Why digitalisation and innovation should be on the agenda of any new transportation infrastructure project?

Tallinn, 11 April 2018

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#Horizon2020

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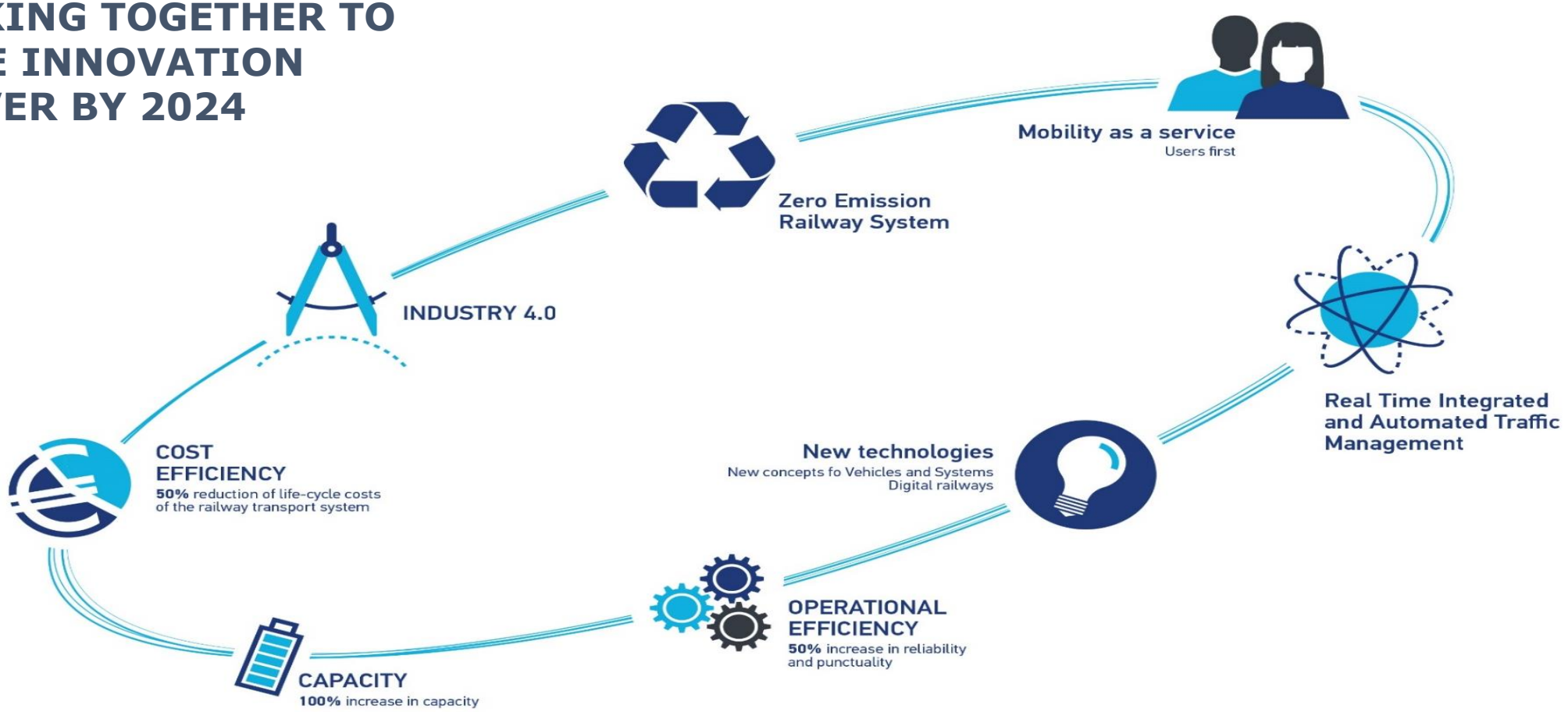
Strengthening the role of rail in the European transport system and the global competitiveness of European Industry
Challenge 1
Quality of service
Challenge 2
Cost
Challenge 3
Integrating the European rail market
Challenge 4
Infrastructure
Challenge 5
Competitiveness
Challenge 6
Skills
Challenge 7
Innovation
Challenge 8
Key challenges of the European rail sector

S2R VISION

To **deliver**
through
railway **research and innovation**
the **capabilities** to bring about the most **sustainable**, **cost-efficient**, **high-performing**, **time driven**, **digital** and **competitive**
customer-driven
transport **mode** for Europe

A PUBLIC-PRIVATE PARTNERSHIP R&I PLATFORM FOR RAILWAY WORKING TOGETHER TO DRIVE INNOVATION DELIVER BY 2024



Capability 1_Automated train operation

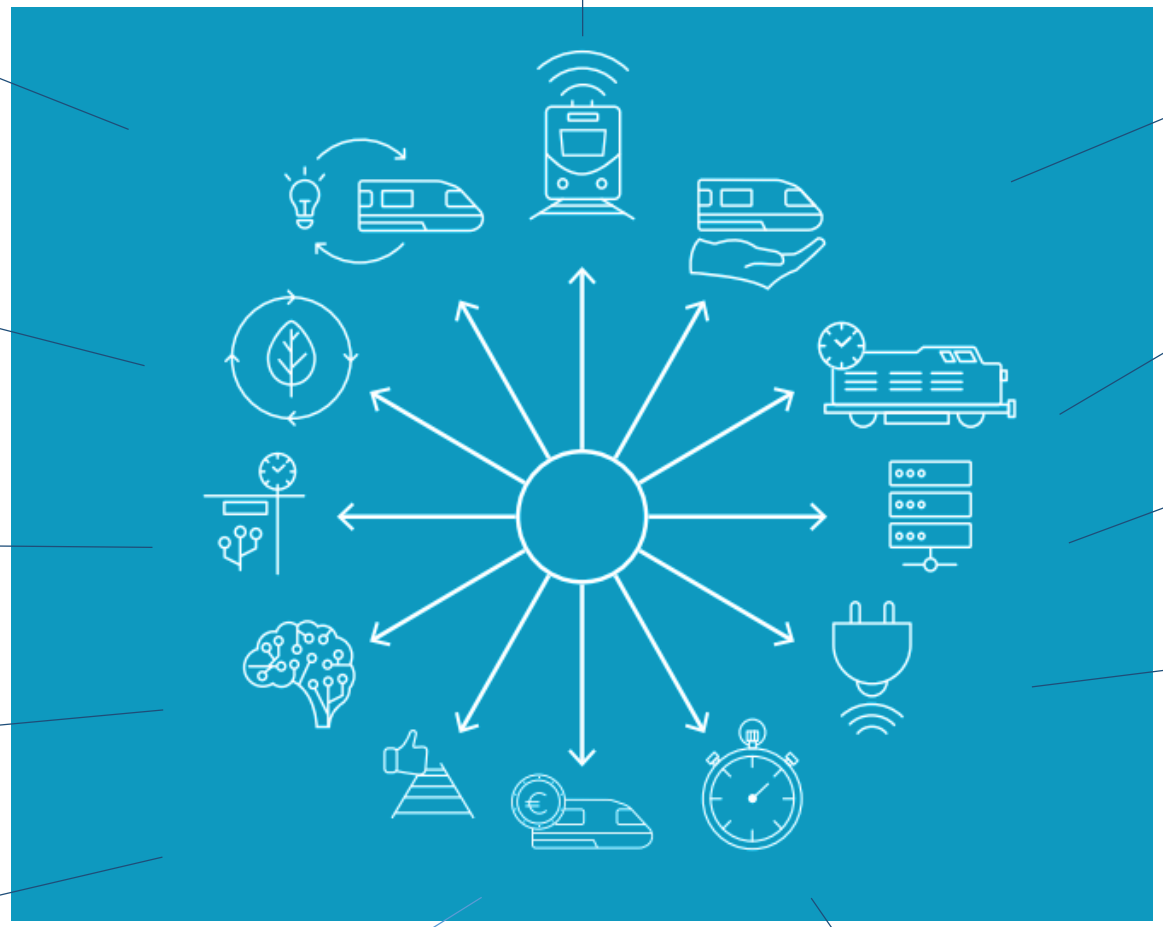
Capability 12_Rapid and reliable R&I delivery

