90
Simple Trains	0.85		0.88
Suburban Trains	0.9	0.88	

Based on the above mentioned grouping of parameters, is produced the following scaling table, giving a rate of importance from 1-10. In cases that a parameter is derived from a certain number of the initial parameters, the importance rate is the average of the initial rating.

Table 3: Rate of importance

Grouped parameters	*Importance Rate*
Cleanliness of train interior	*9.54*
Time-table punctually	*9.36*
Safety on board	*9.30*
Cleanliness of stations	*9.20*
Temperature	*9.17*
Safety at stations	*9.04*
Personnel behavior	*8.88*
Frequency of time-tables	*8.75*
Comfort & accommodation on board	*8.45*
Information at stations	*8.41*
Information during the trip	*8.40*
Easiness of buying tickets at stations	*8.39*
Quality and price of catering products	*8.38*
Trains' general look & cleanliness	*8.27*
Speed	*8.21*
Ticket price	*8.03*
Catering provision at stations	*7.80*
Personnel look	*7.71*
Easiness in buying tickets close to passengers residence	*7.65*
Other comforts	*7.57*
Information before traveling	*6.86*
Innovations in the process of buying tickets	*5.07*

So, we can see that at the top of the passengers' needs are the cleanliness parameters: trains and stations toilets and stations' waiting rooms. Next follows the travel safety, the station cleanliness (general), the train seats comfort and the safety from criminal threats at the stations. High priority has train and station staff attitude, the train frequency, the product quality at the buffet and the general stations' appearance and image. A lower rate of importance have the parameters concerning the information before the travel, the time-tables and the rates and the parameters that are about new services offered to the customers. (use of credit cards- ticket reservation through internet).

3.3 The European experience in measuring customer satisfaction

In UK, the railway infrastructure is the property of Railtrack, and the services are offered from private companies, which are the Train Operating Companies (TOCs), and also there are the companies owning the rolling stock, the Rolling Stock Companies (ROSCOs), offering the rolling stock to the TOCs, under certain fees.

Almost every year, researches are undergoing, based on questionnaires delivered to users/passengers. These questionnaires are based on the 15 quality parameters.

The Scottish Railways (Scotrail), similar to the Hellenic Railways in terms of length, number of stations, and operation, have designed a research, undergone every six months. The questionnaires have 21 questions regarding the demographic characteristics of the customers, and other 24 questions, demanding from customers to comment on the quality of the journey.

The Spanish railways, for the evaluation of the quality offered at their high speed trains, have arranged 4 levels of their research: at sales, at stations, at travel, and after sales. For these 4 stages were defined 40 indicators for the same number of parameters in questionnaires, delivered to users.

4. EN 13816 - Background

Taking into account the strongly competitive business environment, the need for developing models for evaluating the quality of the services offered and improving the quality delivered is getting day-by-day a common practice. Especially in industries and countries that this process has been regulated. So, in order to have a common understanding of quality standards, their definition, measurement, management and improvement, the European Standard EN 13816 was developed.

The objective of the EN 13816:2002 is to promote the awareness of all parties involved concerning quality and to present a tool for the assurance and management of service quality in public passenger transport services.

The EC policy on Public Passenger Transport (PPT) focuses on open markets and controlled competition, i.e. tendering of public service contracts, transparency of public fundings, exclusive rights for limited periods.

That means for PPT companies (railways, bus companies, ferry operators etc.) to ensure competitive costs levels at defined quality standards.

The EN 13816 serves as a European wide basis to assess and to certify the conformity of PPT services with this standard. It should be noted that the EN ISO 9000 refers to the quality management system and the certification of an organization, while the EN 13816 refers to the certification of a product (the PPT service) and to the management of selected, product related processes only. So both norms are two interconnected, but different sides of quality management.

Therefore many companies prefer to implement both norms or use their existing quality management system according EN ISO 9000 to expand it and to certify according to EN 13816 additionally.

The approach of the EN 13816 bases on the quality circle, i.e. the circle of planned quality, performed quality, measured quality and improved quality. Concerning its services a PPT company must

- define the quality of the services according to 8 quality criteria groups,
- manage the service processes,
- measure the quality (e.g. by direct performance measurement, customer satisfaction surveys, mystery shopper survey)
- improve the quality.

For example, in Germany the EN 13816 gains more and more importance because the PPT enterprises want to stabilize or to improve their quality, they want to have a competitive advantage in the case of tendering of PPT services by the state authorities and they want to achieve marketing effects (more satisfied customers, better image etc.)

The most important German PPT companies (German Railway, Berlin Public Transport Company, Transport Company Frankfurt, Rhenus Keolis, and other) have certified their PPT services according to EN 13816 or are on the way to do so.

5. Benefits for TRAINOSE

The benefits of the application of a quality management according to EN 13816. for TRAINOSE were considered very important for its operation, expecting to provide:

- better competitive position through clear quality standards
- better image on the market and in relation to the authorities
- identification of areas for improvements, examples could be:
  - standard: reliability, indicator: realized wagon km / planned wagon km, potential: improvement of reliability through better repair & maintenance, less reserve wagons
  - standard: information in case of irregularities, indicator: customer satisfaction degree, potential: improved customer satisfaction
  - standard: punctuality, indicator: punctual trains / all trains (e.g. min. 95%), potential: optimization of time table, satisfied customer
- higher productivity, e.g. through higher reliability and better punctuality the optimization of time tables and less reserve wagons and personal is possible higher customer satisfaction and there from less price sensitivity.

