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## CONTACT POTENTIAL MEASURES FOR ANALYSING NEW INTERCITY LINKS MADE POSSIBLE BY THE PLANNED TOURS–BORDEAUX HSL

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### **Setting the scene**

This 'contactability' indicator was developed from a vision of networks. As it was developed in theoretical geography and in reaction to classic accessibility indicators, it places too much emphasis on quantifying a level, thus losing the network view of the access conditions.

The scientific study sought to supplement accessibility indicators with a complementary view that would allow for a better understanding of how transport networks contribute or hinder accessibility at the local level.

The planning issues to be addressed are associated with the objectives of spatial cohesion, as expressed in the ESDP (European Spatial Development Perspective): What is the degree of cohesion in a city network? What is the level of contactability for cities and metropolitan regions? Which links are missing in the transport network for better spatial integration of the city network?

### **Conceptual framework and theoretical underpinnings**

Metropolises have become the focus of contemporary economic development. They constitute a type of settlement organising both the short distances of co-presence and the long distances of telecommunication and transport—facilitated by fast transport systems. Despite the rise of telecommunication, many analysts in the field of innovation maintain that face-to-face contact remains paramount. The analysis of professional mobility shows that these contacts take place predominantly during single day trips.

Time geography (Hägerstrand 1970) provides the theoretical and conceptual framework still suitable for analysing this type of metropolitan mobility. It considers the space-time individual constraints as key parameters in the measurement of access conditions. The main indicator is contact potential (Erlandsson 1979), also called contactability (Haggett 2001). It measures the possibility to realise a trip to a distant location respecting the time-space prism.

Accessibility is defined in the contactability indicator as the potential a person has to realise face-to-face contact with another person in a single or a group of distant locations.

The measure of accessibility is each O-D pair looks at the question: Is it possible (YES) or is it not possible (NO) to establish contact under specific time constraints? These constraints are departure not earlier than 5:00 and return no later than 23:00 as well as a minimum meeting time of 6 hours (connection times are also considered) (see figure below).

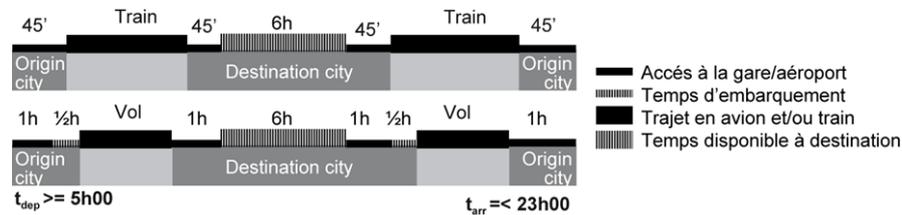


Figure 3.39: The principle of the contact potential for a one-day return trip for a six-hour meeting

### Implementation

Contactability is measured by associating two optimal transport chains corresponding to a return trip. Fast transport systems (by rail and air) are operated with timetables. To reach a certain level of realism, and to consider intermodality in a satisfactory way, a scheduled minimum path must be computed (L'Hostis and Baptiste 2006). Therefore, timetable information must be collected and manipulated in a large database.

This data can be secured by purchasing the OAG database ([www.oag.com](http://www.oag.com)) for flights, and through queries on the Deutsche Bahn website ([www.bahn.de](http://www.bahn.de)) for the train timetables. The data is stored on a mysql database. Timetables and nodes (the graph) must be put in the database, and then the minimum paths are processed through the database. The minimum paths have been computed with the *Musliw* software (not publicly available, developed by P. Palmier from the Centre d'études Techniques de l'équipement Nord-Picardie). The degree of required technical expertise for performing the calculation and processing the information is high, because of the volume of information involved.

### Application to the Tours–Bordeaux HSL

The workshop was set up after a discussion with Èlodie Manceau, the head of the observatory of the Tours–Bordeaux HSL currently under construction in western France. Manceau assisted a presentation by Alain L'Hostis on the contact potential indicator in Lille in an open research workshop, and she expressed an interest in developing this approach on the territory affected by the Tours–Bordeaux HSL project.

For the purpose of the workshop, the indicator was set to simulate the state of the railway network in 2017, including the new timetable of trains on the new line. The indicator was computed for two periods, 2009 and 2017, so that a comparison could be made. The following figures illustrate the existing and new contact potential of the main cities on the line, Bordeaux and Poitiers. Also the results for Angoulême and Tours were presented in the workshop.