Capability 11_Environmental and social sustainability

Capability 10_Stations and "smart" city mobility

Capability 9_Intelligent trains

Capability 8_Guaranteed asset health and availability



Capability 2_Mobility as a service

Capability 3_Logistics on demand

Capability 4_More value from data

Capability 5_Optimum use of enrgy

Capability 7_Low cost railway

Capability 6_Service timed to the second

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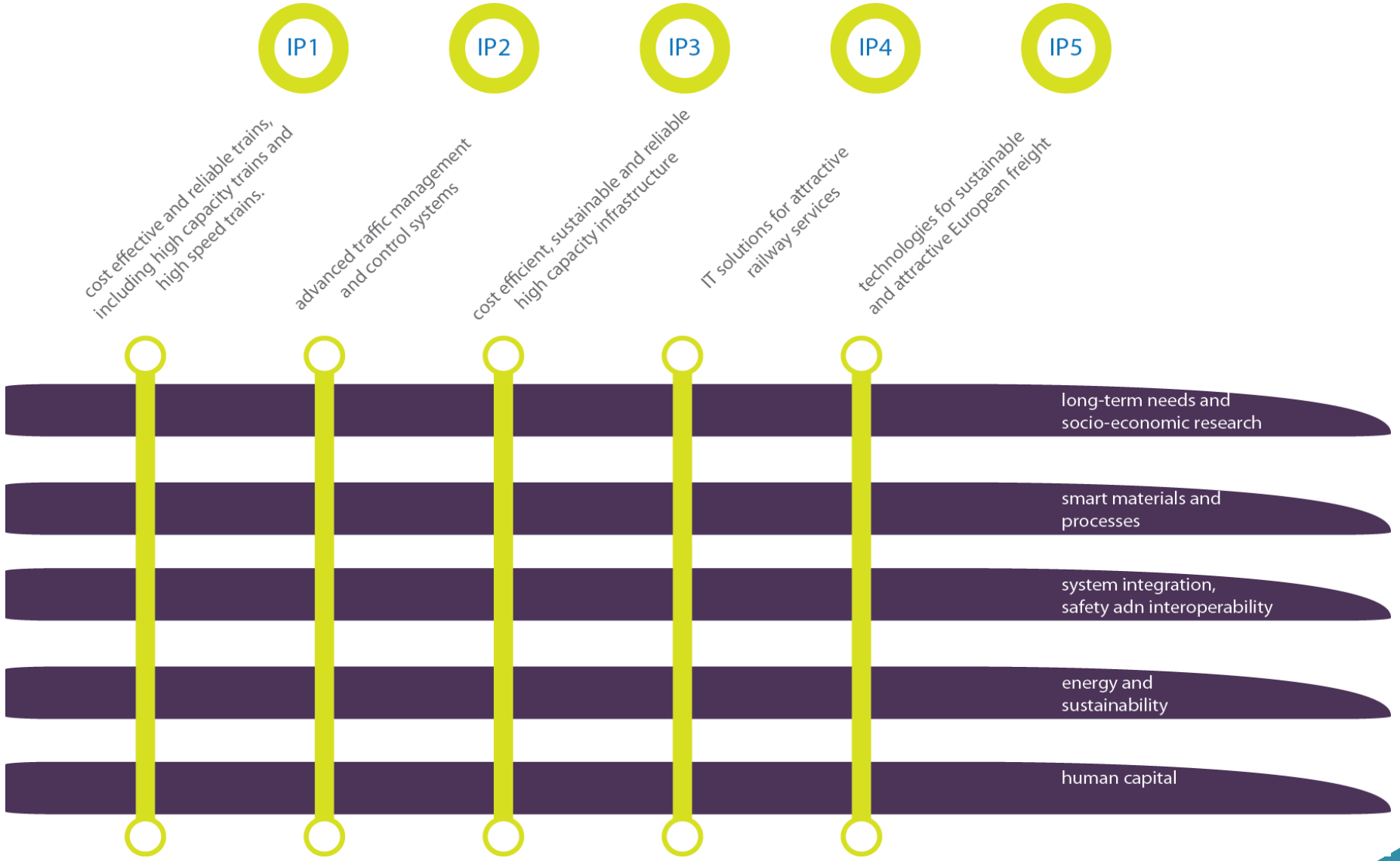
R&I for Innovation Capabilities



