Dialogues on Cross-Border Rail Transport: A Participative Approach

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Abstract. This work is part of the project "Digitalisation of rail transport communication at border crossing between Italy and Slovenia - T4RAIL" within the Interreg nVI A Italia – Slovenia 2021–2027 program. This project aims to tackle the issues frequently observed within the cross-border region encompassing the Italy-Slovenia border. The project is particularly focused on the challenges arising from the absence of seamless integration between the regional and national transportation systems, resulting in inadequate infrastructure for facilitating cross-border mobility. This, in turn, leads to congestion, which is a major contributing factor to the overall challenges in this area. In this context, the objective of this work is to disseminate the initial results obtained through the organisation of a participatory event. This event involved the construction of a methodology through two focus groups. The purpose of the focus groups was to investigate the challenges and opportunities arising from technological improvements in cross-border rail transport. In the first focus group, the emphasis was placed on the pivotal operational, economic and environmental aspects. Conversely, the second focus group directed its attention towards the labour market and, consequently, to the territorial and social aspects.

Keywords: Interreg T4Rail · Focus Group, Cross-border Rail Transport

1 Introduction

The Interreg T4Rail (Translate 4 Rail) IT-SI project has been conceived with the objective of promoting and analyzing the challenges and opportunities arising from the modal shift from road to rail transport, with a focus on the cross-border areas between Italy and Slovenia. The development of highly specialized technologies is intended to achieve two principal objectives: firstly, to enhance the efficiency of cross-border transport; and secondly, to reduce the environmental impacts resulting from traffic (goods and passengers). The ultimate goal is to achieve greater economic, environmental and social sustainability

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of logistics chains. [1] As part of this project, a workshop was developed and organized by the research group of the University of Trieste, involved in the project, together with the University of Ljubljana, in order to share initial results of the project and to obtain detailed information on the topic. The workshop was attended by various actors, including RFI (Rete Ferroviaria Italiana, i.e., the Italian railway infrastructure manager) and various local and cross-border transport and logistics companies. TheWorkshop also involved the conduction of a survey, which was to be carried out through the establishment of two focus groups. The paper is structured as follows:Sect. 2 Methodology; Sect. 3 Data; Sect. 4 Results; Sect. 4.1 Results deriving from the first Focus group; Sect. 4.2 Results deriving from the second Focus group; Sect. 5 Discussion and conclusions.

2 Methodology

The event was structured in two different moments. It started with a plenary session, in which in addition to institutional greetings, the preliminary results of the project were presented, including data on modal shift on modal shift propension and first estimated impacts on a regional scale.

Afterwards, the participants were divided into two groups for participation in thematic focus groups, each consisting of 5–10 participants selected from public and private stakeholders, including representatives of local authorities, transport companies, researchers, etc.

There is no unambiguous definition of the methodology called focus group in literature, but it is mainly defined as a survey technique for social research [2].

There are different types of focus groups defined according to such elements as:

- composition of the groups;
- degree of structuring;
- role of the moderator;
- combination of several criteria.

The methodology employed is of a qualitative nature and has been widely implemented within the social sciences. Its purpose is to investigate participants' attitudes, behaviors and perceptions on a specific topic. This methodology is predicated on the interaction of a small group of people who are guided by a moderator, an expert on the subject analyzed, who conveys and stimulates discussion in order to bring out different points of view [3]. This approach is widely regarded as highly effective in comprehensively understanding participants' thoughts and opinions, while also stimulating further pertinent areas of discussion. However, it is important to note that the focus group does have its limitations. These limitations can be attributed to the representativeness of the participants and the influence of group dynamics on the answers given [4].

Each focus group was overseen by a moderator and followed a semi-structured outline. Conversations were recorded (with informed consent), transcribed and subsequently analyzed using thematic coding methods [5] to identify recurring patterns, divergences and operational proposals.

