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## Comparison and Evaluation of Fare Collection Technologies in the Public Transport

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### Abstract

The development of electronic fare collection technologies records currently considerable progress in many types of payments, including the application in transport. Use of new technologies in public transport contributes both to higher customer satisfaction and smoother movement of passengers and also increases the efficiency of collection of fare compared to the current payment method. Currently are various market pressures to improve check in system based on paper ticket, whether in the form of a draft of new system or in potential measures to improve the current situation. This paper deals with the fare collection technologies and ticketing in the public transport. There is an analysis of the present way of check in of passengers in the integrated public transport systems, including the modern trends in possibilities of check in of passengers. There are concepts of specific ways of comparison and evaluation of fare collection technologies with the utilization of the methods of multicriteria evaluation of variants. Individual proposed variants of check in are evaluated with emphasis on aspects their implementation in the integrated public transport systems.

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## 1. Introduction

The current trend in providing of transport services in Czech Republic is the expansion of integrated transport systems in certain areas. Integrated transport system (ITS) is a way of ensuring public transport with different transport modes which are working together. The aim is establish a clear and understandable system of integrated routes with uniform tariff and uniform transport conditions.

In the centre of attention are the passengers who require simple, fast and reliable collection of fare system and transparent information system during their transport. The questions are whether the modern fare collection systems meet the requirements of passengers and also whether provide the necessary information for the carriers and coordinator.

For these reasons, this article analysed the current fare collection system based on the paper tickets. Also focuses on the possibilities of application of modern fare collection systems in public passenger transport. The aim is the proposal of application of these systems in terms of integrated public transport as well as their subsequent comparison and evaluation.

## 2. Technology of fare collection in integrated transport system

Check-in system is a key interface between the carrier and the passenger. This term is associated with tariff and conditions of transport, used in the sense of realization fare collection, points to the organization of getting in and out of the public transport vehicle, and the definition of paid transport space within the stations. It also defines a method of selling tickets and their validation, produce a valid travel document to authorized ticket inspection personnel. The check-in system must be primarily supported by appropriate distribution of tickets, by their suitably wide range, by clearing system, by information system, by the benefits of fare collection system for individual transport operators etc. (Křivda *et al.*, 2009).

Check-in system directly affects how the passengers perceive transport system and its services. It is reflected in the final quality of the service, which can be detected in a survey of passenger satisfaction or other suitable methods (Olivková, 2016). Optimal setting of these factors can to bring improvement of public transport services and thereby positively contribute to the increase of new passengers at the expense of private car traffic. This is one of the fundamental goals of integration in public transport.

### 2.1. Evaluation of current technology of fare collection

Technology of fare collection in integrated transport system is currently based on the principle of traditional paper tickets. Paper ticket still the most frequently used travel document in the Czech Republic. A travel document is ticket for a single trip, long-term prepaid time ticket or card whose holder is entitled to the transport under special legislation and contractual conditions of carriage (pensioners, disabled people).

Ticket for a single trip must be validated using the electronic machines. The validated ticket is good for the period corresponding to the ticket type and price. Long-term prepaid time tickets (monthly, quarterly, annual) already contain information about the date and time of their validity and therefore may not be validated (Křivda *et al.*, 2009).

Technology of fare collection based on the principle of paper tickets can be generally evaluated positively (see Table 1), in particular with regard to its simplicity, reliability, availability, and low operating costs. However currently there are various market pressures to improve this technology, whether in the form of a draft of new system or in potential measures to improve the current situation. For this reason, the article focuses on the possibilities of modern fare collection systems in public passenger transport, their subsequent comparison and evaluation.

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