

# KEY FINDINGS D3.1 and D3.2

“Identification of current and future skills and competence needs from the supplier point of view“

Public version

**Mafex & Siemens Mobility**

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**STAFFER**  
EUROPEAN RAIL SKILLS ALLIANCE



# Overview

- Aims: Main activities of WP3 and its reports
- Workflow
- Applied methodologies
- Main Results
  - 3.1 Future vision of the rail sector from the point of view of suppliers (finished)
  - 3.2 Identification of skill needs and occupational profiles from the point of view of suppliers
- Expected benefits for rail sector
- Lead authors contact



# AIMS

The main activities of this WP will consist of:

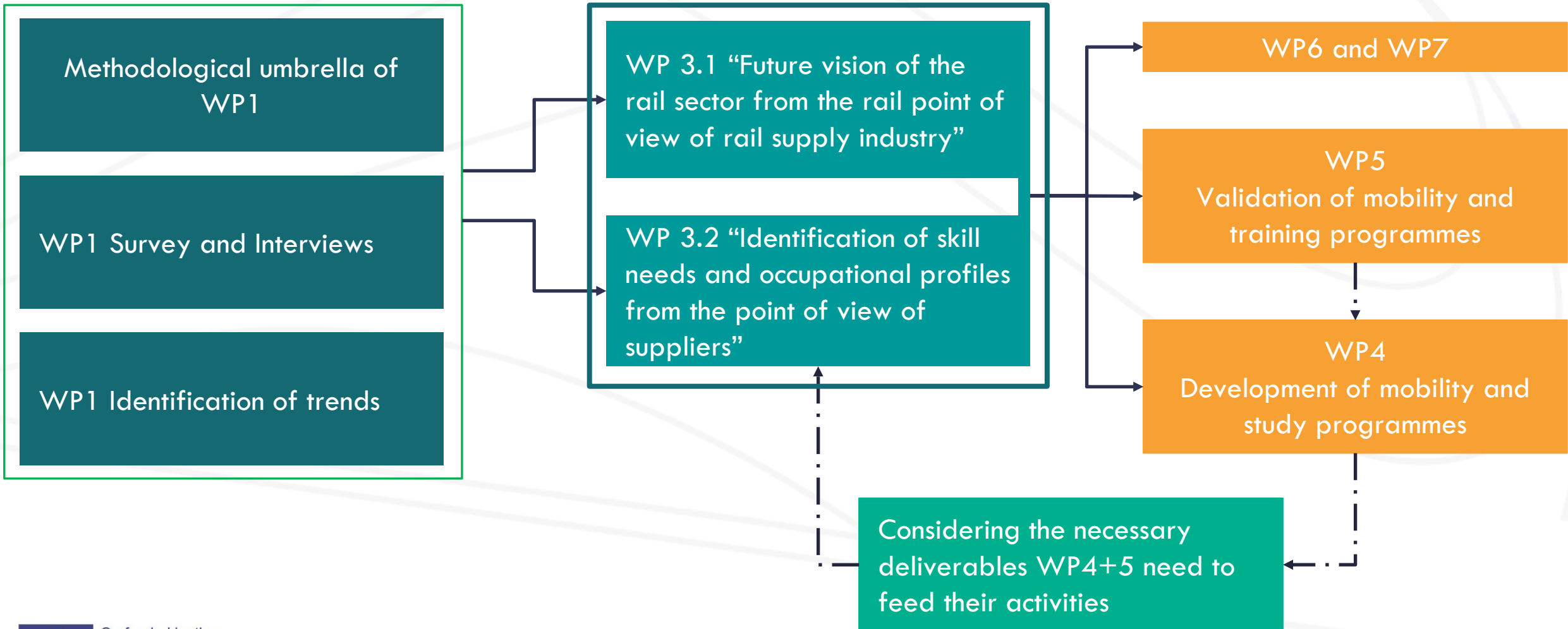
1. The definition of a future vision of the rail sector from the point of view of suppliers. The analysis of the needs of the rail supplier will take into account the current trends of the rail sector and their specific impact on rail industry suppliers;
2. The application of the methodology developed in Task 1.2 in order to identify the skill needs and occupational profiles from the point of view of operators and infrastructure managers.