3 Data

Table 1. Questions posed to the first focus group

Objectives	Question	Type of response
CRITICALITIES	What are the main challenges at operational, economic and environmental level related to cross-border railway transport services?	Response per keyword
OPPORTUNITIES	What strategies have been already adopted and/or considered to overcome such criticalities?	Response per keyword
SCENARIOS: OPERATIONAL ASPECTS	Based on the level of influence (high, medium, low) of technological innovations, what scenarios could be realized and with what impacts?	Open reply
SCENARIOS: ECONOMIC ASPECTS	Based on the level of influence (high, medium, low) of technological innovations, what scenarios could be realized and with what impacts?	Open reply
SCENARIOS: ENVIRONMENTAL ASPECTS	Based on the level of influence (high, medium, low) of technological innovations, what scenarios could be realized and with what impacts?	Open reply

The two focus groups were conducted using two distinct thematic fields, which were designed to address the challenges and opportunities presented by technological innovation in the context of cross-border rail transport. The two focus groups were designed by means of semi-structured questions with the aim of guiding the participants in their understanding of the investigated field. Two key areas of interest were identified: The first related to the operational, economic and environmental aspects, and the second one to the investigation of the labor market and territorial aspects. The questions presented to the participants are defined in Table 1 and Table 2.

Table 2. Questions posed to the second focus group

Objectives	Question	Type of response
CRITICALITIES	What are the main criticalities at social/territorial and employment level challenges at related to cross-border railway transport services?	Response per keyword
OPPORTUNITIES	What strategies have been already adopted and/or considered to overcome such criticalities?	Response per keyword
SCENARIOS: SOCIAL AND TERRITORIAL ASPECTS	Based on the level of influence (high, medium, low) of technological innovations, what scenarios could be realized and with what impacts?	Open reply
SCENARIOS: EMPLOYMENT ASPECTS	Based on the level of influence (high, medium, low) of technological innovations, what scenarios could be realized and with what impacts?	Open reply

4 Results

4.1 Results Deriving from the First Focus Group

In detail, the questions of the first focus group revealed that the inefficiency in the management of rail traffic flows at the Italy-Slovenia border is in communication, transparency and coordination between railway undertakings. In fact, there is no transparency at the meeting points, thus creating a ripple effect which exacerbates the lack of coordination.

The least costly measure would consist in working on soft skills issues, as there is too much bureaucracy, meetings, focusing on the existing infrastructure. In the area of cross-border transport, 'soft' measures are inherent in certain key aspects such as transparency and traceability of convoys and improved coordination of agreements between different states. Furthermore, it has emerged that there is still no real international system of traceability and re-traceability that is shared, leading to the presence of a market that is still highly fragmented, with limited dynamics at national level. The regulatory 'wall' existing between the different countries hinders, also at operational level, the integration of systems and the smooth movement of goods. Overcoming these critical issues requires a joint effort to break down these barriers and promote, both at European and global level, an interoperable and integrated digital infrastructure (Fig. 1).

With reference to the second and third questions, aimed at investigating the strategies aimed at overcoming critical issues, it emerged that in order to overcome the obstacles and problems that currently hinder cross-border rail transport, attention should be paid to a few key concepts which are shown in Fig. 2. In fact, during the discussion, the participants



Fig. 1. Criticalities collected within the first focus group

stated that sharing, availability and dissemination of data and knowledge are a great opportunity for the functioning of the cross-border system and the efficient management of the flow of goods across borders. They therefore become essential in order to foster true interoperability, as they are the basis for a modern, connected infrastructure. The second concept, already mentioned in the previous lines, is interoperability, which has been at the core of European Union strategies for years now. This remains one of the most intricate and complex challenges in terms of implementation even though, thanks to the definition of standardized tools and practices, both at national and international level, significant progress has been made. Furthermore, the concept of interoperability appears to be linked to the evolution of regulations and standards, which are essential elements for the harmonization of networks, technologies and procedures between different transport systems.

Consequently, European regulations (past and present) are working precisely in this direction, and the discussion with the participants revealed that the promotion of such common operating standards can lead to the achievement of the integration of freight flows on a continental scale. Thus, through the alignment of regulations and procedures, it could generate an improvement in international and transnational operations, which today are hampered by a state-based and fragmented approach to rail transport. Consequently, opportunities are defined through the effort to overcome existing obstacles and barriers: a long-term and shared vision must be grasped.