S2R PROGRAMME:
INTEGRATED
CONSISTENT
DELIVERY ORIENTED

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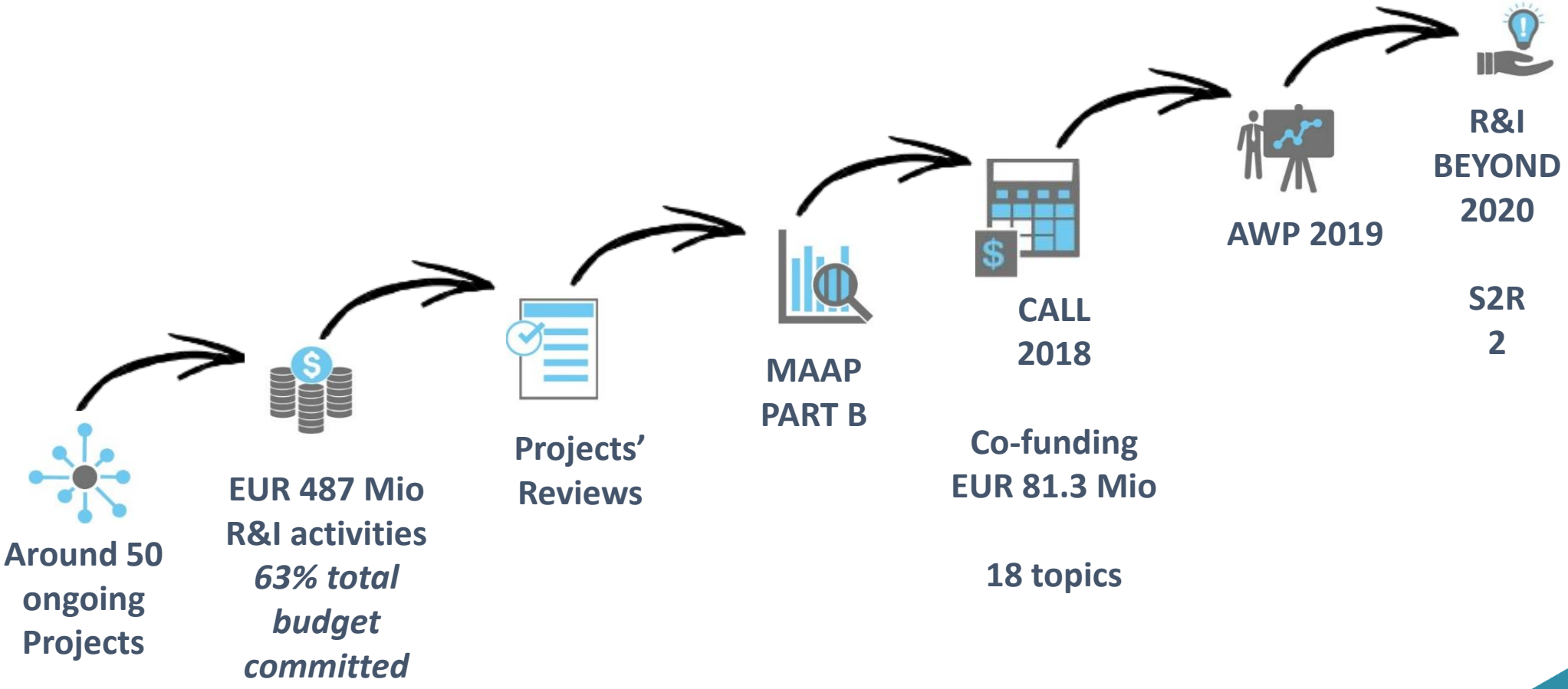
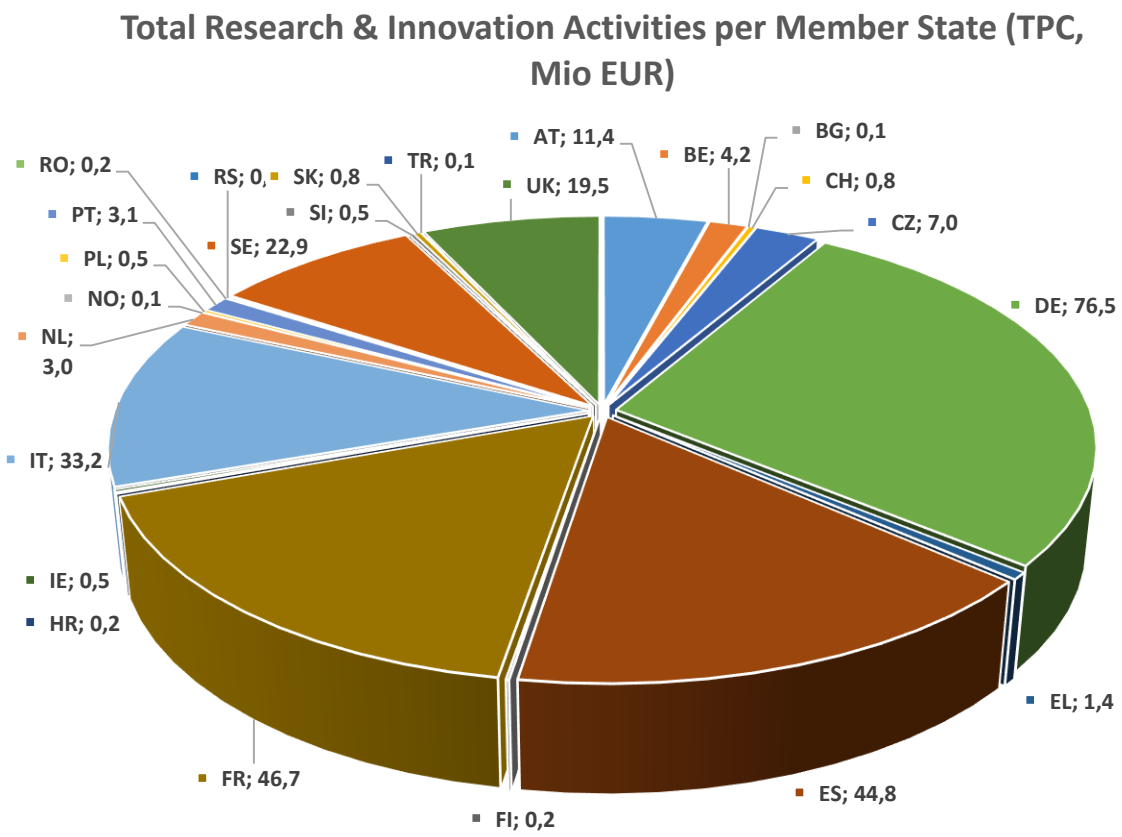
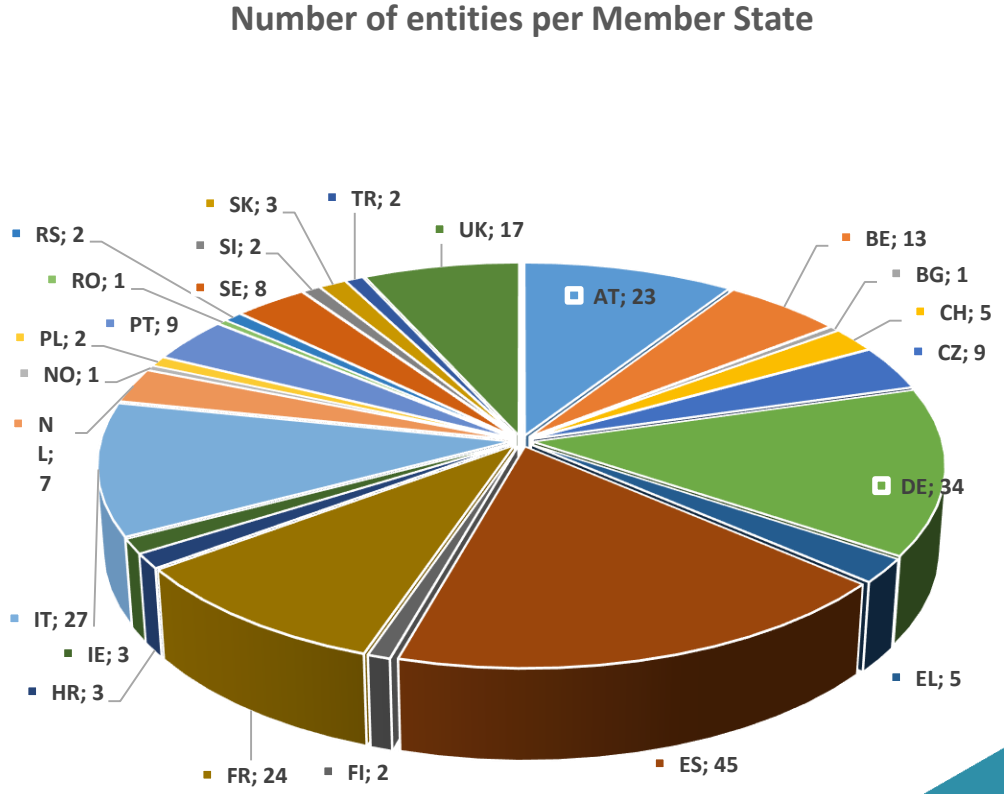
What's ongoing