Report 1 (3.1) “Future vision of the rail sector from the rail point of view of rail supply industry”

Report 2 (3.2) “Identification of skill needs and occupational profiles from the point of view of suppliers”



# WORKFLOW





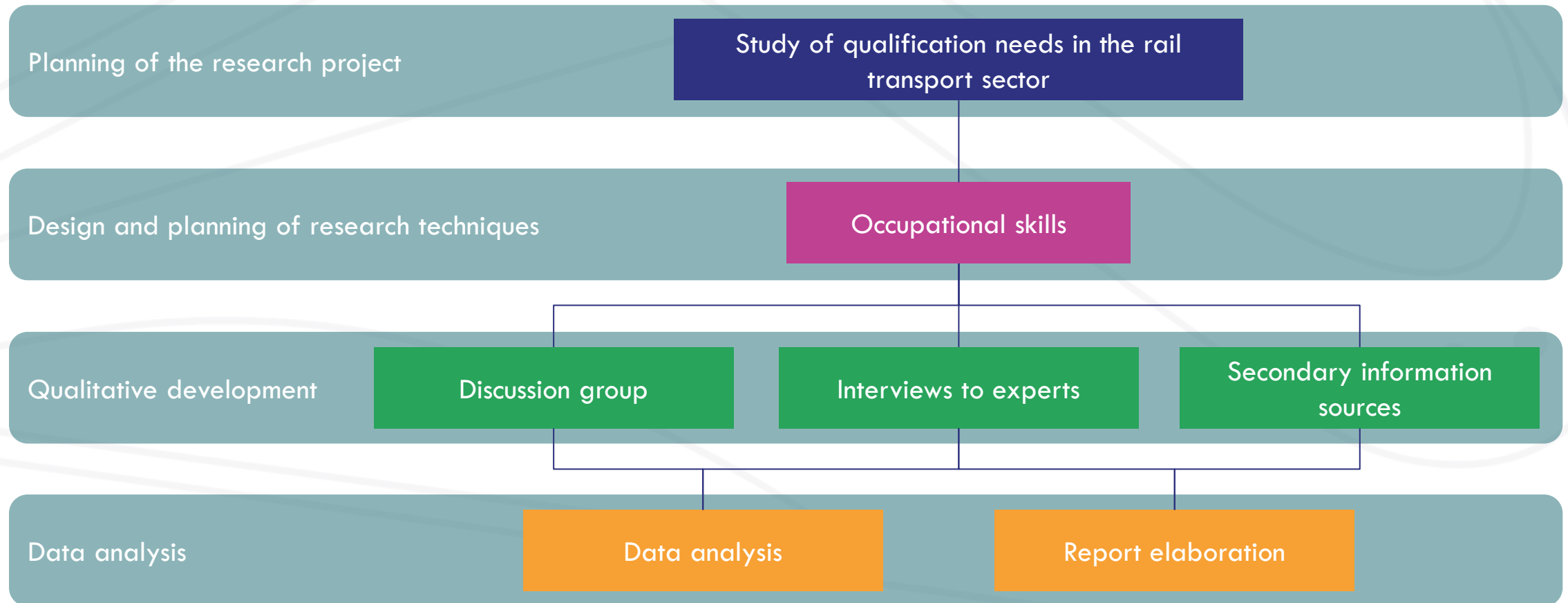
## WP3.1

# Future vision of the rail sector from the point of view of suppliers



# APPLIED METHODOLOGY – Report 1

## 3.1 Future vision of the rail sector from the point of view of suppliers



# MAIN RESULTS – Report 1

## 3.1 Future vision of the rail sector from the point of view of suppliers

- **Description** of Task 3.1:

This task will provide the definition of one or more possible future scenarios with reference to the Rail 2030 and 2050 where rail transport in Europe is the backbone of an intermodal “Mobility as a Service” within cities and beyond, for both passengers and goods, meeting the needs of customers, EU citizens and society.

- **Result** of Task 3.1:

The main results will be summarized in a document/ first report. This document will report the vision of the rail sector from the suppliers’ point of view.

