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Connection of dynamic quality modeling and Total Service Management in railway transport operation

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Abstract

Improving the quality of transport services should be based on the procedure leading to the formation of future better services and define processes to ensure quality so that they comply with the requirements of the customers. The technology of transport and carriage process is one of the elements of the transport system, the quality of which can be influenced actively through the use of new advanced technology. This paper is focused on the new approach in designing the preparation of processes and services in accordance with customer´s needs. New software solution was created for the achievement of the complexity of the preparation, effective implementation and timely indication of any diversions from quality in railway transport. The principles of the dynamic quality modeling and total service management were used as an important support for new software in railway transport operation.

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Keywords: Dynamic models; Total Service Management; process-oriented management; quality.

1. Introduction

In today's competitive and cost-conscious environment, it is necessary to ensure the top-notch services in railway transport and maintain an advantageous position on transportation market. Total Service Management represents a specific sequence of steps to streamline a performance and improve service quality in transport [1]. In recent time, there has been a surge of interest in all aspects of service management, therefore growing attention paid to service

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quality and customer satisfaction had stirred managers of many service organizations into action [2]. This new approach helps managers to depth understand of the complexities of services and simultaneously assure the highest service level. The transportation process consists of individual sub-processes according which the carrier provides transport services for customers. Future focus of each transport company should be not only focused on growing its profits, but also providing better services for passengers with favorable traveling experiences.

Fig. 1. Service quality of the transportation process

The most productive organization is the right one, in which everyone knows what to do, how to do it, everyone does what has to do and makes it good and efficiently and when it is needed [1]. The functional service system with a continuous improvement and reinforcing service quality largely depends on optimizing the workplace. A service company can only be as good as its people. In order to satisfy its customer well, transport companies also have to understand the needs and expectations of their employees [3]. If the employees themselves are not sufficiently motivated to achieve the objectives of the organization, their successful fulfillment will never be achieved [4]. The success and effectiveness of service provision can be accomplish on the basis of a system which alone can guarantee a full cooperation of all concerned organizational units, involved in providing services [5]. The actual change in business performance, depends on how we can convey the information of the process characteristics and the required competencies to people. It is necessary to take into account a connectivity, thus linking the processes with the surroundings through the input and output and also to ensure information flows between these elements [6]. The quality of services depends on various criteria such as information, time, safety, availability, accessibility, delay, customer care, territorial planning, geographical conditions, and speed of transport. Additional and very important dimensions of services from the perspective of first contact employees (frontline employees) are courtesy, willingness which are also reflected by a cheerful greeting and pleasing of each passenger. However, it is individual and depends on different attitude to each passenger, the satisfaction with providing service performance is miscellaneous.

2. Software solution using innovative graphical representations

Improving the quality has significant potential in information technologies, through which we can exercise control, management and implementation of various measures in operation [7]. Department of railway transport in cooperation

with Slovak state and foreign railway companies created a software solution which allowed the user to model the development of transportation for any train on the network for normal as well as extraordinary operation. Whereby a user can define quality criteria that are crucial for that transport.

The software application, see Fig. 2, has been created with regard to easy possibilities for modeling, ease of portability of information, speed and transparency in use.

In the future, users can extend the functionality of application as follows:

- implementation of the Android / iOS,
- implementation of the web to improve accessibility,
- obtaining real-time data from railway transport carriers and infrastructure managers for preserving always current data [8].