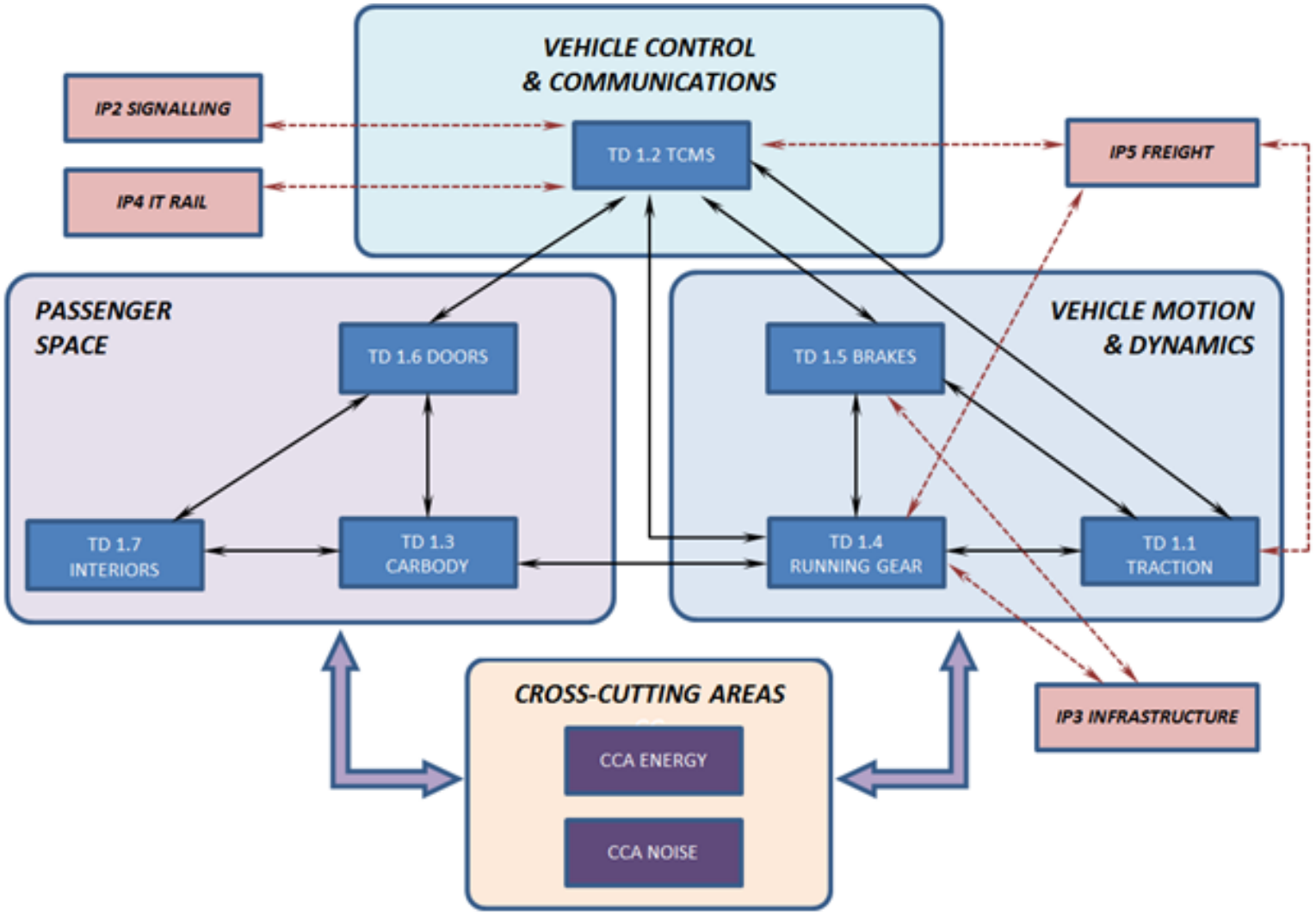
Participation per MS

excluding Lighthouse Projects, at award





IP1 Cost-efficient and Reliable Trains, including high-capacity and high speed



IP1 Cost-efficient and Reliable Trains, including high-capacity and high speed

✓**Traction system:** use of silicon carbide for higher energy efficiency, passive Cooling Equipment and Noise Reduction

✓**TCMS:** standardised interfacing for coupling different trains, use of wireless communication within vehicle/consist, drive-by-data technology and function distribution architectures – lower weight, increased services and control possibilities, virtual coupling

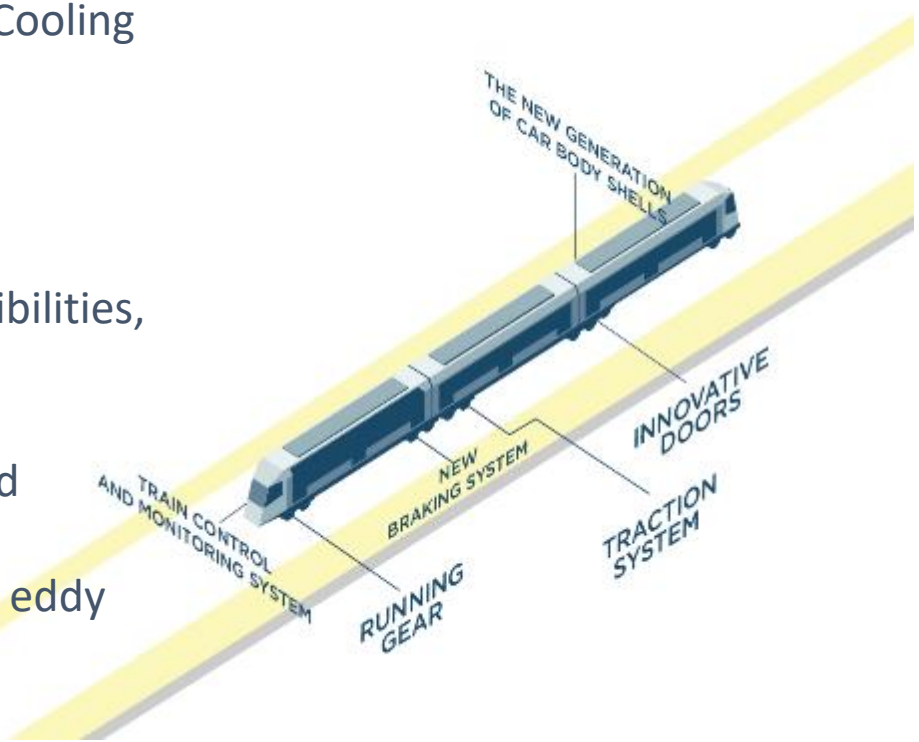
✓ **Running Gear:** Low-noise, lightweight, track friendly and sensors embedded

✓ **Brakes:** fully electric brakes, reduction of failures and noise levels; new gen eddy current brakes

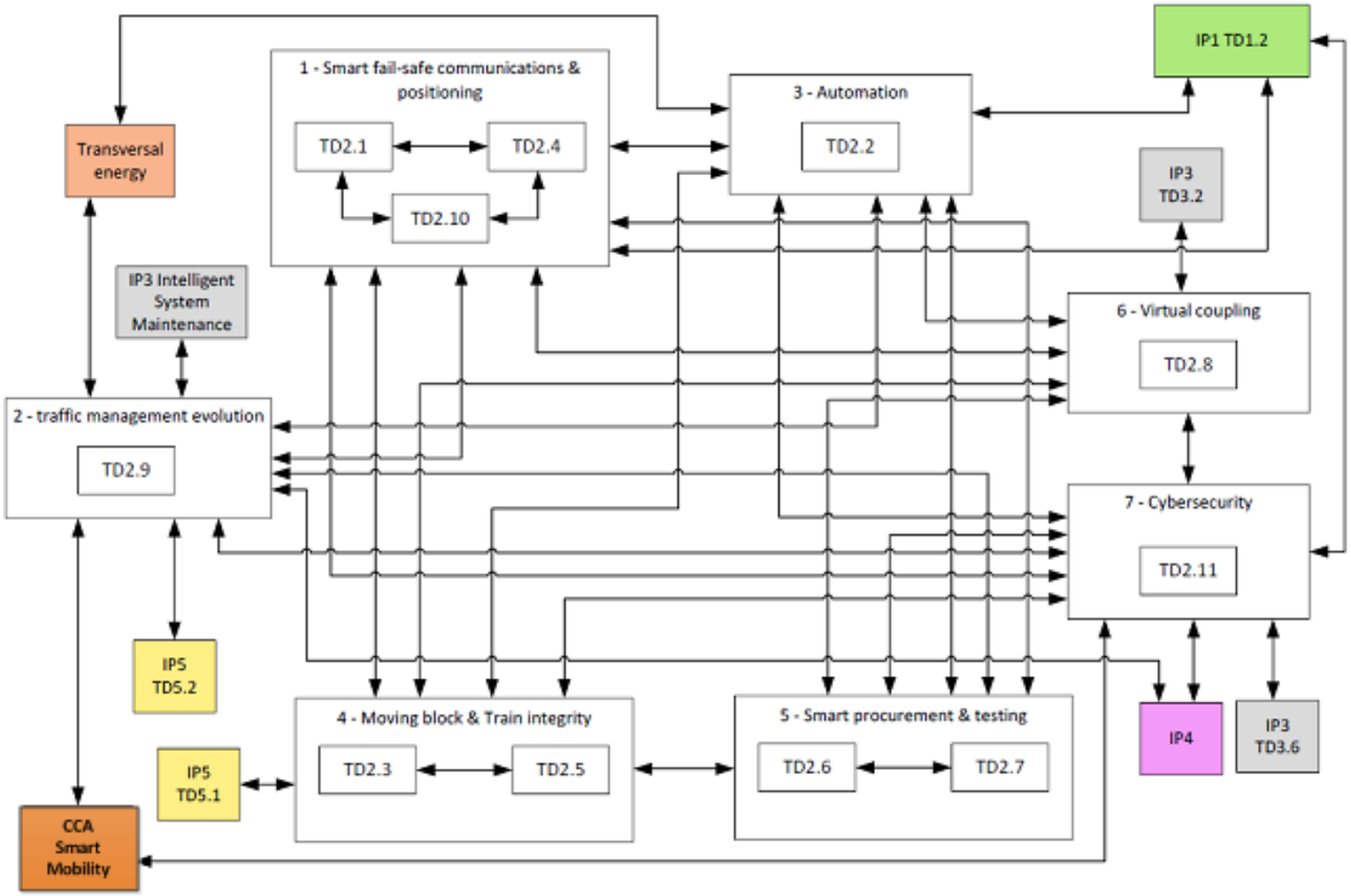
✓**Carbody shell:** hybrid use of composite materials, new designs and reduced maintenance