Subsequently, an attempt was made to investigate in more detail certain aspects of cross-border rail transport related to technological innovation and what the impact of this could be, depending on the scenarios envisaged (i.e., with a high, medium, or low influence of technology), on the operational, economic and environmental aspects of this environment (as by example, please refer to Fig. 3 and 4).

The discussion of these technological scenarios can be linked to the results of the first part of the focus group, which was focused on the opportunities and challenges in the transnational railway transport sector. Specifically, data sharing and interoperability



Fig. 2. Opportunities emerged within the first focus group

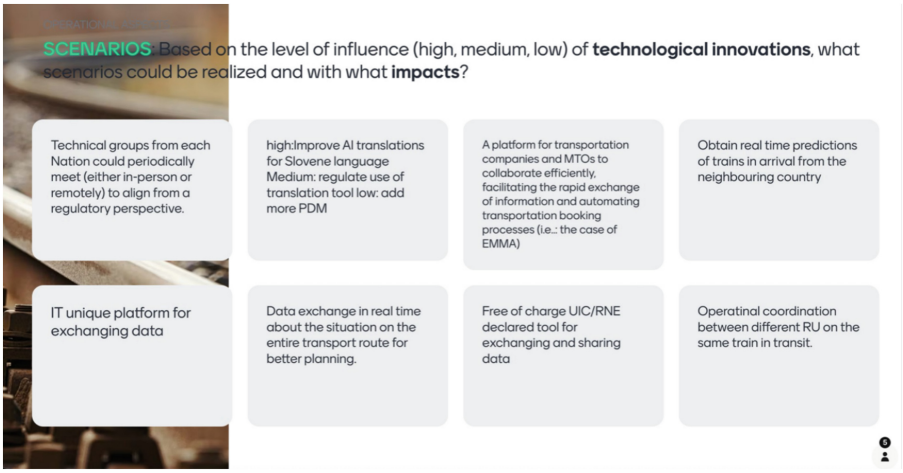

Fig. 3. Scenarios concerning operational aspects

of operations are key elements. The need to use single, free and standardized platforms that allow the exchange of information in real time, such as the UIC (UIC = Union Internationale de Chemins de fer)/RNE (RNE = Rail Network Europe) platforms, are possible and concrete answers to the fragmentation of cross-border countries, both at regulatory and operational level.

The scenario in which a high level of technological innovation is realized, e.g. simultaneous translations or the ergonomic interface for tablets, contributes to the breaking down of existing language and technical barriers. In addition, investment in multi-system locomotives and increased collaboration between operators on a single transit train, on the other hand, also represent operational solutions that would strengthen and improve