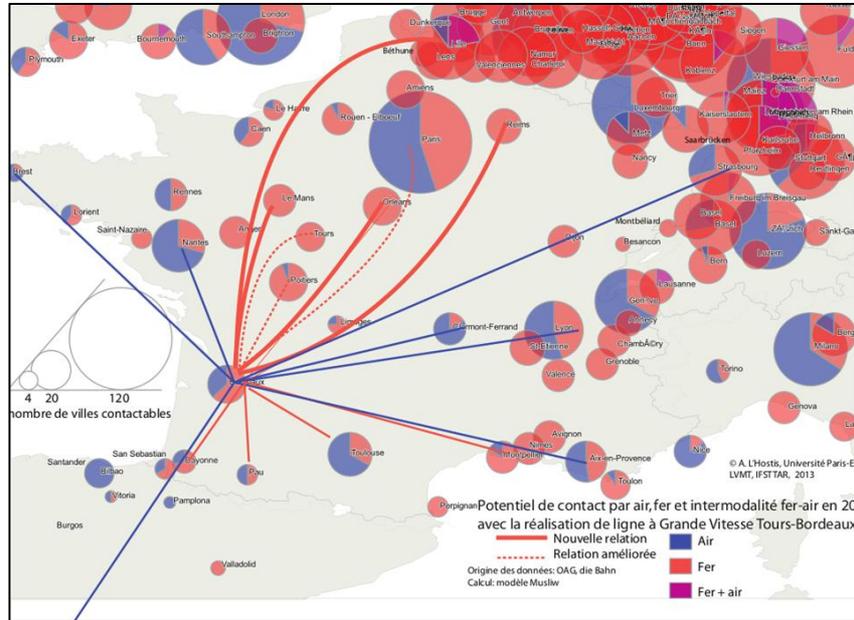


Figure 3.40: Existing and improved contact potential from Bordeaux with the Tours–Bordeaux HSL

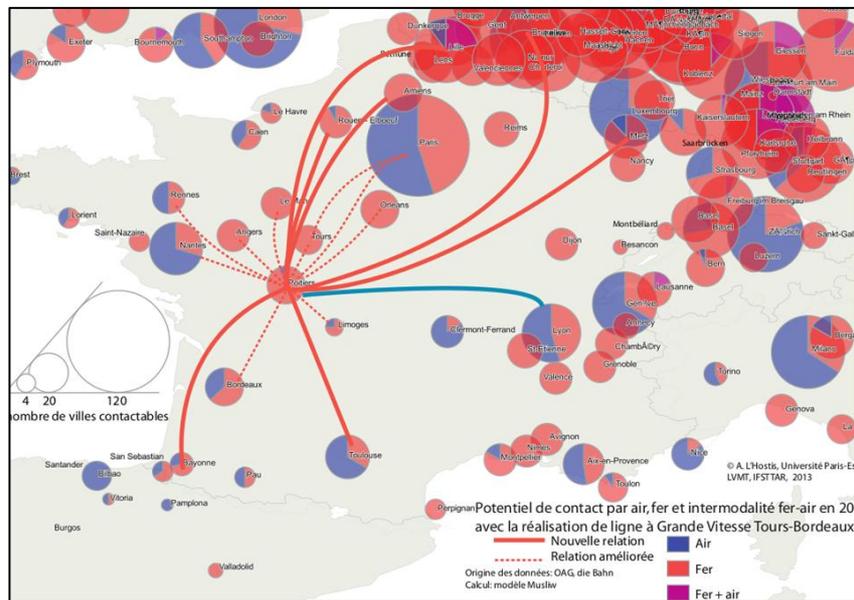


Figure 3.41: Existing and improved contact potential from Poitiers with the Tours–Bordeaux HSL

A map of all the new links made possible by the new line was also presented (see figure below), and considerable effort was invested to improve the readability of the maps.

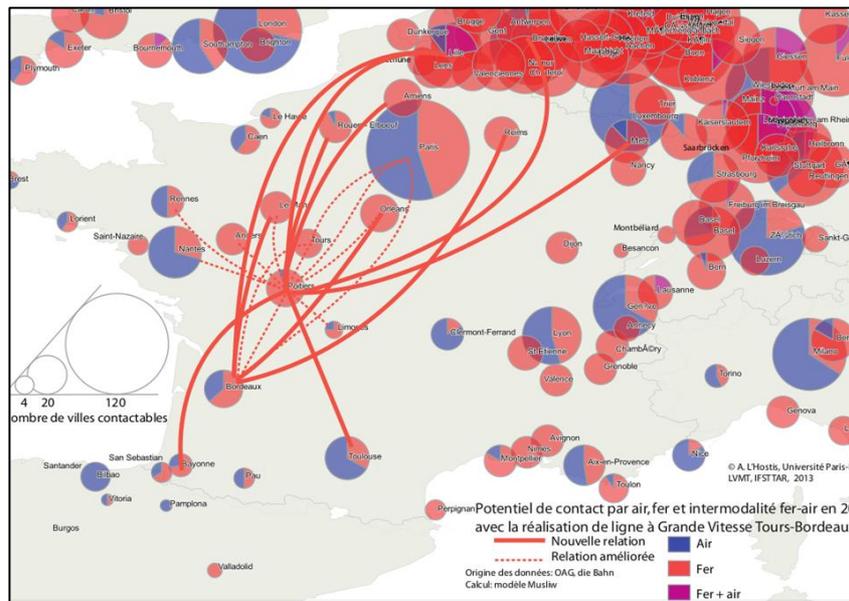


Figure 3.42: Total new and improved contact potential with the Tours–Bordeaux HSL

### Organisation of the workshop

The workshop took place on the premises of RFF, the French Rail Network, in Paris, on 17 October 2013, from 9:00 to 12:30.

