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#Parallel Workshop

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Parallel Workshop

9. Ports, airports and other infrastructures

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The role of railways toward sustainable and cohesive territories

An integrated approach for the territorial impact assessment

Mario Tartaglia, Serena Martini**, Chiara Ravagnan**, Chiara Amato***

The growing attention on the territorial impacts of transports policies and infrastructure projects is fostered by the progressive strengthening of sustainability and cohesion among the great objectives of the European Union. This attention has boosted research paths of the many companies and sectors of the Italian Railway Group (FS Group) to update the methodological frameworks related to the evaluation of the socio-economic and environmental impacts of railways from an integrated territorial perspective. In fact, mobility infrastructures represent a main sector that contribute to the socio-economic, spatial reorganisation and environmental sustainability objectives, both directly, by improving accessibility, and indirectly, with a series of complementary interventions (es. public spaces) and indirect impacts (es. reduction of travel costs and time). In particular, railways can reduce greenhouse gas emissions, improve the goods traffic, increase the quality of services, and create indirect benefits for all citizens and users. On the other hand, a low transport endowment and quality, with consequent high transport costs, together with a low competitiveness, can have negative impact on the territorial development (Prezioso, 2020).
In this framework, the Next Generation EU, the NRRP and the Procurement Code in Italy have given rise to new environmental and socio-economic projects assessments, fostering the elaboration of new documents, such as the *Sustainability Report*, to deepen multi-dimensional impacts of projects, including Life Cycle Assessment and Territorial Impact Assessment (TIA).

To this end, in order to evaluate the potential of Transport infrastructures projects on territorial cohesion, interpreted as the "territorial dimension of sustainability" (Camagni, 2006), and in consistency with the scientific debate on TIA methods, the Italferr Sustainability Unit and the FS Research Centre have developed a joint study to propose a framework of pillars and indicators for the assessment of railways projects territorial impacts. This activity takes into consideration various phases in order to define guidelines for *the TIA methodology* relating to railways (Fig.1): (1) the delineation of a methodological framework of indicators, which is mainly illustrated in this abstract; (2) ongoing discussions with experts and development of the model, including the discussion in international conferences; (3) the next steps relating to institutional and local stakeholder feedbacks; (4) within these phases, the methodology has been experimented in project cases. In particular, the research path presented in this abstract involves phase (1) and (2) and is articulated in 3 steps: (a) the literature review on territorial cohesion that points out the main pillars of the TIA; (b) the literature review on the TIA methods and sustainability protocols for infrastructure projects for the selection of indicators; (c) a proposal of a framework of pillars and indicators for the TIA for railways projects supported by cases.

With regards to the literature review (a), *territorial cohesion* is relatively recent and commonly understood as a concept made up of multiple interconnected dimensions (Prezioso, 2020), mainly aimed at counteracting the prevailing tendency of territorial and economic polarisation around the most competitive and populated regions. This concept has been progressively highlighted in several EU emblematic documents, including the ESDP (1999) and the Green Paper on territorial cohesion (2008), which states: "the concept of territorial cohesion builds bridges between economic effectiveness, social cohesion and ecological balance, putting sustainable development at the heart of policy design". Despite the absence of a unique definition, the literature review points out a convergence on several crucial aspects: reduction of socio-economic disparities, rebalancing of access to services, efficient use of territorial capital, improvement of territorial cooperation and integration, local identity protection, contribution to territorial quality and the efficiency of the environmental resources, as well as mitigation of climate change.