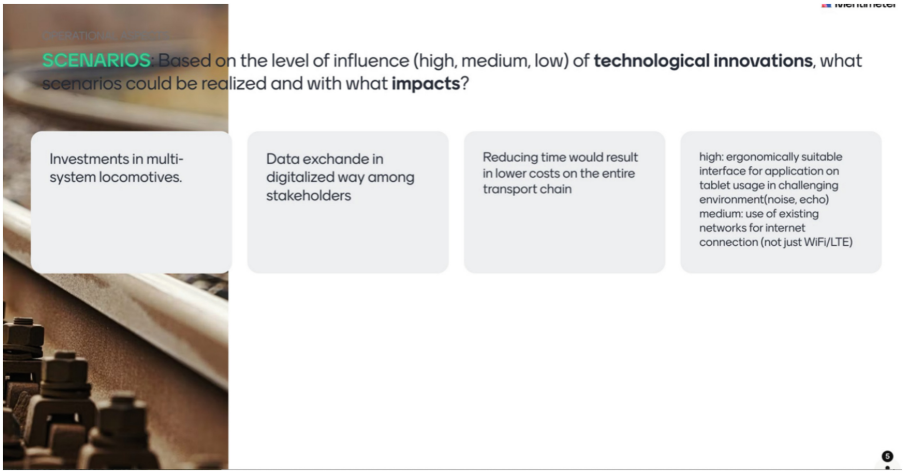

Fig. 4. Scenarios concerning operational aspects

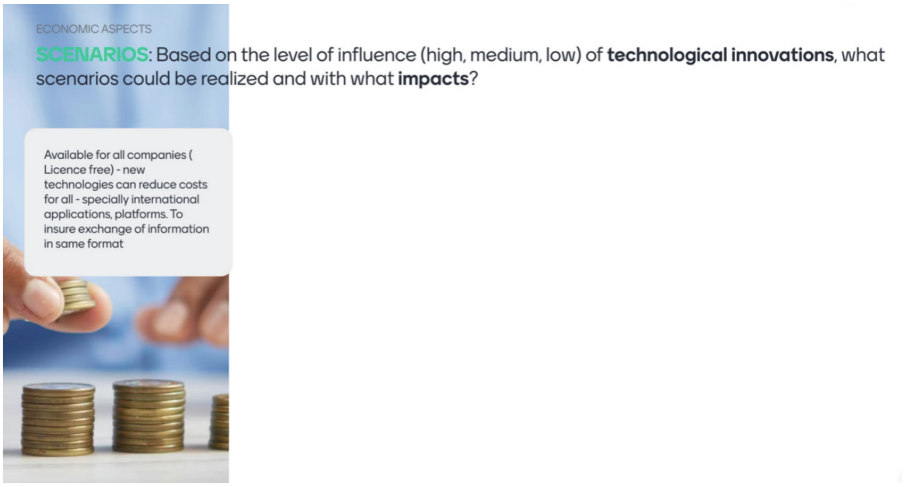

Fig. 5. Scenarios concerning economic aspects

efficiency, reducing time and costs along the entire logistics chain. From an economic perspective, open source and license-free technologies could be implemented to reduce costs, while from an environmental perspective, sustainability itself can be improved through efficient locomotive management (Fig. 5).

4.2 Results Deriving from the Second Focus Group

At the same time as the first focus group, a further focus group was carried out with the aim of investigating social and territorial aspects and the employment market, in relation to both freight and passenger transport. The answers provided by the participants,

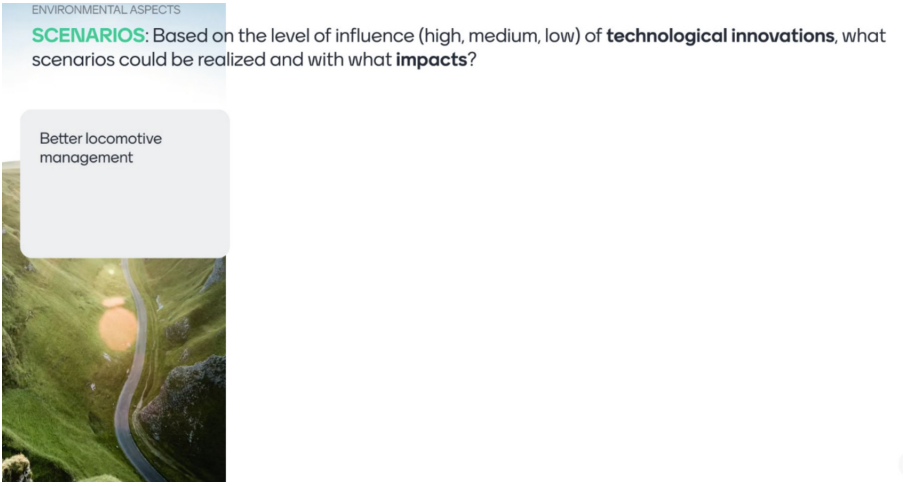

Fig. 6. Scenarios concerning environmental aspects

concerning the criticalities encountered in cross-border rail transport, highlighted several existing criticalities including technical and interoperability barriers, language barriers, which represent an obstacle not only for rail workers but also for passengers (Fig. 6).