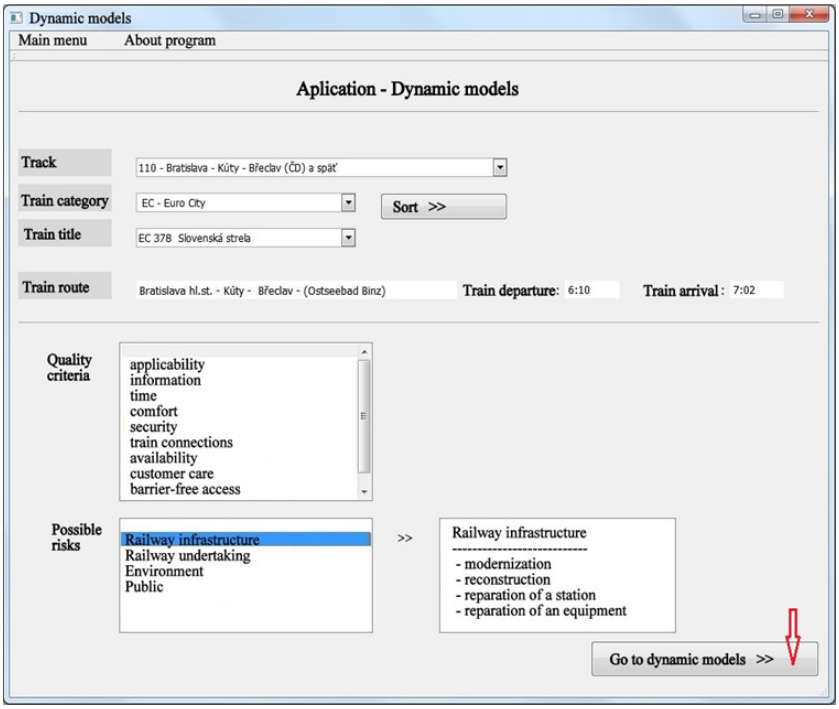

Fig. 2. Dynamic models software application

In implementing the new procedures, the development of the transport market, changing the number of passengers, changes of their thinking, the development of science and technology need to be taken into account. Precisely because of frequent changes in the minds of travelers, it is essential constantly monitoring their needs and wishes. This new software solution uses innovative graphical illustrations which are helpful for the user [9]. Through the button “go to dynamic models”, it is possible to illustrate dynamic processes in normal and extraordinary situations in practice. Two of various software possibilities are described in the next part of this paper.

3. Practical example of dynamic modeling connection with Total Service Management

The importance of dynamic models lies in the possibility of continuous monitoring quality of service throughout the transport chain, taking into account all factors affecting the time, space and various stochastic effects [7]. The

product of transport is an effect of relocation which has an intangible nature i.e. that is consumed during the transport process. During this relocation the customers evaluate the services which are provided by carrier and this evaluation leads to their decision of reuse or non-use railway passenger transport. Therefore, if a railway company wants to keep loyal customers, it has to deal with assessment and requirements of customers and reflect these requirements directly in the operation [10].

Effective measurement of service quality cannot be bound only to a particular point in time, but it is necessary to ensure continuous monitoring of quality throughout the process of services provision [11]. Dynamic models and their graphical expression represent a modern trend in quality management, more precisely Total Service Management. Models follow the procedural character of the provided services that are unique, unrepeatable and constantly changing [12]. Dynamic process can be illustrated through bubble plot diagram and contour plot diagram.

Practical example of dynamic modeling connection with TSM can be shown in the case of customer dissatisfaction and customer complaints when a train delays. Train delay, as a quality criterion, is one the key components during the decision-making process of choosing a transport mode [13]. The analysis results train delays and interactions between the number of delayed trains and minutes, as it is shown in Figures 3 and 4.

