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# **BRIDGING THE IMPLEMENTATION GAP**

**OF ACCESSIBILITY INSTRUMENTS AND PLANNING SUPPORT SYSTEMS**

**FACULTY OF ENGINEERING OF UNIVERSITY OF PORTO**

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**COST TU1002 FINAL CONFERENCE**  
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# **BRIDGING THE IMPLEMENTATION GAP**

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**ABSTRACTS**

**24<sup>TH</sup> OCTOBER 2014**

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## MEASURING RAIL ACCESSIBILITY USING OPEN DATA

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Rail transport is a strategic sector and its importance is fully recognised by the European Commission. As stated in the White Paper on Transport, efforts are needed to increase the share of rail passenger transport over other modes.

Although conventional planning approaches tend to overlook and undervalue the concept of accessibility, several studies have highlighted that accessibility is a key factor in determining the mode choices made by the transport system users. Planning support systems are therefore more and more requested to have a sound capacity to evaluate accessibility.

Railway systems are often less accessible than the other transport modes due to their highly infrastructure-based nature, so special attention must be put in measuring the accessibility of such systems. However, available studies about railway have some methodological weaknesses: they are usually based on infrastructure data (e.g. distance, planned speed) rather than on the real service performance (timetables); or they are referring to a selection of cities and on most relevant connections. These limitations are often due to the lack of detailed data.

In the order to overcome the mentioned weaknesses, this paper presents a comprehensive methodology aimed to evaluate rail accessibility and monitor the railway attractiveness for passengers introducing a time-based element (i.e. timetables) in accessibility analysis. This approach allows to add a new dimension of evaluation that was previously challenging to reproduce at a wide scale. Moreover, since European Commission is supporting Open Data in the public sector and it's encouraging the release of these data and the reuse for policies analysis and social gains, our methodology is based on the use of real timetable Open Data.

The prototype of this study was proposed in the Nectar Cluster 6 meeting in Seville on 6th February 2014, where one of the authors presented a preliminary elaboration based on some capital cities at NUTS3 level. This paper go a step further on and illustrates a series of accessibility indicators based on passenger train timetable with a comprehensive analysis of the railway connections inside three main European countries (Netherlands, U.K. and France). Additional advantage of the developed methodology is the introduction of the LAU 2 level (municipalities or equivalent units) analysis. Furthermore we set up the study also on the main urban centre definition, based on the concept of Greater City, developed by EC DG REGIO and OECD, because the lack of harmonised definition of a city and its functional area allows limited cross-country analysis.

Given the growing utilization of the General Transit Feed Specification (GTFS) data by transit agency also at national level, it was decided to build accessibility indicators on this timetable format developed by Google for their map service Transit. Several benefits from the use of Open GTFS have become obvious during this work, such as data accuracy, format standardization, and regular updates availability. Therefore, another relevant purpose is to explore the potentiality of GFTS, that is now becoming a standard for public transport operators and evaluate its integration in GIS to study the accessibility of the different zones of Europe.

A key result of the paper is the description of the real connections representation using GIS with an open-source toolbox that incorporates GTFS data into the spatial graphic representation of the road network. Each connection between stations is reported with regard to the number of trains stopping, calculating in addition the frequency of the service based on the type of the train. The analysis does not use the average travel time of all daily connections but the real travel time. This allowed, after processing the raw data with a GIS, the evaluation of the real impact of the service on customers: number of trains per day, train category, possibility of direct connection, number of transfer and total travel time (including waiting at transfer points).

The study analyses two main aspects of the accessibility as presented in the literature:

- (i) transport component (travel time and cost of the O/D trip) based on real timetable.
- (ii) temporal component (time restriction/availability of service) based on service availability and calendar.

This extended concept of accessibility can be fully considered as a social indicator (evaluation of services and infrastructure) in a spatial and economic dimension. The examination of these results could help the national and European authorities to further advance transport policy objectives.

The lesson learned and the recommendations will serve as a foundation for the objective of expanding the uses of schedule and route information that resides within the Open Data and particularly in the GTFS format. In addition, this research illustrates the possibility of fostering Open Data to promote their innovative use in planning activities and policy evaluations. The presented methodology could be further enhanced once all European rail data will be available to present a comprehensive European-wide assessment of the level of service (LOS) of passenger railways in Europe.

Keywords: Accessibility, Rail, Timetable, Open Data, GTFS, Degree of urbanisation, LAU2, GIS

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