With reference to the labor market, the main criticalities are found in wages, which are not competitive, and in the costs necessary for training. On the territorial side, the criticalities are configured more in the difficulty of creating efficient connection systems for peripheral areas and in the lack of attractiveness for young people with reference to access to services and recruitment of the new workforce.

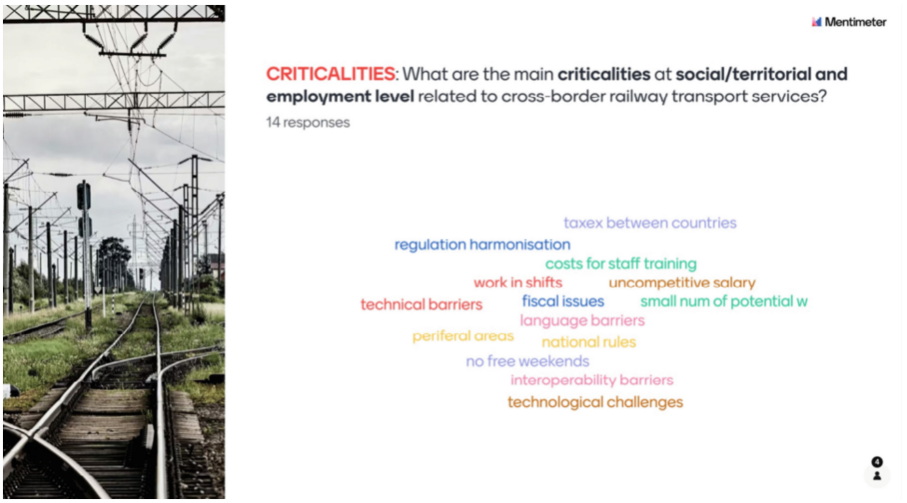

Fig. 7. Criticalities

Hence, regional and national regulations, together with technological challenges, also describe a synthetic picture that is complex and requires the implementation of coordinated actions in order to improve both the effectiveness and attractiveness of cross-border rail transport (Fig. 7).

With reference to the opportunities to overcome the critical issues that emerged from the first question, the participants proposed various strategies, including the implementation of the ETCS (European Train Control System) system, an important technological tool that constitutes an innovative solution for dealing with regulatory issues, as regulatory coordination is an indispensable factor for harmonization between different countries. In addition, various initiatives emerged from the discussion, such as language training to overcome communication barriers, and also incentives to promote the development of cross-border rail transport. Another element is the integration of systems, which is a crucial strategy for improving interoperability and overall efficiency (Fig. 8).



Fig. 8. Opportunities

Subsequently, the last two questions focused on the analysis of technological innovation scenarios (high, medium, low) with reference to territorial and social aspects and the labor market in cross-border rail transport. From the open answers and the discussion created during the focus group it emerged how the implementation of advanced systems (e.g. ERTMS - European Rail Traffic Management System - (GSM-R) > FRMCS - Future Railway Mobile Communication System) and their integration strongly influence the improvement and overcoming of existing barriers. The technological innovation that could have a positive impact is automation, providing all the necessary information to train drivers and sending commands directly to the trains. This technological innovation could generate greater attractiveness for cross-border areas and consequently increase the flow of people and goods between countries. (Fig. 9).

