



On Tackling Skill Shortage in the Rail Sector: The STAFFER ERASMUS+ project

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Abstract. The rail sector is experiencing an aging workforce that is approaching a well-deserved retirement, while rail enterprises, in many European Member States, are reporting difficulties to find railway engineers. Educational and training pathways are essential to prepare students, transitioning employees and current rail professionals for fulfilling and impactful careers in the sector for the coming decades. The EU project STAFFER, “Skill Training Alliance For the Future European Rail system” is the Erasmus+ Sector Skills Alliance for rail consisting of 31 full partners and 17 associated partners from 12 EU countries.

STAFFER is aimed at developing a holistic Blueprint strategy to recognize present and new skill needs suitably and timely.

In synergy with the European Year of Skills, a common methodology for the identification of current and future skills and competence needs for the whole complex rail system is developed.

Keywords: Future Rail workforce · Skills Gaps · Rail Digitalization · Training and Mobility Programmes · Rail Employability and Career Opportunity

1 Introduction

Europe’s railways represent the least carbon intensive mode of mass transit, contributing only 0,4% of the transportation sector’s considerable greenhouse gas emission [1]. This attribute, combined with the fact that rail has managed to be the only mobility service to become more energy efficient while increasing capacities, has led the European Commission (EC) to seek to inspire a doubling of passenger and freight rail traffic by 2030 and 2050, respectively [2]. In addition, rail is expected to serve as the backbone of the future multimodal European transport system according to the 2050 vision of the European Rail Research Advisory Council [3], while, in parallel, a digital transformation of the sector is ongoing and rail industries are attempting to deploy rapidly evolving digital technologies.

Another important challenge, currently faced by the sector, is the overcoming of existing obstacle to long-distance cross-border rail services [4].

In this context, tackling the imminent skill shortage in the rail sector is crucial. The sector not only needs to address the ageing workforce, but also the fact that highly skilled people, with IT and engineering profiles, tend not to choose a career in rail. Moreover, rail

companies struggle even to fill lower-skilled job profiles, as the demand for rail services increases with an increasingly climate conscious customer base. Finally, the rail sector needs to diversify the current workforce by attracting young people and women, which only account for around 21% of the railway sector workforce [5].

The EU project STAFFER, “Skill Training Alliance For the Future European Rail system”, is the Erasmus+ Sector Skills Alliance for rail consisting of 31 full partners and 17 associated partners from 12 EU countries. The project gathers the different parts of the complex rail world: infrastructure managers and operators, industry suppliers, educational institutions, and other different associations and organisations. It started on 1 November, 2020, upon approval by the EU Education, Audiovisual and Culture Executive Agency (EACEA) and runs over four years. STAFFER proposes to create an innovative broad European framework where the different stakeholders can deal together with skill gaps and employment risks, collaborating in defining a common perspective on the challenges to face. No similar framework has ever existed, and it will lead to consider rail to be a unique system of systems, which in turn will allow to improve supply, demand, use and development of skills in the sector.

Its objective is to help identify the main existing skill gaps and assess the future skill needs in the rail sector. Vocational & Education Training (VET) institutions and technical universities will propose adaptations to curricula, training and educational programmes, so as to address new technological developments and trends [6].

2 Methodology for Skills Needs Identification

A common methodology for the identification of current and future skills and competence needs for the whole complex rail system is developed, considering the future vision of the rail sector from the point of view of rail operators and infrastructure managers and rail suppliers.

The common methodology for skills needs identification is based on the following steps [7]:

1. Trends identification, which consists of selecting the relevant trends that are affecting the sector in terms of skills needs.
2. Occupational profiles identification, which regards the selection of rail occupational profiles affected by skill mismatch.
3. Skills gaps identification which deals with the skills needs related to the identified profiles.

The “trends identification” was based on the analysis of existing studies and in-depth interviews.

The results and findings of the literature review (projects/studies/initiatives) provided an overall view of the development of the railway sector and showed close interaction of several trends. The “trends identification” was then completed by conducting a survey among railway operators and suppliers. Through this, the level of impact of each macro and micro trend in the working field of railway suppliers and operators was determined. The survey provided a general insight into perceptions of trends, professional profiles and assessment methods of skills needs in the sector.