✓**Doors**: next gen doors, PRM access, noise attenuation and increased accessibility

✓**Interiors**: new modularity concepts, easier upgrades



IP2 Advanced Traffic Management and Control System



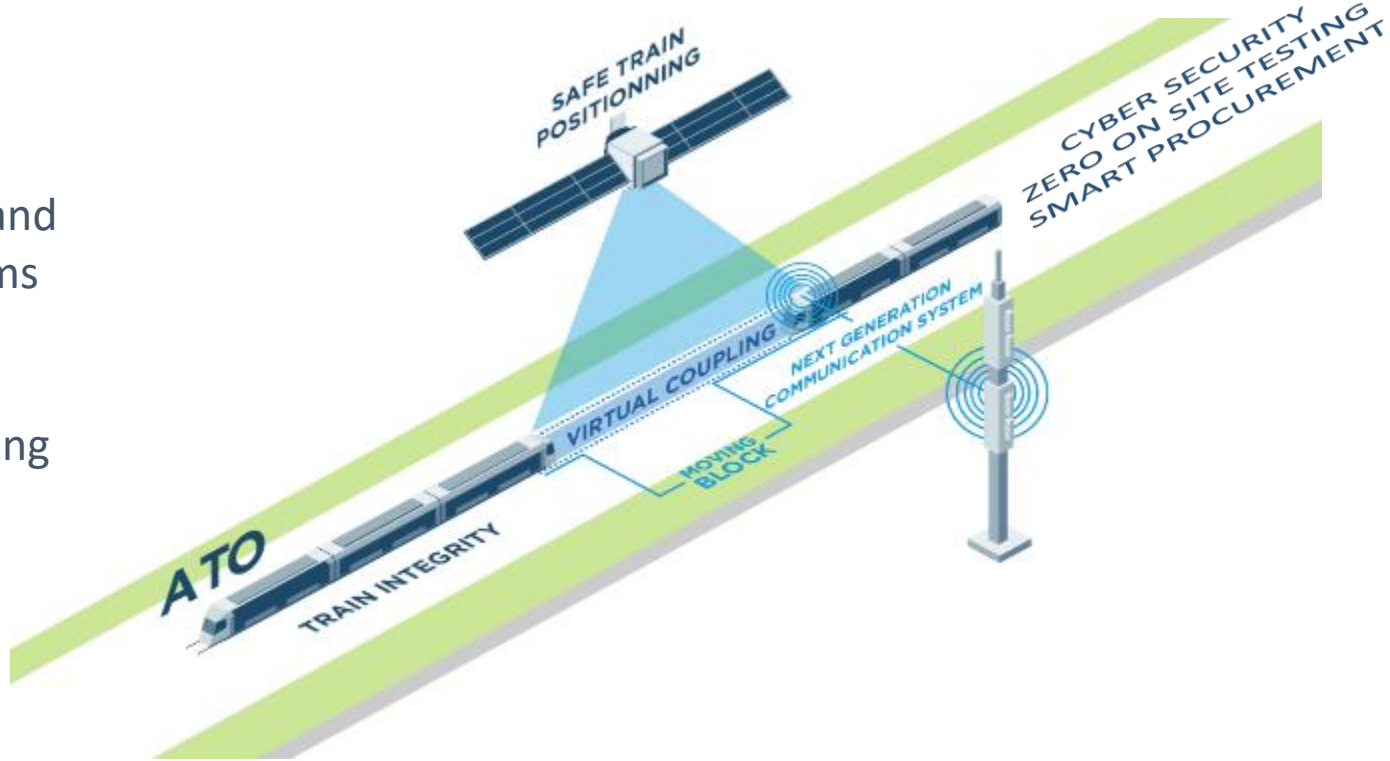
IP2 Advanced Traffic Management and Control System

✓**Moving Block** based on ERTMS/ETCS specifications and opportunity to remove trackside fixed signalling systems

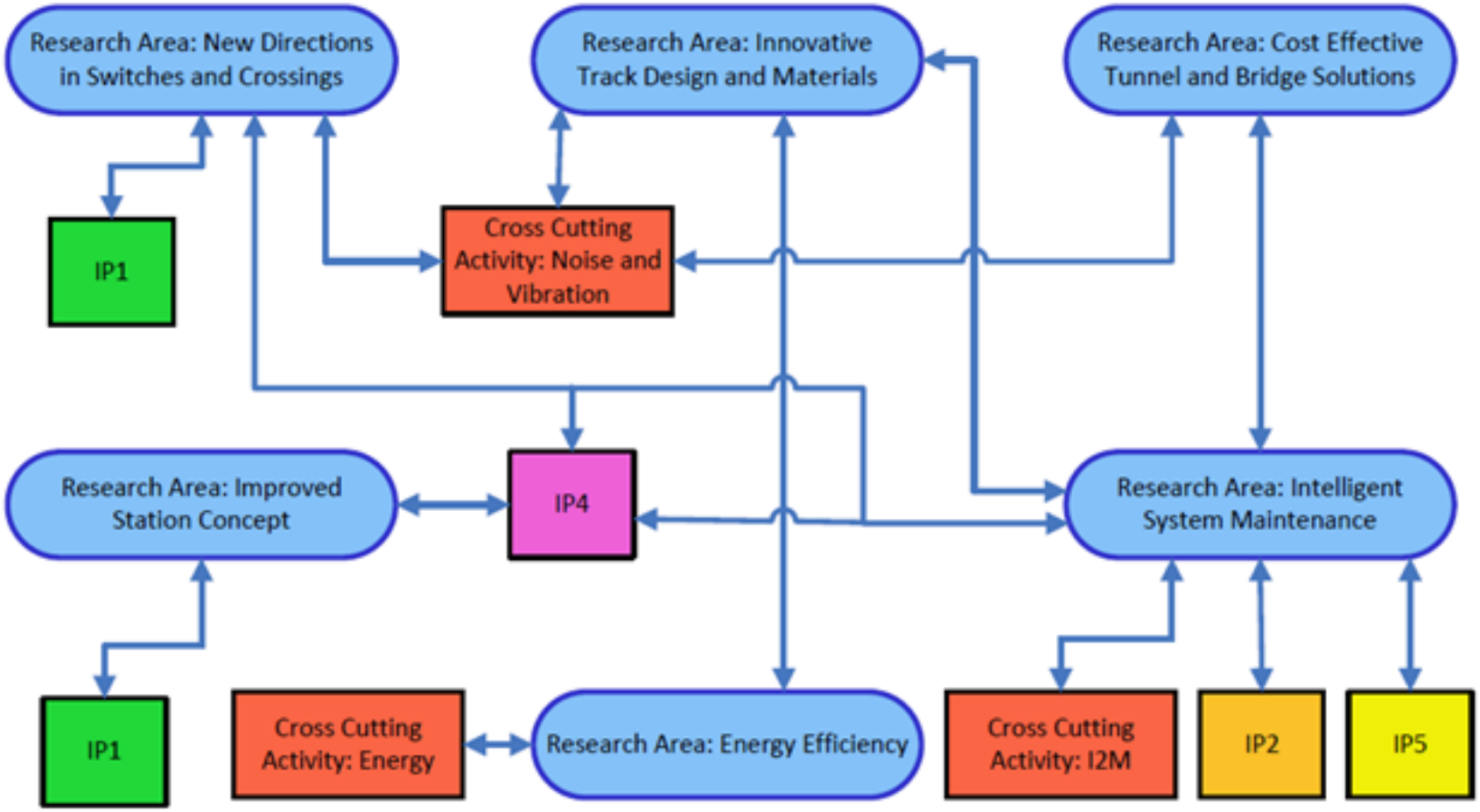
✓**GNSS/positioning systems** applied to rail to remove physical balises and facilitating the application of moving block

