Optimizing Waiting Room Utilization in High Speed Railway Stations Based on an Information Integration Approach

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ABSTRACT

The setting of railway station waiting room and waiting zones relates to passengers’ feeling and satisfaction. In this article, the authors develop an optimization model for railway station waiting room assignment, as well as considering adjustment of platforms. With four types of improvement strategies: zone optimization, room optimization, time optimization and interactive priority policy, this optimal model aims to effectively and efficiently improve the railway service quality and security.

KEYWORDS
Information Integration, IoT, Railway Station, Waiting Room, Waiting Zone

INTRODUCTION

High speed railway grows fast globally in recent decades. In China, high speed railway operating mileage is 23,600 kilometers in 2015 and will reach 30,000 kilometers, covering more than 80% of the cities in China (Liu, Cen, Zhang, Liu, & Dang, 2016). Figure 1 shows the planned high-speed railway network in China.

Railway station waiting rooms are considered as an important part of the railway system. It is the place where passengers wait for departure, take breaks, check in, go through security check and prepare for departure. The waiting room directly impact passengers’ feeling about the railway station. On the other hand, waiting room is also the place with high passenger density and substantial staying time before their departure, therefore the optimization issue of the waiting room is crucial to the overall railway station service quality.

A railway station usually has several waiting rooms, which can be divided into n waiting zones with check-in gates. Waiting room management is a key part in effective utilization of transportation stations and affects passenger comfort and safety (Yuen, Lee, Lo, & Yuen, 2013). Mohring, Schroeter, and Wiboonchutikula (1987) find that passengers in public transit stations perceive their waiting time to be almost twice that of the actual waiting time. According to Davidich, Geiss, Mayer, Pfaffinger,

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and Royer (2013), passengers’ waiting behavior can prolong some pedestrians’ walking time during the peak hour of the boarding process.

In recent years, the increasing railway passenger volume leads to a series of technical and layout problems to railway stations (Zhao, Dang, Ma, 2009). Many large railway stations are now overloaded as Figure 2 shows. During the construction process of some big rail stations such as Wuhan Station and Shanghai South Station, some issues arise: large amount of investment for construction and reconstruction, limitation of land use, and limitation of utilizing new technologies and new equipment to improve the service quality. As a result, the optimization strategy of railway station waiting room has its crucial importance to improve the railway service quality.

Figure 1. High speed railway network in China

Figure 2. A schedule display at a large high-speed railway station in China
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