With regards to the studies on TIA (b), many researches (including ESPON) have

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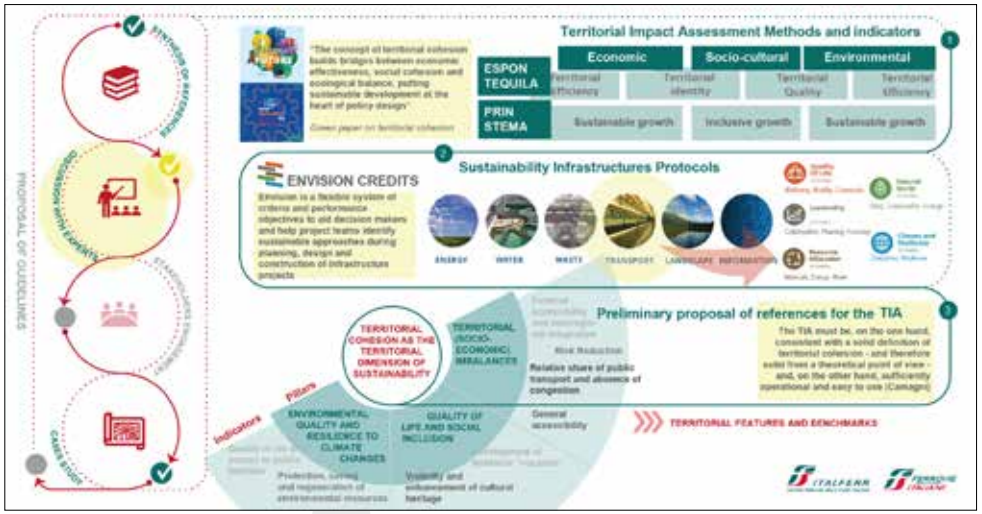
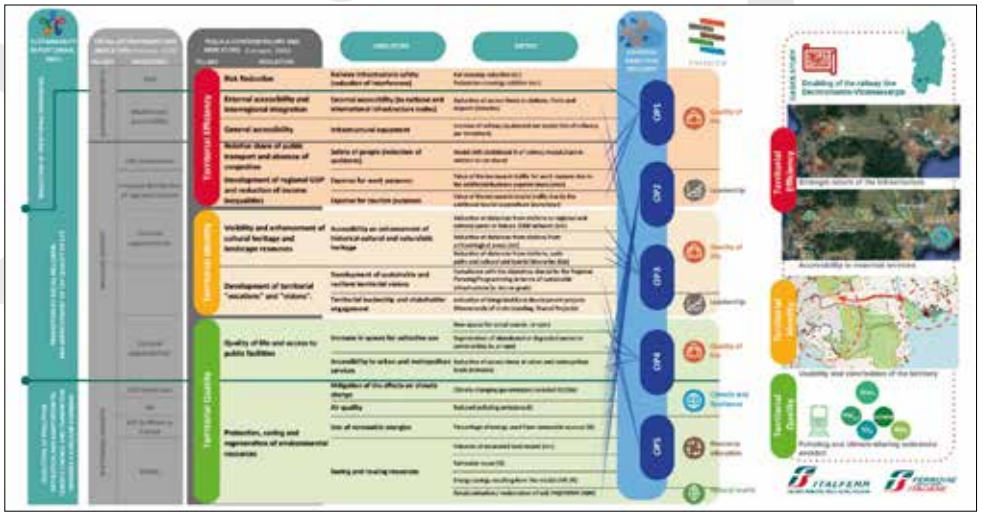
Fig. 1.
Research path

Fig. 2.
Indicators framework





proposed multi-dimensional TIA methodologies and tools (Camagni, 2006; Medeiros, 2020; Prezioso, 2020), showing convergences in infrastructure projects assessment. In particular, the TEQUILA - Territorial Efficiency, QUality, Identity Layered Assessment model (Camagni, 2006) proposes an "operational notion of territorial cohesion" paying attention to territorial efficiency, territorial quality, territorial identity.

In order to propose a summary and comparison of the references of these studies, the research used an inductive methodology to select the pillars and indicators (c), compared with the Envision Protocol, a rating system of infrastructure sustainability. The selected indicators are illustrated as follows (fig. 2) and supported by metrics. The purpose and interest of the study are not to propose a new methodology that is unrelated to the other methods, but rather to begin establishing an integrated, open, and consolidated framework of indicators that can meet the main requirements of the Sustainability Analyses, in order to build a bridge between economic effectiveness, social cohesion and ecological balance, as stated by the Green paper. The methodology is actually used to assess several projects including the Doubling of the Decimomannu- Villamassargia line (in Sardinia, Italy).

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