The workshop was organised according to the COST Action guidelines. It started with a presentation of the indicator and the results, followed by an open discussion regarding the indicator's usability potential. All of the cartographic outputs were also printed on a large scale format (A3) and made available to the participants. Several tables with detailed information about return trips were also distributed, to supplement the overhead presentations and stimulate discussion.

### Workshop participants

In total six persons participated in the workshop: Alain L'Hostis, Èlodie Manceau, Antoine Frémont, Roseline Monfort, Chris Behière and Liu Liu. The list of invitees was compiled from inputs by Èlodie Manceau, who has in-depth knowledge of all the actors affected by the Tours–Bordeaux HSL. We sought to strike a balance between land use and transport actors.



Figure 3.43: Testing the contact potential indicator for the Tours–Bordeaux HSL project

Élodie Manceau is the head of the South-Europe Atlantic HSL Socio-Economic Observatory. Antoine Frémont is the head of territorial issues at RFF. Roseline Laot-Montfort is in charge of territorial strategy at the *Gironde Département* (one of the five *Départements* that make up the *Région Aquitaine*). Chris Béhière is a PhD researchers focusing on time-oriented local policymaking in the Poitiers agglomeration. Liu Liu is a Phd researcher at IFSTTAR on the topic of transport and planning coordination. Alain L'Hostis is a researcher at IFSTTAR on the topics of transport and planning issues.

#### **Outputs of the workshop: use of the contact potential indicator**

The workshop participants shared several very interesting remarks, which will be used for the subsequent developments of the indicator and by the local actors. The initiative around the Tours–Bordeaux HSL Observatory and the contact potential indicator has already aroused the interest of some Bordeaux metropolis actors, who would like to use the indicator to express the potential for interaction with other cities that the new line enables. The indicator will be used to populate an atlas at the Bordeaux metropolis level.

#### *Comments on the indicator itself*

- The indicator is based on the maximum time available at destination. It does not compute the values if less time is needed (e.g. 6 instead of 9 hours) and must be complemented by frequencies analysis.
- The indicator provides little meaning if the trend to consider home as a place of working develops. It is not that obvious because even if home becomes a place of work, the need for occasional mobility may still persist; hence, the need for one-day returns to distant cities may remain strong.
- One-day return trips are tiring for the traveller, and usually are not done each weekday but only occasionally in most business sectors.

*Comments on possible modifications of the indicator*

- It would be interesting to combine this indicator of reachable cities with the availability of office space and/or services for business travellers. This remark raises the issue of service provisions inside and around railway stations. The HSL will increase the volume of these users with specific needs in terms of goods and services (e.g. temporary office space in railway stations or temporary meeting rooms).
- The criteria need to be kept strict. If the criteria are relaxed (e.g. less time available at destination or next-day returns), all cities become accessible and the indicator is neither selective nor useful.
- Could the time spent waiting for connection (connecting time) be mapped to help develop a strategy for service deployment in railway stations?

*Comments on employing the indicator in policymaking*

- Is the indicator of contact potential relevant for territorial policies?
- Two issues emerge regarding the directions of the relationship: Which location can be accessed from a specific city? and From which cities is it possible to reach a given city for a meeting? The answers to these questions provide very different implications in terms of territorial strategies: What activities should be developed in my city, and, on the other hand? How can we help travellers realise one-day returns, and are their needs being met in terms of services and local accessibility?
- The indicator shows that the HSL creates the possibility for a new relationship between Bordeaux and Reims. This is important to know but the real question is what should be done with this new connectivity. What purpose can it fulfil?
- For the operator of the line, being aware of this new connection helps improve communication with the territorial actors.
- Smaller cities (like Angoulême or Libourne) can develop a metropolitan level contact potential. They benefit from a network effect by being located on the itinerary of the new HSL. What can be their strategy? To which local level can one develop the contact potential measures? The tool informs of the new proximities in time-space produced by the new line. Some distant cities like Angoulême, located in a different Département and Région, would be accessible within 30 minutes from Bordeaux. How does this change affect the Gironde Département with Bordeaux as its main city and capital?
- The difficulty of communicating the information to the average elected policymakers needs to be considered. How can it be made more accessible? Ideally, decision-makers should be able to use the information

and analysis provided by the tool to inform their elaboration of transport strategies in their administrative unit?

### References

- Erlandsson, U. 1979. Contact potentials in the European system of cities, in *Spatial inequalities and regional development*. 93–116. Dordrecht: Springer.
- Hägerstrand, T. 1970. What about people in regional science? *Papers of the Regional Science Association* 24:7–21.
- Haggett, P. 2001. *Geography, a global synthesis*. Harlow: Prentice Hall.
- L'Hostis, A., and B., Hervé. 2006. A Transport network for a city network in the Nord-Pas-de-Calais region: linking the performance of the public transport service with the perspectives of a monocentric or a polycentric urban system. *European Journal of Spatial Development* ([www.nordregio.se/EJSD](http://www.nordregio.se/EJSD)).