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Transportation Research Procedia 27 (2017) 125–132

Transportation Research Procedia

www.elsevier.com/locate/procedia

20th EURO Working Group on Transportation Meeting, EWGT 2017, 4-6 September 2017, Budapest, Hungary

Understanding commercial synergies between public transport and services located around public transport stations

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Abstract

The public transport system integrates a complex ecosystem, composed not only by transport operators and travellers but also by other services such as schools, firms, restaurants, museums, banks, and public establishments. Therefore, by adopting a holistic point of view, we propose a new service approach linking city services and public transport. This approach consists in partnerships that may include discounts, combined packages, reduced prices, deals and marketing campaigns, targeted to each specific audience. In order to develop these partnerships it is important to analyse the services located around the stations and the public transport usage. We use the city of Porto, Portugal, as an illustrative example and we rely on two data sources: Automated Fare Collection system data and business data points. The analysis of both datasets allowed us to determine the level of concentration of city services located around public transport stations and to identify the types of services that tend to agglomerate near the stations. We were also able to analyse the correlation between the number of travel card validations and the number of services located around the stations. Finally we present a case of a service exposure to different demographic segments.

Peer-review under responsibility of the scientific committee of the 20th EURO Working Group on Transportation Meeting.

Keywords: Public transport; city services; partnerships, automated fare collection systems; business data points

1. Introduction

Congestion in urban areas and its immediate and wider consequences on the climate are pushing central and local governments to instigate sustainable mobility through the use of cleaner and more efficient means of transport such as public transport. To achieve that goal, public transport must become more attractive for citizens. Several service solutions have been studied and developed in order to simplify the way of travelling and using public transport. Most

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2352-1465
Peer-review under responsibility of the scientific committee of the 20th EURO Working Group on Transportation Meeting.
10.1016/j.trpro.2017.12.052

of them are focused on the development of services related with the trip itself, such as mobile ticketing, real-time traffic information and timetables, and interactive journey planners. However, the transport system must be looked holistically and in context. Based on the fact that every trip has a purpose, such as work, school, recreation, social, we propose a multiservice approach in order to engage and attract new passengers to public transport.

This multiservice approach consists of creating partnerships among city services and public transport, in order to encourage people to use cleaner transport modes during their daily commute. These partnerships may include discounts, combined packages, reduced prices, deals, marketing campaigns and others. Such initiatives will contribute to modernize the image of transport operators, improve quality of service, attract new customers and retain the existing ones. On the other hand, it will also boost local businesses, due to increased awareness, loyalty and sales. Customers benefit from convenience, availability, better services, and increased savings.

In order to develop partnerships between transport operators and businesses it is important to analyse the services located around the stations and the public transport usage. We use the city of Porto, Portugal, as an illustrative example and we rely on two data sources. The first one is the Automated Fare Collection (AFC) system data from the city of Porto. These includes all travel card validations made in the city of Porto during the year of 2013. From this dataset we selected the month of October for analysis. The second dataset used for the analysis is based on Google Places API. We have manually estimated an area of the Metropolitan Area of Porto (MAP) of approximate 400 km^2 and used the Google Places API to scan for all establishments located on that area.

The analysis of both datasets allowed us to calculate the concentration level of city services located around public transport stations and to analyse the types of services that tend to locate near the stations. Additionally, correlation between the number of travel card validations and the number of services located around the stations was analysed. Furthermore, we present a case of a service exposure to different demographic segments.

The outline of the paper is as follows: first the theoretical background is presented, then the data and methods are described, followed by the results achieved. Finally the conclusions and future work are presented.

2. Theoretical Background

AFC systems are used in many public transport systems around the world as a mean of automating the ticketing system. The automated ticketing reduces the operating costs of the fare collection process and ease the public transport use for passengers. Additionally, AFC systems generate continuous data useful to observe trends and support decision-making. These continuously generated data have received much attention from researchers. Analysis of AFC systems data include: estimation of the destination of individual passenger journeys (Nunes et al. 2016); validation of travel behaviour (Munizaga et al. 2014); influence of meteorological conditions on the number of public bus trips (Arana et al. 2014); detection and estimation of activities of public transport users (Devillaine et al. 2012); improving public transport decision making, planning and operations (Oort & Cats 2015); and modelling transit travel patterns from location-stamped smart card data (Chapleau & Chu 2007). The use of AFC systems data to explore the development of services provided by entities other than transport operators has not received much attention, despite the potential advantages of such opportunities.

In order to promote a sustainable mobility, public transport must become more attractive by offering better service quality, accessibility and reliability. The attitude of travellers towards public transport may also be affected by the travellers' misconceptions about its use (Murray et al. 2010). One of the strategies used to induce positive attitudes towards public transport is mass media campaigns about the benefits of public transport. (Beale & Bonsall 2007) revealed that persuasive marketing messages on the benefits of using public transport encouraged its use by habitual travellers. Car users frequently underestimate their potential satisfaction with public transport use, leading to persistent negative attitude towards mode switch. (Taniguchi & Fujii 2007) investigated the psychological effect of an intervention, which consisted of newsletters (a marketing technique) and free bus tickets, on travellers' decisions to use public transport. Each household received two free bus tickets, available for one month, enabling them to experience the bus at least once. The results showed a persistent increase in bus use after this period.

Public transport is also an important instrument for revitalizing retail commerce in historical city centres where pedestrian streets rule out private transport and parking is scarce. The presence of public transport facilities has a positive influence on retailers around the stations (Castillo-Manzano & López-Valpuesta 2009). Firms and establishments are exposed to a large number of transit passengers, which create a robust business environment.