✓**Advanced ATO for railway lines**; GoA4 will reduce human error and increase service availability

✓**New and dynamic control of train management** – based on Virtual Coupling and On-board intelligence



IP3 Cost Efficient and Reliable High Capacity Infrastructure



IP3 Cost Efficient and Reliable High Capacity Infrastructure

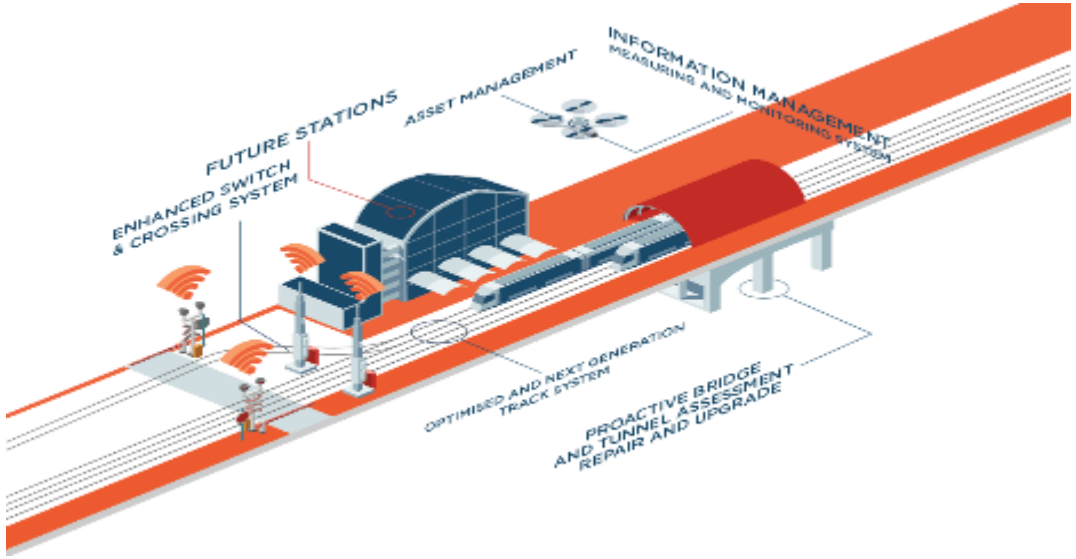
✓ **Intelligent asset management:** from reactive and/or preventive maintenance to condition based and/or predictive maintenance, based on intelligent monitoring/analysis of the assets. IT decision supporting tools and new processes/procedures. Lower costs and down-time

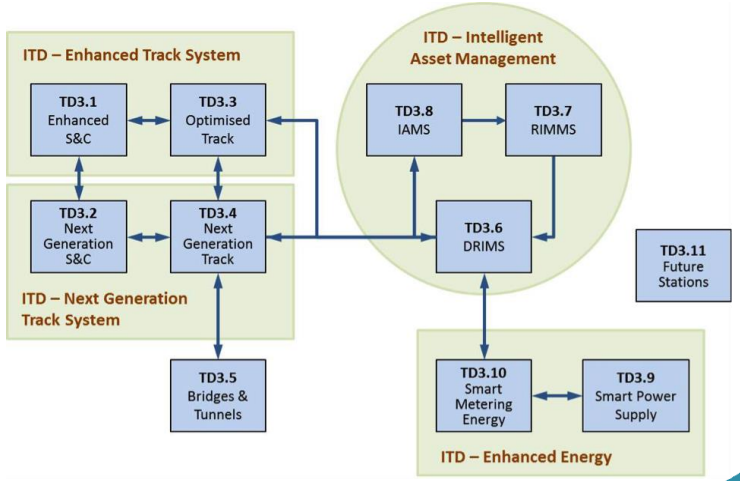
✓ **Enhanced energy management:** smart metering of the energy consumption for optimised use and power supply equipment able to optimise energy use and link to smart-grid

✓ **Enhanced track system:** new solutions to improve the life-cycle of tracks and S&C. Continuous monitoring techniques for better design solutions and automated maintenance. Noise & vibration reduction

