

# IP in your Project Proposal

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## Case Work

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# Scenario

- Your research group has been working on finding innovative solutions for transportation systems; especially on railroad transportation.
- You hold a great network among researchers on the same area, including railroad institutions and associations.
- To your knowledge, railroad companies are using advanced algorithms and data analysis softwares to tackle large amounts of data being collected worldwide to enhance safety, reliability and service to customers.
- Next generation automation technology will continue to reduce the impact of human error and human limitations on railroad operations, improving safety and efficiency.

# Main Innovation Trends in Industry

## 1. Autonomous Trains

- Using advanced sensor technology, reduce technical errors, improve punctuality, reliability, and capacity optimization in the railway industry.

## 2. Internet of Trains

- IoT-enabled advanced analytics allows railway operators to find data-driven solutions to improve fleet control and rail operations efficiency.

## 3. Artificial Intelligence

- Deep learning algorithms and neural networks help optimize train scheduling and minimize delays. Moreover, advanced passenger information systems improve transportation services and increase passenger satisfaction.

# Main Innovation Trends in Industry

## 4. Decarbonization

- The most common decarbonization solutions include replacing diesel trains with battery technology, hydrogen fuel cells, or electric trains. Furthermore, rail operators deploy electric locomotives that use energy from renewable sources, such as solar or wind.

## 5. Rail Connectivity

- 5G and other communications-based train control enables efficient rail traffic management and asset monitoring.

## 6. Passenger Experience

- Rail companies employ automatic ticketing and video surveillance, set up train delivery services, and create train hotel experiences. Video surveillance detects theft and helps optimize passenger load. Further, smartphone and mobile apps automate ticketing and price comparisons for passengers and rail companies. Boarding systems further improve last-minute booking, identification control, as well as seat assignments, and infotainment systems engage passengers during travel.

# Main Innovation Trends in Industry

## 7. High-Speed Rail

- Requires adaptation of the existing infrastructure and the development of new high-speed systems

## 8. Rail Automation

- The automation of the railway industry lately focuses on robotic systems for infrastructure cleaning and maintenance and drone technology for remote inspection

## 9. Big Data & Analytics

- By deploying smart railway sensors, millions of data points are gathered and analyzed to further improve the safety, security, and reliability of rail infrastructure. The ability to predict failures further allows rail operators to plan repairs, increasing the availability of rail.

## 10. Augmented & Virtual Reality

- Interactive train windows provide infotainment and route information while augmented reality (AR) mobile apps allow passengers to take part in rail infrastructure design. Additionally, virtual reality (VR) headsets make training more immersive and informative. AR and VR solutions allow railway companies to reduce personnel training costs and improve passenger satisfaction and loyalty, increasing their sales.

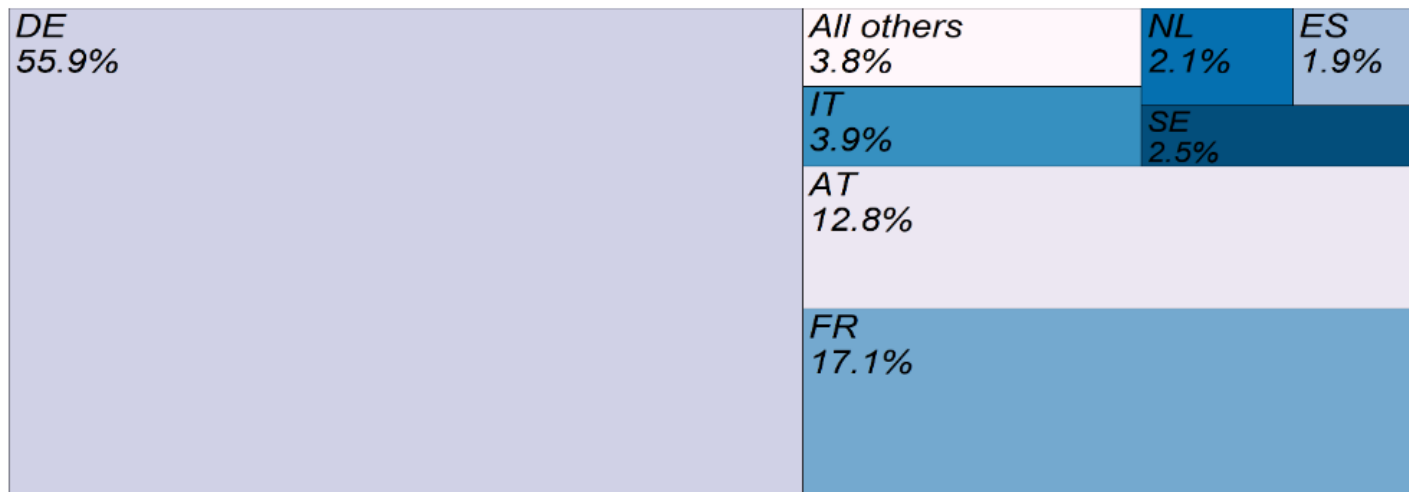
# Patenting Trends in Railroad Industry

- Railroad industry associations had a background analysis for patents and presented below CPC list as relevant to the industry:

Subsystem	Level	Definition
Control, command and signalling (CCS)	1	All the trackside and onboard equipment required to ensure safety and to command and control movements of trains authorised to travel on the network.
Energy (ENE)	1	The energy supply system, including overhead lines.
Infrastructure (INF)	1	Covers all the following INF subcategories
INF-rail	2	Rails, rail joints, and general track elements
INF-fastenings	2	Elements to fix the rail to sleepers
INF-sleepers	2	Elements to which the rail is fixed
INF-ballast	2	Foundation on which track elements are positioned
INF-switches	2	Elements to guide, shunt and transfer vehicles on the network
INF-crossings	2	Elements for rail/road level crossings
Rolling stock (RST)	1	Covers all the following RST subcategories
RST-traction	2	Traction elements (e.g locomotive and pantographs)
RST-bodies	2	Passenger carriages and freight wagons
RST-suspensions	2	Underframes, bogies and wheel axles
RST-couplings	2	Couplers, draw-gear and buffers
RST-brakes	2	Vehicle fitted related braking material

# Patenting Trends in Railroad Industry

- A look into the number of inventions by EU country shows that the vast share of patents is filed by German applicants.
- This can be explained by the country's strong manufacturing base, both of domestic and international companies.



# Scenario

- As you analyse the latest innovation trends in the industry, your research team develops a project concept for «rail automation»
- Your project proposal is built upon using drones for remote inspection of railroad vehicles, besides drones can be used to improve the safety and maintenance of critical public infrastructure.
- Currently, your research team holds a number of articles published on railroad automation systems, and your institution holds 3 patents and 1 industrial design registration on the subject matter.



# Discussion Round 1

- Please discuss potential consortium composition and expertise & background of the desired partnership
- Please discuss how you manage confidentiality when you recruit partners to the consortium
- Please discuss how you improve project concept in cooperation with the potential partners

# Discussion Round 2

- Please discuss how you demonstrate the excellence of the project proposal, what resources and analyses you use IP in demonstrating the innovativeness of your Project proposal?
- Please discuss how you identify background of your institution and partners, how you manage confidentiality?

# Discussion Round 3

- Two of the beneficiaries in your consortium have developed a concept for a novel method;
- The method is working well in the lab conditions;
- A. Potential use of the method in prototyping requires use of your protected patent,
- B. Potential commercial exploitation via of the finalised method in complete system requires use of your protected patent,
  
- How you manage the situation, regarding the IPR issues?
- What issues you consider; territory, duration, commercial potential etc.