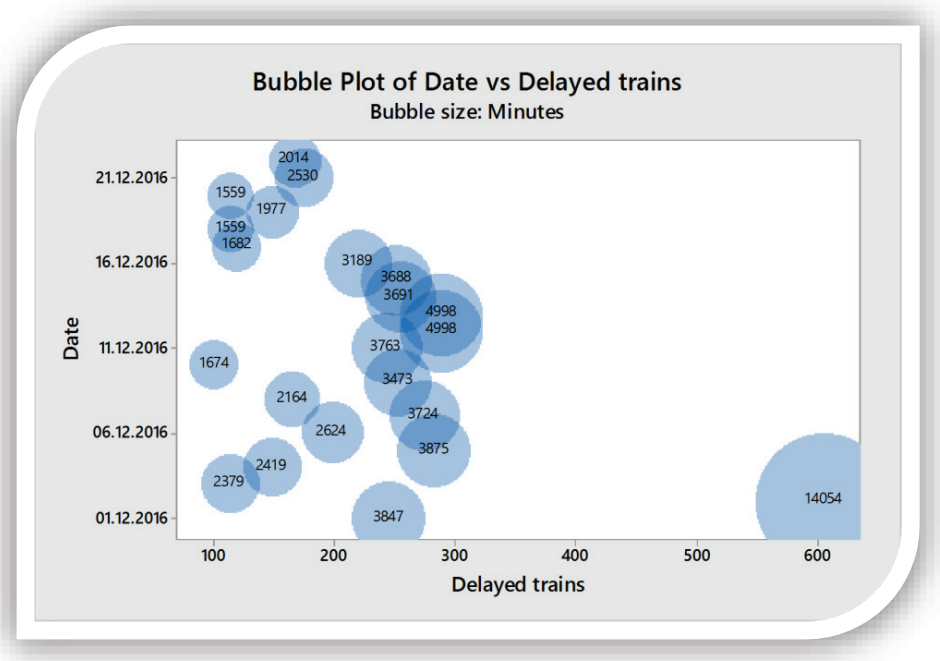

Fig. 3. Bubble plot graphical representation of the train delays

The survey was solved regard to train delays during the December 2016, including all of passenger trains operated by the state company Železničná spoločnosť Slovensko, railway passenger transport operator. There is a dependence between the increasing amount of delayed minutes and delayed trains ensue from figures, thereby there arise decrease

network throughput and displeasure of passengers. Another new approach how to express train delays development is represented through contour plot diagram.

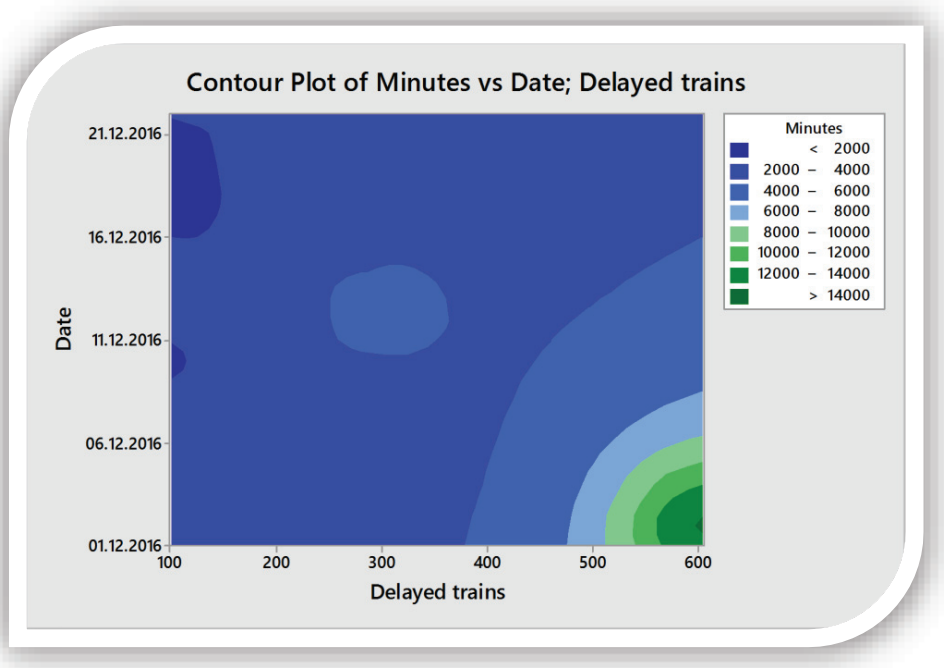

Fig. 4. Contour plot graphical representation of the train delays

These graphical solutions represent part of software application, whereby the software is based on objective data depending on the statistical resources and information system of the carrier. In the event of train delay, it is necessary to pay attention on elimination the problem and continuously endeavor the reduction of customer dissatisfaction [14]. To accomplish these goals, they must be able to put real-time service information into hands of their staff members that need it most as well as the end of customers themselves [15].

Conclusion

Due to modernization and technologization of a society, it was designed software solution that links the area of railway transport with the area of modeling diagrams. Containing needs of users, railway transport companies' management, it represents simple graphical method for the modeling of processes and constraints in the railway passenger transport.

The suitability of this software solution was confirmed by staff and experts from railway undertakings. At the same time they were given recommendations for the future enlargement of the application. Currently this application is particularly suitable for the area of passenger railway transport but in addition or modification of the input parameters can be used as needed for infrastructure managers or in the field of railway freight transport [16].

Implementation of dynamic quality models and tailor-designed software solution for the company operating in the transport, on the basis of the findings was clearly beneficial. The benefits of such an implementation can be seen in shortening the response time during extraordinary circumstances, the transparency of transactions and responsibilities, approaching to customers in the form of taking into account their wishes with a result in maintaining or increasing the

number of passengers, creating a positive image of the company, but ultimately also in reducing the costs incurred in removing weaknesses and errors.

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