6. TRAINOSE pilot application of EN13816

TRAINOSE has decided to start with a pilot project, on the most commercial line of OSE, the high speed passenger line Athens –Thessaloniki - Athens (Inter City & Inter City Express), being easier in implementing a functioning quality management system in a limited period, to benefit from positive results quickly and to have a demonstration model for other areas.

TRAINOSE operates on this line, 8 pairs of quality trains with a fixed composition of four or five wagons and a locomotive.
The service is delivered in cooperation of several OSE directorates. The most important are, traction, train circulation, passenger transport and passenger rolling stock.

The objective of the pilot project is to implement a quality management system according to EN 13816, based on management principles, procedures and instructions which are compatible with EN ISO 9001 in order to be able to extend the management system to this standard easily.
The deliverables produced are:

- to develop and to implement quality indicators, measurement methods and a reporting concept
- the concept of the quality management system which is described in a quality manual
- the most relevant procedures necessary for the quality management (e.g. general organisation and responsibilities, time table planning, train operation, station service, train service, repair & maintenance, security, analysis and improvement actions, internal audits).

7. Quality criteria definition

The quality of public transport contains a large number of criteria which have been divided in 8 categories, very similar to the parameters identified at our research.

The quality management group, discussed extensively the expectations of the customers regarding the quality of the line, the existing quality levels and areas for potential improvement and finally were selected the sub-criteria for each category to focus on:

Table 4: Quality criteria for the line Inter City Athens- Thessaloniki

	Level 1	**Level 2**
1	Availability	1.5.Depentability
2	Accessibility	2.3.Ticketing Availability
3	Information	3.2.Travel Information/ normal conditions 3.3.Travel Information/abnormal conditions
4	Time	4.1.Length of trip time 4.2.Adherence to schedule
5	Customer care	5.3.Staff
6	Comfort	6.2.Seating and personal space 6.3.Ride comfort 6.4.Ambient Conditions
7	Security	7.1.Freedom from crime 7.2.Freedom from accident 7.3.Emergency management
8	Environmental Impact	8.1.Pollution

Based on the quality criteria selected and considering the number of passengers affected, the quality management group had to specify the performance levels to be targeted for each of the above mentioned criteria. After that were defined the expected level of achievement, the acceptable and the unacceptable practices.

At a next step, were selected the measurement methods for each criterion, the procedures for the documentation of the results and the results' evaluation process.

Table5: Examples of Performance & Satisfaction Measures for Inter City Trains on the line Athens-Thessaloniki-Athens

Criteria Level 1	Criteria Level 2	Measures of Satisfaction	Measures of Performance
1.Availability	1.5.Depentability	**Customer Satisfaction Surveys (CSS)** – Confidence in network	**Targeted Performance (TP):** Network that Instills Confidence in Users **Measurement of Performance (MP):** CSS
2.Accessibility	2.3.Ticketing Availability	**(CSS)-** Ease of Obtaining a Ticket **(CSS)-** Passenger Obtaining the Correct or Most Suitable Ticket	**(TP):** Provision of specified ticket issuing facilities within the network Provision of specified ticketing outside of network Provision of ticketing in advance of travel date **(MP): Mystery Shopping Surveys (MSS)** Performance of ticket selling service

So, at the moment, TRAINOSE is at the process of testing performance for the verification of the targeting performance and for the final definition of the expected aims of performance (%) for each criterio. Tests will take about 3 months.

After that the company will have to define the frequency of the measurements of customers' satisfaction and line's performance for the completion of TRAINOSE Quality Manual and starting the implementation of a definite quality management system.

8. Conclusion

Based on the principle that any product is considered as quality product when it is consistent with certain standards and with the needs of the customers, this paper was an attempt to group all the quality criteria which are considered important for customers and furthermore to come closer to their needs in order to define the appropriate criteria for increasing their satisfaction, and from the rail services provider point of view, how to offer high quality services.

We worked on the data provided from a detailed questionnaire for the identification of the quality criteria of railway customers, we grouped them and then we matched them to the criteria defined by the Quality Standard for Public Passenger Services, EN 13816.

Worthies to note that for Hellenic Railway users, cleanliness is the most important parameter, follows travel safety, next is comfort and the safety from criminal threats at the stations. High priority has train and station staff attitude and the general stations' facilities and comfort. A lower rate of importance have the parameters concerning the information before traveling and time-tables.

So, the quality management group, had to include railway customers' needs into the criteria measured, both for the customers' satisfaction and TRAINOSE performance. Ending up to the following level 2 quality criteria: Dependability, Ticketing Availability, Travel Information/normal conditions, Travel Information/abnormal conditions, Length of trip time, Adherence to schedule, Staff, Seating and personal space, Ride comfort, Ambient conditions, Freedom from crime, Freedom from accident, Emergency Management & Pollution.

Customer Satisfaction Surveys, Mystery Shopping Surveys and Direct Performance Measures are the tools used for the operation of this quality management system, supporting management decisions for quality services offered and quality improvement.

Concluding, it seems that the developed quality management system can meet the expected targets both for customers and railway companies. More specific for TRAINOSE, it can contribute to the overall increase of its market share, since the "word of mouth" is very important and easily achievable when the quality of services delivered is of certain, high standard. Moreover, it is expected that TRAINOSE costs will be gradually minimised in 3-4 years time by 20-25% due to the well organised day-to-day activities of the company, for the application of EN 13816 for the provision of Inter City services.

Finally, by all means, TRAINOSE is gaining a strong competitive advantage against its competitors, since customers are feeling safe and satisfied, being the centre of the commercial policy of the company.

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