Furthermore it will set the basis and prepare the background for the identification on the skill needs performed in Task 3.2, as well as rail supplier related activities as set out in WP 4, 5, 6 and 7.



# MAIN RESULTS – Report 1

## 3.1 Future vision of the rail sector from the point of view of suppliers

Injection of capital to favor the green transition, including investments in rail transport for the modification of safety and interoperability legislation

Driving demand for high-capacity rail public transportation solutions, especially in cities and congested areas

Improved conditions for new operators to invest in the sector, increasing the demand for new rolling stock vs. protectionist policies that impose barriers to entry (e.g. China)

Leading Chinese OEM CRRC is significantly increasing its exports, putting great pressure on rolling stock prices

The competition in costs and the reduction of margins is driving the demand for standardized rolling stock, for which savings of 15% in manufacturing are expected

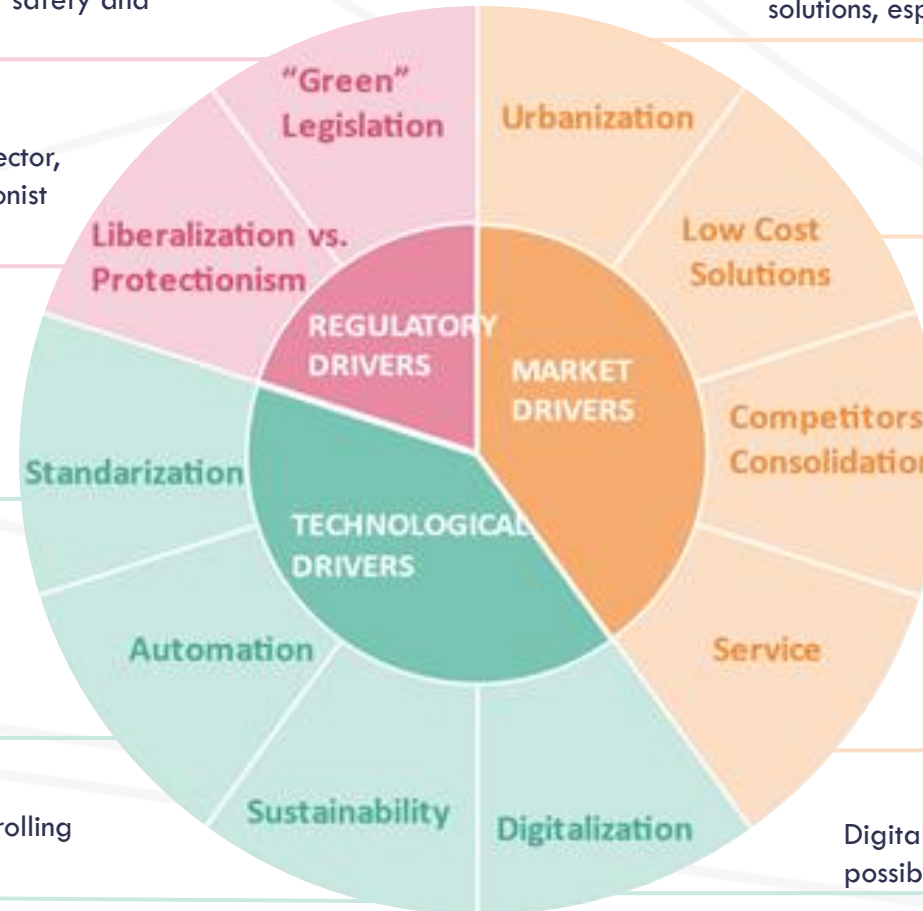
The optimization of costs and competitiveness is causing a consolidation of the sector, currently 71% of the market is in the hands of 10 OEMs

Autonomous rail systems will continue to grow in the future, especially boosting the market for urban vehicles such as metros and trams

Changes in the bases of competitiveness, which are increasingly governed by being a full service provider than by the manufacture of quality rolling stock

Technological change in the propulsion of the rolling stock and favoring the market growth

Digital technologies allow real-time monitoring, offering the possibility of developing increasingly advanced services





# MAIN RESULTS – Report 1

## 3.1 Future vision of the rail sector from the point of view of suppliers

We could say that the rail supply was lagging behind other industries in terms of adapting training approaches, in relation to taking advantage of new technologies that allow new ways of capabilities. In this sense, the lack of standardization is one of the main barriers in the sector. The progressive substitution of electronic components for mechanical components and the reduction in the useful life of assets, has promoted standardization, therefore, the sector's ability to match skills offer with the future skills demand.