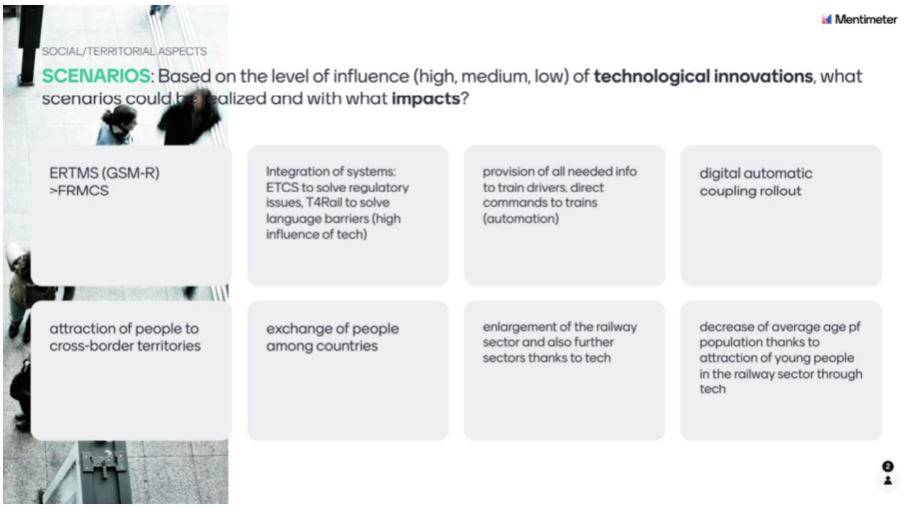

Fig. 9. Scenarios concerning social/territorial aspects

From the labor market point of view, new job opportunities within the rail transport sector could emerge from technological innovation, in terms of new professional figures related to maintenance, development and management.

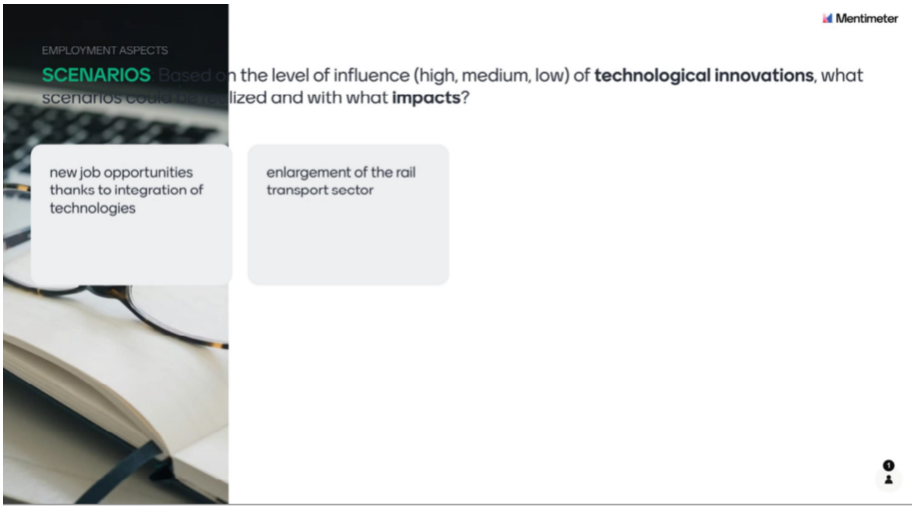

Fig. 10. Scenarios concerning employment aspects

Furthermore, it turned out that there could be an expansion of the rail transport sector as a direct consequence of technological innovation, and also other employment opportunities in related sectors (Fig. 10).

Consequently, technological innovation is a driving force for achieving efficiency, attractiveness and integration, positively impacting the territory and the social fabric, rejuvenating the workforce and facilitating exchanges between countries.

5 Discussion and Conclusion

The workshop organized within the Interreg project T4Rail IT-SI was a strategic event which allowed to disseminate the first results obtained regarding cross-border transport, through a comparison of the results obtained by the Italian research group (set up by the university of Trieste) and the Slovenian research group (belonging to the Faculty of maritime studies and transport of the university of Ljubljana based in Portorož). The data obtained during this day was collected and processed in order to expand on the results previously obtained through the administration of semi-structured questionnaires and through ad hoc interviews carried out with organizations and companies in the area. In addition, the initiative of organizing two separate focus groups to investigate the various elements characterizing cross-border railway transport enabled to highlight the potential positive impact of the implementation of technological innovations the sector.

In this framework, it emerges that the scenarios outlined consist of integrated technological strategies, capable of overcoming challenges and criticalities, seeking to exploit opportunities that are closely linked to technological innovation and the integration of the European cross-border railway systems. Technological improvement certainly constitutes a good strategy for the optimization of existing processes, but it is also a driver for the creation of new jobs and for the expansion of the sector, in light of the fact that automation and digitization could change the required skills and a higher qualification of personnel. In the near future, more actions and events will certainly be promised to help consolidate the changes taking place in cross-border rail transport.

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