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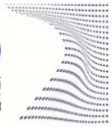


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A methodological framework for evaluating the equity impacts of High-Speed Rail

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Declaration

I hereby declare that the contents and organization of this dissertation constitute my own original work and does not compromise in any way the rights of third parties, including those relating to the security of personal data.

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Synthesis of the thesis

The transport sector is required to contribute to local and global sustainability objectives. Its contribution to atmospheric pollution and potential for decarbonization are widely recognized by the scientific community. Several policy, programming and funding initiatives have been set up to ensure that the carbon footprint of mobility will be lower in the future. Within this context, transport mega-projects such as High-Speed Railways (HSR) are being promoted, especially in Europe and Asia, to shorten physical and economic distances between cities, enhance regional and trans-national competitiveness, and contribute to coping with environmental and policy goals.

The social sustainability and the equity implications of transport projects are fundamental to ensure the competitiveness and livability of communities, particularly in peripheral, less accessible areas. Despite this, these issues are more rarely discussed compared to issues around the environmental and economic dimensions of sustainability. The contribution in terms of equity and social aspects to the more general paradigm of sustainability is now acknowledged by most scholars and by regulatory and planning contexts; however, confusion on how to define and measure equity, as well as on how to incorporate social issues into more conventional assessment processes, is still very much present among transportation decision makers.

The concept of “equity” is vast and includes social and spatial aspects, with sociodemographic, market-related and policy factors concurring to determine a complex and indented framework with significant impacts on people’s quality of life. The theoretical conceptualization of equity in transport is the first focus of this work. Equity is approached through the discussion of its many facets and of its theoretical and practical transposition in transport planning and decision-making, as well as through a debate on the conceptual link between the concept of equity and other relatable ideas, such as justice, fairness, and accessibility.

Through a focus on HSR, this thesis also approaches the link between larger-scale transport projects and equity and sustainability at the local scale, including the retention of local attractiveness and competitiveness in peripheral areas. The research also proposes a reverse perspective, looking at the contribution of mobility decision-making in sharpening or alleviating societal and distributive inequality. Dense urban environments, shrinking rural areas, polycentric low-density zones are all in need of tailored strategies in which mobility planning plays a game-changing role, enabling attractiveness (e.g., managing depopulation), empowering the disadvantaged (e.g., through subsidized public transport), providing new opportunities (e.g., to isolated communities or to businesses) or improving citizens’ quality of life (e.g., through a dialogue between mobility and logistics services). The complexity of contemporary regions and the economic and societal challenges

that they face, as well as the massive diffusion of HSR and the general shortening of physical and virtual distances between hubs and cities all require an equity-oriented approach to mobility planning, an aspect even more important as the next-generation EU funds are available to pursue these and other goals. The equity-oriented approach – also invoked by the United Nations within the Sustainable Development Goals, Goal 11 – is necessary to ensure an effective use of available resources, so that the transport sector can effectively contribute to reaching global and local policy objectives in societal and economic fields as well as from the perspective of environmental sustainability.

Finally, this work discusses methods and tools to assess equity implications of HSR projects and to include equity considerations in transportation decision-making. In more detail, through a tailored approach to different territories, the research approaches possible methodologies for understanding equity implications and for incorporating policies and actions to ensure equity and fairness in transport planning and projects. The research goes on to explore some relevant aspects of the macro-topic of equity and HSR, looking at the implications of operational HSR on excluded territories, at those of planned HSR, and expanding the cost-benefit approach in the assessment of local implications of HSR in relation to possible alternatives.

In general terms, the contribution of this work to the scientific research is most relevant in the following aspects: first, it contributes to the understanding and acknowledgement of the relevance of equity's role in impacting people's quality of life, especially in peripheral areas. More attention needs to be reserved to the topic from both scholars and policy makers. Second, the work provides a set of transferable, replicable, and scalable tools and methods to assess and evaluate equity implication of transport choices, focusing on the case of major projects, where equity should be included in sustainability assessment, but also looking at implications on local policymaking.

More specifically, the value of this work lies in both conceptual and methodological innovation. From a theoretical perspective, the collection of articles presented here starts from the very definition of equity and explores its declination in mobility and in transportation decision-making. Despite the consolidated recognition of the role of equity as a component of the wider sustainability framework, confusion and pluralism still affect its conceptualization. In this work, light is shed on the differences and similarities between equity and other - potentially partially overlapping- concepts. Each is categorized according to specificities highlighted by previous research or decision-making practice. On the whole, the first relevant contribution of this research is a thorough conceptual analysis of equity, equity in transport, and equity within the more recent exploit of HSR projects. This is concluded with the laconic observation that the confusion and lack of depth of analysis devoted to equity results in inadequate methodologies for its analysis and determination, as well as for calculating the equity implications of transportation projects, including - all the more so - those as large as HSR.

For this reason, the methodological contribution of this work focused on developing appropriate, customizable, scalable methods to improve researchers and

practitioners' ability to understand equity implications of HSR at various scales, in both the *ex-ante* (pre-project assessment) and *ex-post* (project monitoring) conditions. The proposed methodologies are intended to complement conventional appraisal methods, such as the Cost-Benefit Analysis, the privileged and legally required assessment tool in the European context. Contextually, these methods are designed to be autonomous in giving effective indications on equity implications, even outside the context of wider appraisal processes. Besides providing specific equity-oriented assessment, these methods focus on those territories and communities that transportation megaprojects traditionally neglect: interstitial areas, intermediate locations, vulnerable users and those who lack access to various transport options. In most cases, they focus on territories which are subject to HSR projects but are not or will not be served by high-speed trains. Communities living in these areas are most exposed to the risks of degradation of their transport option, affecting their easiness of access to opportunities and, in consequence, negatively impacting their quality of life.

Overall, this doctoral dissertation provides the reader with a thorough overview of the link between spatial and social equity impacts of High-Speed Rail and regional development, with a clear focus on why the topic is of the utmost importance for the quality of life and with a basket of techniques to approach, analyse and evaluate the different contexts and mobility systems in an equity-oriented perspective, within the wider paradigm of sustainable mobility. I believe that this research topic is optimally framed within global, European, and national sustainable development and resilience challenges and strategies and that contributions on these themes will be central in future design and planning of development. The progress of my research, from a conceptual approach to a decision-maker approach, to the perspective of the technical assessment of HSR, valorizes the intrinsic integrated, multidisciplinary aspect of the matter. It links, both conceptually and methodologically, the various competing objectives of transportation decision-making to the more diverse dimensions of urban and regional development. Equity is seen, in a wider sense, as the interpretation of transdisciplinary sustainability goals. This takes on the multiple contemporary challenges faced by mobility as a comprehensive sector and closes in on the call for a multidisciplinary perspective on planning, as promoted by European strategies and, more closely, by the PhD programme in Urban and Regional Development at the Interuniversity Department of Regional and Urban Studies and Planning.