Chapter 8

An In-Depth Study of Mobile Ticketing Services in Urban Passenger Transport:
State of the Art and Future Perspectives

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ABSTRACT

This chapter presents an in-depth study of the current situation of mobile ticketing services in the context of urban passenger transport, and points out future trends and directions that will define forthcoming versions of mobile ticketing services. It defines mobile ticketing services and presents the technologies most used to deliver these solutions. This is complemented by a survey of research studies and experiences of deployments in a real environment. The mobile ticketing ecosystem is then deeply explored, where key players are identified as well as their key drivers and concerns regarding mobile ticketing services. Finally, future trends and research opportunities regarding mobile ticketing solutions are presented.

INTRODUCTION

Urban mobility is one of the greatest challenges that cities currently face. Road networks are suffering from recurrent congestion, the accessibility of city centres is deteriorating, and the negative environmental impact caused by emissions of greenhouse gases from vehicles is taking problematic contours. Improv-
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ing the mobility of dwellers using means that are sustainable, safe and high-quality is essential in order to reduce congestion in urban and metropolitan areas. Reducing the problems of urban congestion and stress will benefit businesses and citizens in the form of lower costs, time savings and improved accessibility. However, to promote a mind shift is not an easy task. Complex transport networks and lack of seamless options have proven to be barriers to the adoption of urban transport services (Puhe, Edelmann, & Reichenbach, 2014). Urban passenger transport is more attractive as it becomes easier to use.

The general adoption of mobile devices and its increasing functionality is changing the way people use them. Currently, it is already possible to make payments with mobile devices in several countries. This general trend is being applied to several sectors, including urban passenger transport. Modern mobile ticketing service solutions can free customers from difficult purchase decisions, allowing easier access to services.

The pervasive deployment and adoption of mobile ticketing solutions requires action from complex ecosystem of organizations (e.g. passengers, transport operators, transport authorities, banks, mobile network operators, third parties and others) to create a mobile ticketing service solution. Each entity desires to have the leading place in the mobile ticketing ecosystem and dominant role in the value chain. Mobile ticketing entail a complex, system-interdependent ecosystem of players whose success depends on the joint action of all players simultaneously (Ezell, 2009). However, the struggle for these inter-dependent organizations to form coalitions just hindered the emergence of successful mobile ticketing platforms.

This chapter presents an in-depth study of the current situation of mobile ticketing services in the context of urban passenger transport and points out future trends and directions that will define forthcoming versions of mobile ticketing services. It starts by defining mobile ticketing services and presenting the technologies most used to deliver these solutions. This is complemented by a survey of research studies and experiences of deployments in a real environment. The mobile ticketing ecosystem is then deeply explored, where key players are identified, as well as their key motivations and concerns regarding mobile ticketing services. Finally, along the chapter future trends and research opportunities regarding mobile ticketing solutions are pointed out.

Several mobile ticketing definitions can be found in the literature. Some include the whole payment actions (Au & Kauffman, 2008), while others relax this requirement and consider it as the use of a mobile device to hold a virtual ticket (Puhe et al., 2014). In this chapter mobile ticketing is considered as the use of a mobile device to purchase and/or validate a travel ticket or to initiate a journey. This definition includes the use of a mobile device to previously purchase and/or validate a travel ticket or to start a trip through a declared check-in or through a be-in/be-out scheme, whose information will then allow to calculate the price to be paid for the journey.

As mobile ticketing take place through mobile unwired devices, data communication assumes a fundamental role, mainly between the user’s mobile device and the service provider. There are several technologies available in mobile devices that can be used to implement mobile ticketing solutions. Recent mobile ticketing trends show that current approaches commonly use more than one technology, by using each one to address the shortcomings of the other. The main technologies used in mobile ticketing solutions are described in this chapter and a comparison between them at various levels is presented, including compatibility with check-in/check-out or be-in/be-out ticketing schemes, their main advantages and disadvantages.

When compared with traditional ticketing systems, mobile ticketing has several advantages. They allow ubiquitous and remote access to payments, to avoid queues and to replace banknotes and coins. It reduces service providers’ costs, by decreasing the need for ticket sellers and collectors, handling physical
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