The “occupation profiles identification” was carried out, starting with the analysis of the ESCO, the (multilingual) classification of European Skills/Competences, Qualifications and Occupations (<https://esco.ec.europa.eu/en/classification>). Compiling the STAFFER list of rail profiles, together with the information from ESCO, helped to gain further insights about the validity of these job profiles regarding their descriptions, skills and competences. It also proved that some of the profiles identified within STAFFER are new job profiles, not already defined in ESCO.

Regarding the proposed methodology for “skill gaps identification”, the following procedure has been followed:

- Analyze micro and macro trends affecting the market and the industry.
- Project and evaluate the impact of the trends on respective business products/ services and processes.
- Break down the evaluated products/ services and processes in corresponding tasks and evaluate the changes on a task level.
- Assign relevant occupational profiles to the task level and discuss the skill gap.
- Decide on workforce adaptations: re-skilling/upskilling or separation/ new hiring.

Two parallel activities were carried out, to collect the perspectives of both operators/infrastructure manager and suppliers.

In order to learn more about specific challenges and needs as regards future skills and competences that are specific to railway operation, a number of research activities were carried out, including desk research and focus groups with company practitioners, cross-border railways, rail freight corridors and transnational cooperation. The research looked at current and foreseeable future challenges in three areas:

- Cross-border rail traffic, with particular reference to EU rail freight corridors.
- Language and communication issues in cross-border traffic.
- Skills requirements of railway personnel, including trainers and managers, as well as skills and competences of professional profiles affected by digitalisation, big data, cybersecurity as well as environmental policies.

Specific challenges and needs related to the suppliers were, instead, identified with an approach based on best practice analysis, experts’ interviews and data scrolling.

The scope of the data scrolling was to explore the actual talent demand on the job market for rail suppliers, as well as an analysis about skills and their request development over the past four years. These big data analyses are especially interesting to get insight of big trends in skills that are reflected in job postings.

3 Results

The results of the first phase about trend identification, conducted through literature research and surveys, revealed as main macro trends “technical changes”, “society”, “environment and politics” and “economics and market”. For each trend, specific micro trends were assigned and their relative importance was estimated. The surveys results show that the most important micro trends came from the “environment and politics” and “economics and market” macro trends. The importance of the “environment and politics”

trend can be explained by a growing environmental mindset to reduce emissions and the fact that the railway sector is seen generally as an environmentally friendly mode of transport. Within the “economics and market” macro trends, it is worth highlighting the micro trend related to new mobility solutions, such as mobility as a service or mobility on demand, which play an important role for the integration of rail services into multimodal transport solutions.

The results about the analysis of the occupational profiles show that the profiles with the highest need for adaptation include engineers and digital and IT technicians, as a result of new digital technologies and the increasing complexity of the rail system, with a consequent increased necessity for data security and an increased demand for data analysis, as shown in Fig. 1.

From the operators and infrastructure manager point of view, 30 occupational profiles were identified in different domains of railway operation and infrastructure management on the basis of ESCO, the (multilingual) classification of European Skills/Competences, Qualifications and Occupations.

Three occupational profiles /groups were selected for an in-depth analysis as they are particularly relevant in terms of the impact of main trends, such as digitalization, and expected changes due to emerging technologies, such as automated operation, digital traffic control, disruptive changes in infrastructure and maintenance of rolling stock as well as construction (BIM, digital twins, predictive maintenance, etc.). These three groups are:

- Train drivers (including train driver instructors).
- Occupational profiles in traffic control centers (dispatchers, signal box staff, etc.).
- Occupational profiles in infrastructure and maintenance, including engineering profiles.

Regarding the third phase of skills gaps identification, a survey was conducted during May and June 2021, promoted by the European rail associations for operators and infrastructure managers CER and rail suppliers UNIFE, which gathered more than 80 responses from 19 European countries.

When asked which skills are missing and are necessary in the future, participants indicated “applying and handling digital technologies”, “skills and overall knowledge about the railway systems” and “new collaboration forms” as the most important trend, as depicted in Fig. 2. Moreover, hard and soft skills, such as “language skills” or “innovative and open learning attitudes” and “cultural skills” were also deemed important.

From the rail operators and infrastructure managers point of view, responses showed that there is a general trend from medium to more advanced skill levels across all occupational profiles.