The slide before shows that the **growth of the rail market** is being driven by urbanization of the planet and people's awareness towards sustainability. The related **main drivers** of the rail market are

- Technological drivers, based on digitalization, sustainability, automation and standardization
- Market trends, based on urbanization and servitization



# MAIN RESULTS – Report 1

## 3.1 Future vision of the rail sector from the point of view of suppliers

In depth discussions from the rail industry including the information from the WP1 - survey, from the rail suppliers' point of view several **skills shortages** will be expected or are already experienced:

- Systems engineering
- Remote condition monitoring
- Cloud based signalling
- Virtual reality simulators and trainers
- Cybersecurity
- Big data analysis
- Different customer service skills (for autonomous services)

The rail industry also believes that there will be a **need of “generic” skills** as rail transforms into a more modern, technology driven industry with stronger links and integration with all transport networks, education providers, manufacturing and government. These generic skills could be

- Problem solving skills
- Communication Skills
- Association skills





# MAIN RESULTS – Report 1

## 3.1 Future vision of the rail sector from the point of view of suppliers

From the supplier's point of view, there is a strong believe that **technological innovation** and **new technologies** are the **key driving forces** for **future new skills** in rail supply industry.

Technological innovations deliver more optimized asset management and operations, offer greater energy efficiency and deliver stronger safety outcomes. New technologies have the capacity to significantly change the type of skills required by rail suppliers.

Next to technological innovations, also **non-technical capacities and skills** will be needed such as communication and a collaborative or partnering mindset. Leaders of rail organizations will need to be skilled in effective change management strategies to navigate through uncertainties and risks. Non-technological skills will influence the workplace attitude towards flexibility, adaptation to change a commitment to continuous learning derived from the variety of technologies that will impact the industry in the coming years.





## WP3.2

# Identification of skill needs and occupational profiles from the point of view of suppliers





# MAIN RESULTS – Report 2

## 3.2 Identification of skill needs and occupational profiles from the point of view of suppliers

- **Description** of Task 3.2:

By using the overall methodology developed in WP1, this task will give report about the results of research on existing evidence for the rail sector; furthermore it will give an overview about the results of monitoring and evaluating feedback from supplier companies regarding future skills and competence needs.

- **Result** of Task 3.2:

The main results will be summarized in a document/ second report. This document will describe the results of research on existing evidence for the sector, but also the results of monitoring and evaluating the feedback from supplier companies regarding future skills and competence needs. It will feed into the activities as set out in WP 4, 5, 6 and 7.



# APPLIED METHODOLOGY – Report 2

## 3.2 Identification of skill needs and occupational profiles from the point of view of suppliers

- Basis = definition provided in Task 3.1 and the analyzed trends
- Collecting and analyzing the stakeholders' requirements
- Identifying the needs in terms of training provision
- Identifying the occupational profiles with reference to the classification of the European Skills, Competencies, Qualifications and Occupations (ESCO)

### Good & Best Practices about Skill Development

- Summary of good and best practices by considering the rail supply stakeholders
- Overview about programs and trained skills
- Future skills from WP1 survey

### Spreadsheet of Occupational Profiles

- Table of Occupational Profiles with skills and competences based on ESCO
- Expert interviews: Input about critical incidents and skill needs from internal experts of the stakeholders' companies

### Data Scrolling by an external Partner

- Evaluation of Data Scrolling as another source pool for the actual talent demand and analysis of skills for rail supplier
- Based on about 1 Mio. worldwide job postings



