# Accessibility and territorial competitiveness: a high-speed railway accessibility indicator for nodes

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*In this paper I present the Railway Accessibility Indicator (RAI), a tool that can be used to support the analysis of competitiveness of territorial systems. This indicator – based on a composite approach – integrates the measurements of infrastructural endowments to investigate also the service level provided by the transportation systems. The indicator allows to compare the high-speed direct railway accessibility of the selected nodes, assessing how close a node gets to its own optimal service level, defined in terms of both quantitative and qualitative criteria; therefore, the results do not depend on the sheer dimensions of the concerned region. The application of the RAI to Barcelona, Lyon, Milan and Stuttgart shows that the French node has the best accessibility, mainly by virtue of the excellent speed of the TGV trains.*

## 1. Introduction

In economic literature there's a growing concern about the importance of the concept of accessibility, not only in the analysis of the transport systems in a territory, but also as part of the decision-making process regarding the planning of infrastructures and the assessment of their socio-economic impact on the territory (Thakuriah, 2001).
The need to integrate the classical measurements of infrastructural endowment by means of accessibility indicators which take into account also the level of service that a transport system supplies is made clear by the sheer term 'transport', in which two elements are combined: one refers to the *infrastructure of transport*, and the other one to the *transportation service*. Let's see the case, for example, of two territories A and B, in which the only transport infrastructures are as many airports; the airport A has two runways and the B has three of them. Measuring the accessibility in merely physical terms, one would state that the territory B is more accessible; however, if a greater number of flights leave (and many more destinations can be reached) from A, clearly a different approach of measurement could yield a different result.
The modes of transport that enable a region or a metropolitan area to gain the best middle-long run accessibility for passengers are the air mode and the rail mode. In this work, focussing on the rail mode and particularly on the high-speed direct connections, the Railway Accessibility Indicator is presented, applicable to transport nodes, based on variables such as the frequency and the speed of the trains and on a vector of weights obtained via a simple gravitational model.

## 2. Methodological approach to the measurement of accessibility

In shaping an accessibility indicator it is possibile to follow different methodological approaches. Obviously, according to the different layouts, the indicator yields results that can widely differ from each other and even seem uncoeherent. It is useful, therefore, to adopt and clarify some precise methodological choices, so that the numbers deriving from the survey and above all their comparison can be read transparently.

The concept of accessibility is actually somewhat hard to handle. As Gould (1969) brilliantly suggests, accessibility is "one of those common terms which everyone uses until faced with the problem of defining and measuring it".
The first fundamental question concerns the fact that the focus can be on the supply side or on the demand one; we have, therefore (Baradaran and Ramjerdi, 2001):

- *process indicators*, if measured accessibility is that supplied by the system;
- *outcome indicators*, when one measures accessibility perceived by individuals, which is reflected in their consumption behaviour.

As we will see in detail in the next chapter, the RAI turns out to be a process indicator; the data that are used for the calculation, in fact, refer solely to the supply side, so as to measure the potential accessibility that characterizes a node or a region. The focus on the supplied service rather than on the users' behaviour derives from the basic objective that we set, that is the elaboration of a tool supporting the analysis of the competitiveness of territorial systems; the question that we want to answer is therefore: what are the possibilities for an individual (let us say a business-man) who wants to reach the city or to reach somewhere from the city?
The proposed indicator, besides, adopts a composite approach which integrates elements of various methodologies such as gravity and utiliy, as classified by Baradaran and Ramjerdi (2001). The aspect of the RAI that is in common with gravity approaches is that it includes a modelling of the interaction between masses (specifically, the connected city pairs) in terms of size and distance and opportunities between the two. This last aspect is where the utility-approach side of the RAI lies; in fact, to address the evaluation of the service supplied by the system, the opportunities of connection are computed in terms of utility brought to the users.
In order to further clarify the methodological approach