The main drivers of an upward skill shift are new technologies, digitalisation and automation. A detailed about the skill needs for train driver is shown in Fig. 3.

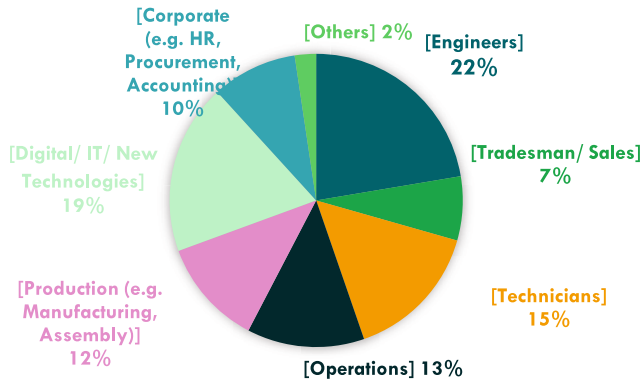


Fig. 1. Occupation groups with the highest need for skill adaptation

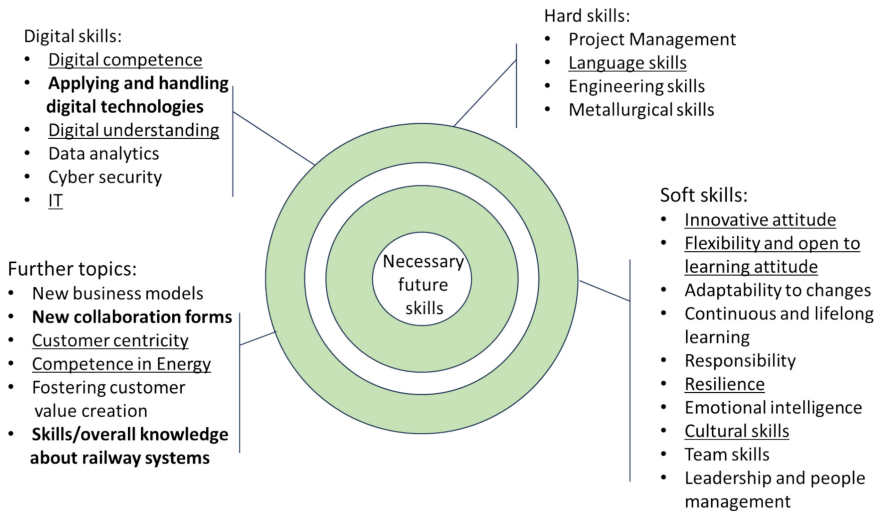


Fig. 2. Necessary future skills of the workforce

Another finding is that greater efficiency and employability in cross-border rail could be achieved with shifting mindsets from national-focused to more European-focused. This would require more European railway knowledge and intercultural competences, including soft skills like communication, problem-solving, autonomy and resilience, learning motivation and openness. From the suppliers' point of view, five most relevant future skills needs were identified, which are highly related with each other: "collaboration", "problem solving", "holistic understanding & system thinking", "bridging of traditional and digital approaches" and "life-Cycle Management".

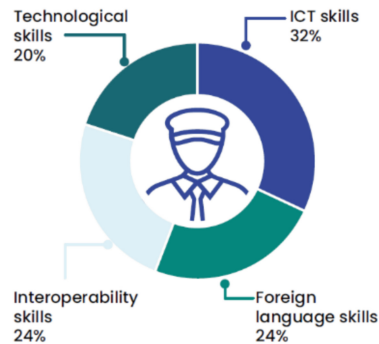


Fig. 3. Train driver: fundamental future skill needs as highlighted by survey participants.

4 Conclusions

STAFFER is defining a long-term and sustainable strategy to fill the gap between the supply of and the demand for a suitably skilled workforce. In addition, a long-term action plan is going to be developed and endorsed to roll-out the project results at the different territorial levels. Upon the identification of current and future skills and competence needs for the whole complex rail system, suitable training and education paths and curricula are designed, developed, and validated for effectively increasing employability and career opportunities. Results highlight the need of a better understanding of the existing mismatch between the current promotion strategy and what the target groups find attractive about the rail sector. The goal is to help making the rail sector more attractive to current and future employees, with an attention to diversity and gender balance issues.

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