# MAIN RESULTS – Report 2

## Results from reviewing the spreadsheet by experts

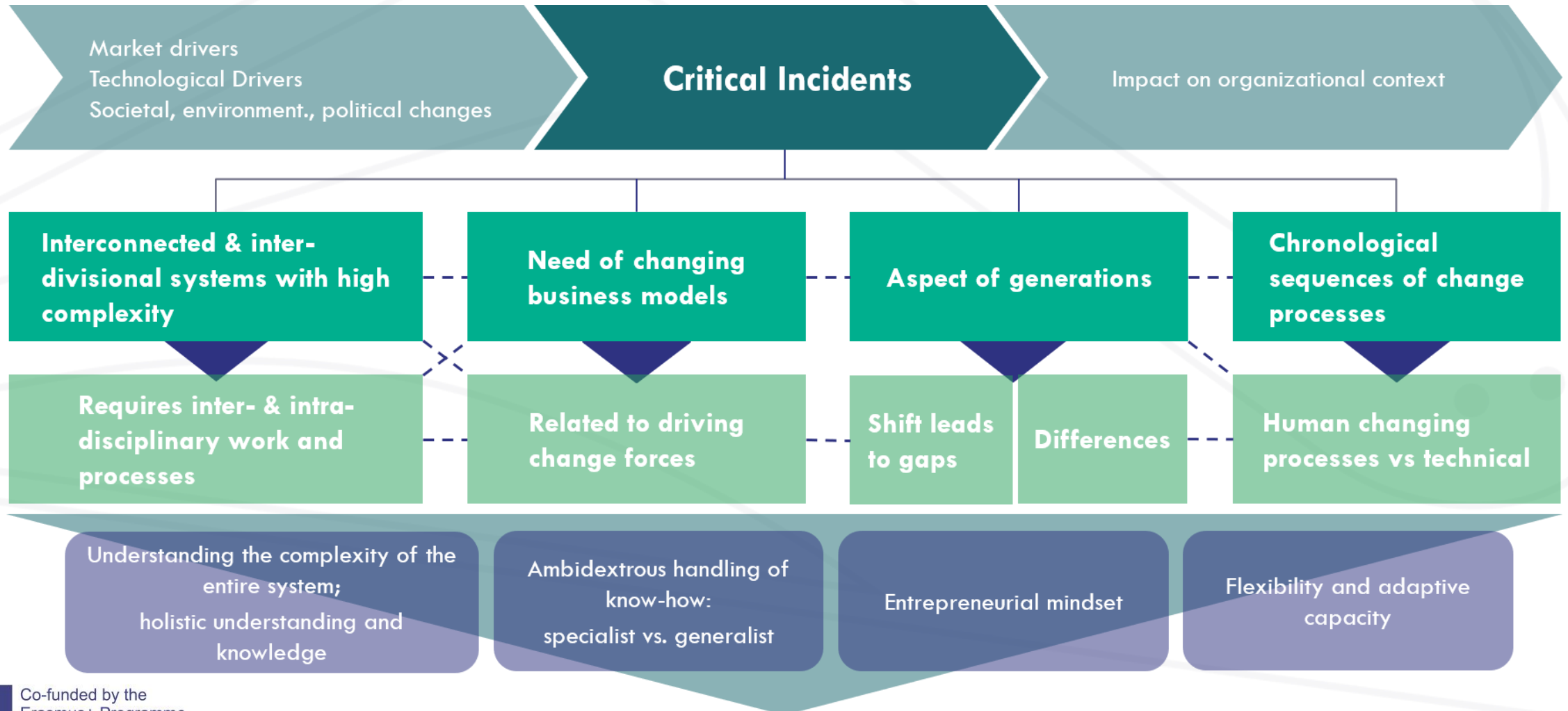
- Spreadsheet combined with expert interviews, discussing these two leading questions:
  1. What kind of changes are to be expected in a digitalized world?
  2. What future skills need to be built up?
- Challenges and difficulties within the interviews:
  - Many of the listed profiles are not yet seen as urgent enough for today's challenges
  - Prediction of particular profiles like Robotics or AI is strong related to the uncertainty of the point of time and scope in which these profiles will be need