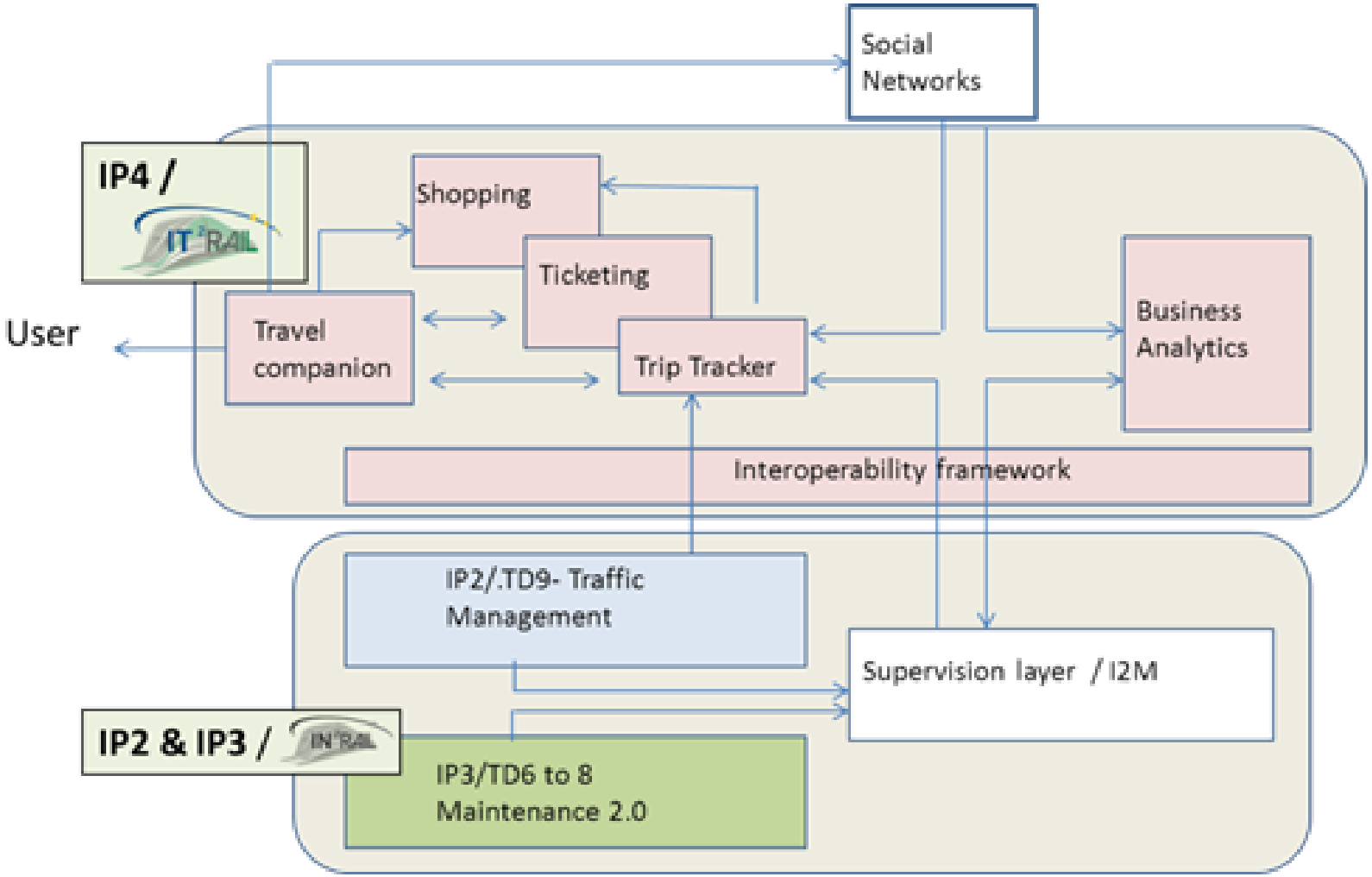
✓ **Next gen track system:** disruptive technology applicable to both track and S&C. possible tonnage increase, maintenance increased automation. Noise & vibration reduction

✓**Station:** design taking into account new IT techniques, crows flow and new management strategies





IP4 IT Solutions for Attractive Railways Services



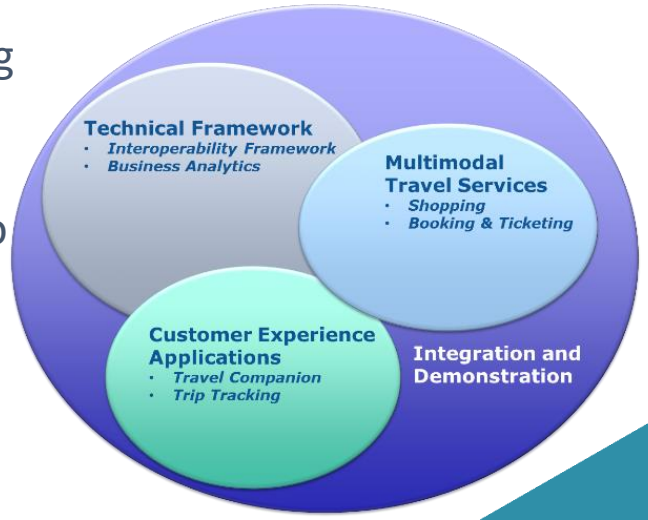
IP4 IT Solutions for Attractive Railways Services

✓ **Interoperable framework:** semantic based IT solution capable of making interoperable different databases using different standards, without the need of changing the legacy systems → creating a multimodal framework

✓ **Business analytics:** providing to the operating companies the means to understand and adapt their offer to a real time multi-modal demand

✓ **Multimodal travel services:** providing to the passenger the easy interface, masking the complexity of technical and financial interaction among the several services provider, for shopping, booking and retrieving their right to travel

✓ **Customer experience applications:** providing to the user the engine to search its travel accordingly to his/her specific needs/preferences + providing an useful companions guiding the user across the right platform or across a service disruption through an automatic re-routing, etc.

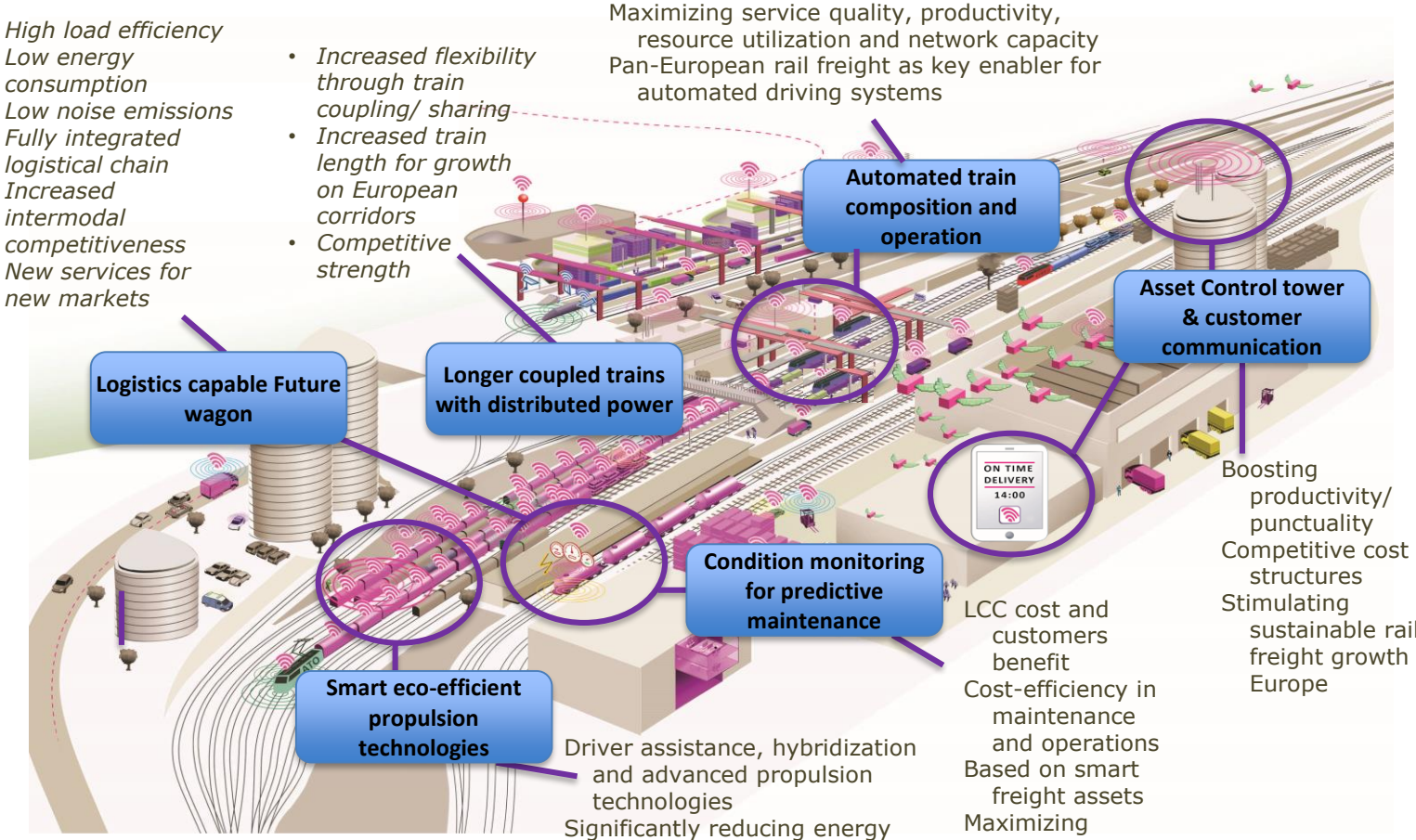


IP5 Technologies for Sustainable & Attractive European Rail Freight

- *High load efficiency*
- *Low energy consumption*
- *Low noise emissions*
- *Fully integrated logistical chain*
- *Increased intermodal competitiveness*
- *New services for new markets*

