



THE INTEGRATED TIMETABLE IN LIBERALISED RAILWAY NETWORKS

Reconciling competition, infrastructure development and passenger benefits has been a major challenge in liberalised railway networks. Only a comprehensive approach can optimise the system and therefore the overall benefit.

Problem Statement

The liberalisation of the European railway market fosters competition which has led to many improvements but also some challenges. The improvements include a growth in passenger numbers, reduced ticket prices as well as increased quality levels. Challenges are the compatibility of self-sustaining Open Access services with the ITF¹, the allocation of train path requests of several railway undertakings and effective utilisation of a cost-intensive, ITF-optimised infrastructure. Even current legislation considers the ITF. Self-sustaining Open Access services prevent the ITF from being implemented in an optimal way and pose a major challenge to infrastructure managers and public transport authorities. Slot allocation of long-distance trains can have negative effects on the regional network as well as passenger transfers. Furthermore, cost-intensive construction of railway infrastructure requires long-term planning, which is not possible with short-term oriented self-sustaining services. In Austria about 30% of the railway infrastructure investments are spent on ITF-relevant projects. Therefore, an infrastructure utilisation according to the principles of an ITF is not only efficient but also sustainable.

Approach

This doctoral thesis provides an integrated approach to combining timetabling, infrastructure development and train path allocation in a liberalised railway market. In order to combine competition and ITF at the level of long-distance services, the competitive awarding of system train path bundles as Public Service Obligations (PSO) is proposed. System train paths need

¹ ITF is short for German „Integrierter Taktfahrplan“ meaning Integrated Periodic Timetable

to be designed by the infrastructure manager beforehand according to the target timetable and the infrastructure parameters. The design and competitive tendering of system train path bundles is done preferably by a public transport authority. Further train slots for self-sustaining Open Access services which do not interfere with system train paths may be allocated by the infrastructure manager. A guideline is derived on how PSO tendering of system train path bundles can be implemented in accordance with the current EU legislation. With the competitive allocation of STP, a fair and non-discriminatory process can be ensured requiring only a minor adjustment of the allocation criteria in the network statement (SNNB) of ÖBB-Infrastruktur AG.

Method

The feasibility of the system train path concept is presented in detail. First the legal boundary conditions and an approach that guarantees prioritised implementation in the train path allocation are discussed. Then the parameters of system train paths are analysed and the feasibility is demonstrated on sections of the Austrian Southern and Western Line. A procedure for creating bundles is presented and applied on a test model. Finally, tendering procedures are evaluated and a suggestion for a stepwise tendering in a long-distance railway network is made.

Results

The presented scheme guarantees an optimal network-wide implementation of the ITF according to the framework of the EU legislation. This concept (i) allows for the application of the ITF, (ii) fosters network-wide competition for tendered PSO services and allows for self-sustaining Open Access services, additionally (iii) customers benefit from well-connected and integrated services. System train paths are thus a planning tool that make the joint implementation of ITF and competition possible.

The practical suitability of system train paths can be proven by means of application on several edges in the Austrian long-distance railway network. Compared to current timetables the capacity of lines is not reduced by system train paths. Individually designed train paths for self-sustaining passenger services as well as regional and freight services are allocated as long as they do not interfere with system train paths.

The competitive tendering of system train path bundles as PSO ensures equal treatment of RUs and at the same time creates the basis for prioritisation in train path allocation. An eight-step procedure was developed for forming lines and bundles in an ITF railway network. The

procedure for the formation of system train path bundles was applied in a model network showing plausible results, which were confirmed by a sensitivity analysis.

Innovation

The concept of system train paths has not been used for network-wide timetabling in a liberalised railway market in the European Union so far. The applied approach fulfils the requirements of the ITF and is flexible enough to reflect the vehicle characteristics of different railway undertakings. The procedure shows how an ITF and self-sustaining services can be implemented in accordance with EU legislation. This non-discriminatory approach enables infrastructure managers to effectively utilise the cost-intensive infrastructure.

Competitive network-wide tenders have scarcely been applied so far in the long-distance passenger railway market in Europe. The methodology of using a PSO tendering of system train path bundles will allow new market entrants to gain attractive market shares. This methodology is of special interest to policy-makers, as infrastructure development costs billions of taxpayer money, especially in countries which align their railway network according to the requirements of an ITF.

Outlook

The proposed procedure shows how customer benefits, competition and an effective use of an ITF-aligned infrastructure can be combined. Due to climate initiatives and ongoing infrastructure development resulting in shorter travel times and more capacity on many routes, the demand for railway services will most probably increase. This will bring new competitors into the market and make further routes relevant to self-sustaining services. In this context, not only will the intensity of competition be increased but also the need for a clearly defined, legally feasible procedure.

Competitive tendering will be mandatory as of 2023 for most railway services according to Regulation 2338/2016/EU. Therefore, procedures for tendering PSO-services will become more and more relevant.