Reviewed Occupational Profiles	
Electrical Engineers	Computer Engineers
Civil Engineers	Automation Engineers
RAM/ LCC Engineers	Vehicle Architecture
Software Engineers	System Engineers
Programmers	Mechanical Engineers
Telecommunication Engineers	Safety Engineers
ILS Manager	Information Technology Engineers
Welding Engineers	Artificial Intelligence Engineers
Welding Technicians	
Non-Reviewed Occupational Profiles	
Railway Engineers	Network Engineers
Signal Processing	Transportation System Engineers
Robot Engineers	Process Engineers



# MAIN RESULTS – Report 2

## Overall results from the expert interviews







# MAIN RESULTS – Report 2

## Overall results from the expert interviews

First of all, the expert interviews proved that **dramatic skills shifts** in single job profiles are not the only essential key element, but there is **also a need for re- and up-skilling the workforce in a general way**.

The slide before shows the basic approach from the supplier's point of view: Before discussing and searching for future skills and competences, **critical incidents** need to be considered. What does that mean? Critical incidents are **those situations and processes where the changes will be or are already located and are giving impacts**. Finding these critical incidents enables to figure out appropriate skills and competences – and furthermore it gives the opportunity to retrace the directions of ongoing impacts and related job fields.

So, the figure in the slide before shows how skills have been identified by considering these critical incidents which are driven by several trends. This technique helps to understand the context and derive the skill need from it, furthermore it includes diverse perspectives on future development of the trends stated in WP1.





# MAIN RESULTS – Report 2

## Future skills and the search for the black swan

Summing up all the insights the report gained from expert interviews, research, discussions and the results from the survey in WP1, two directions of future skills and competences could be stated:

- The one direction goes hand in hand with the changes within specific job profiles and job fields, which **require specific skills** especially driven by technological trends and innovations. Part of these job profiles had been discussed on base of the spreadsheet with the experts.
- The other direction shows that required future skills and competences are no rare black swans, which need to be desperately searched for – in fact, skills which need to be increased, changed or added could be a **mix out of very common and already existing skills**, such as collaboration for example: In the light of agile working structures, overcoming silo thinking and flattening hierarchy's collaboration gets a different meaning than before.





# MAIN RESULTS – Report 2

## Conclusions and Messages

### Good & Best Practices about Skill Development

- Companies use 70-20-10 scheme and similar approaches and strategies to keep their employees re- and up-skilled
- Skill development and its strategy is essential to keep the overall employability of the workforce

### Spreadsheet of Occupational Profiles

- Explicit prediction of future skills and competence needs is related to
  - Critical incidents in job profiles or job disciplines, driven by
  - Trends in market, society, environment, politics and economy; and
  - Strategy and business models of the company
- For sure: fields of engineering will be firstly affected, paired with strong need to build up the capacity for digitalization
- Top recommended future skills for the further WPs
  - Collaboration
  - Problem Solving
  - Holistic understanding & system thinking
  - Bridging of traditional and digital approaches
  - Life-Cycle-Management

### Data Scrolling by an external Partner



# EXPECTED BENEFITS FOR RAIL SECTOR

## Expected benefits:

- Assumptions and definition of a **future vision of the rail sector** from the suppliers' perspective
- Analysis of **current trends** that impact the rail industry from the suppliers' point of view
- Analysis and assumptions on **how the change of trends affects the skill situation, occupational profiles** and specific **job groups** (supplier)
- Collection of good and best practices for skill development, re- and up-skilling the workforce for future situations





# LEAD AUTHORS' CONTACTS

## Sabine Schneider

Siemens Mobility GmbH  
SMO HR TA&PI  
Otto-Hahn-Ring 6  
81739 Munich, Germany  
Mobil: +49 152 59436285  
mailto: [sabine.s.schneider@siemens.com](mailto:sabine.s.schneider@siemens.com)

## Garazi Carranza

MAFEX  
Responsable de Competetividad e Innovación  
Parque Empresarial Ibarraebarri  
Calle Iturriondo, 18  
48940 Leioa, Spain  
Mobil: +34 681 081 416  
mailto: [garazi@mafex.es](mailto:garazi@mafex.es)



# STAFFER

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