- *Increased flexibility through train coupling/ sharing*
- *Increased train length for growth on European corridors*
- *Competitive strength*

Maximizing service quality, productivity, resource utilization and network capacity
Pan-European rail freight as key enabler for automated driving systems

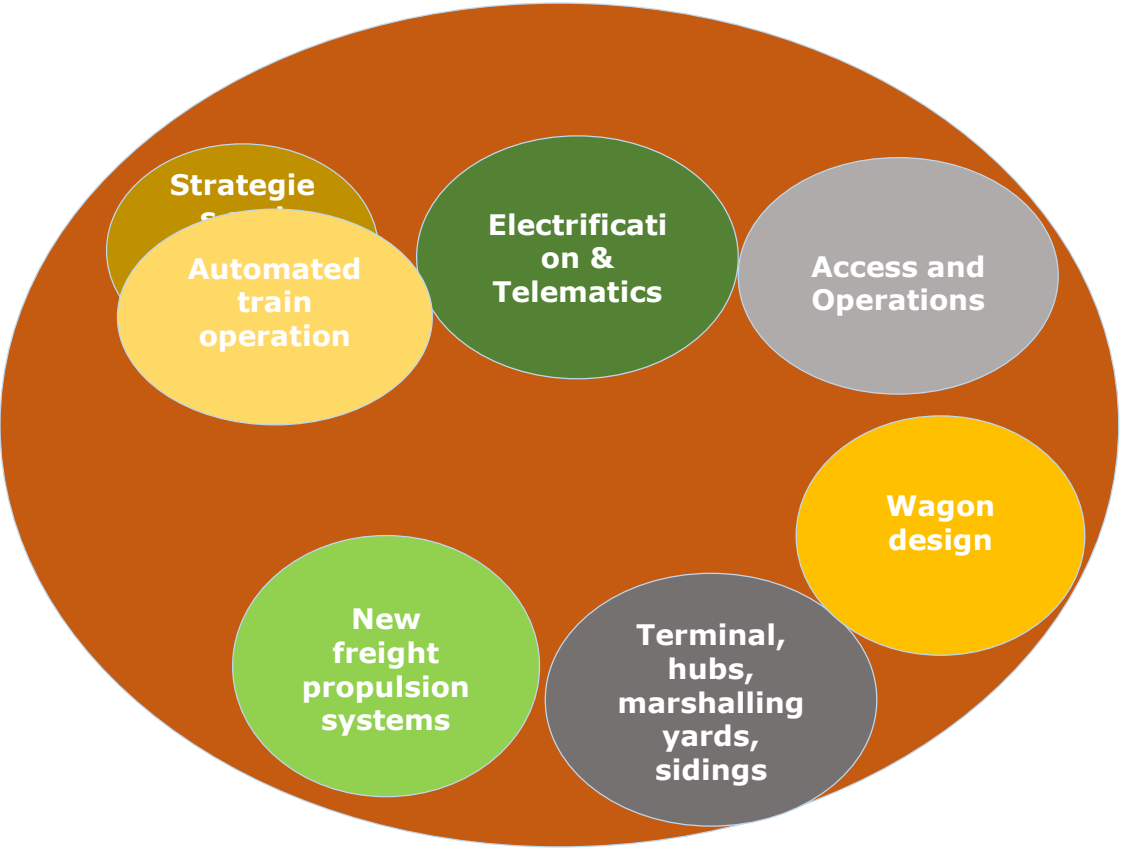


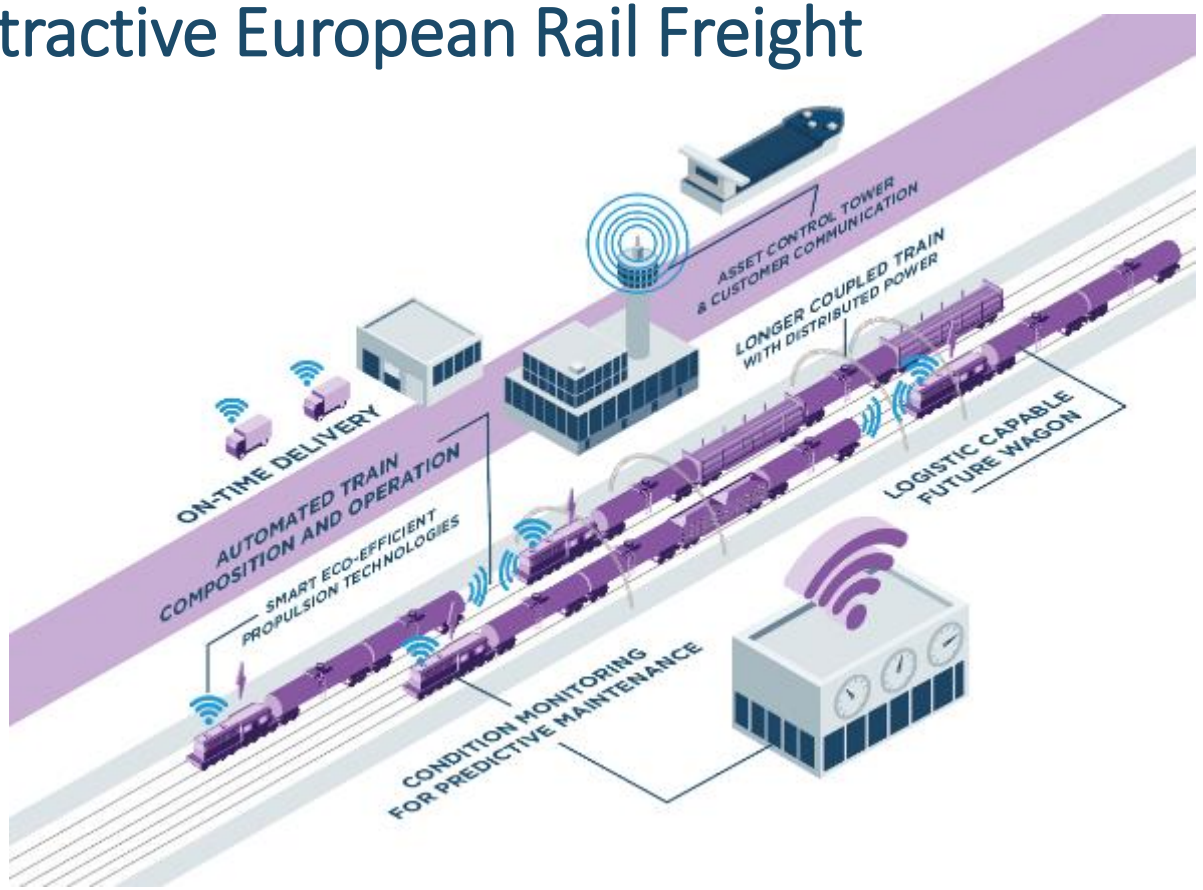
Boosting productivity/ punctuality
Competitive cost structures
Stimulating sustainable rail freight growth in Europe

LCC cost and customers benefit
Cost-efficiency in maintenance and operations
Based on smart freight assets
Maximizing reliability

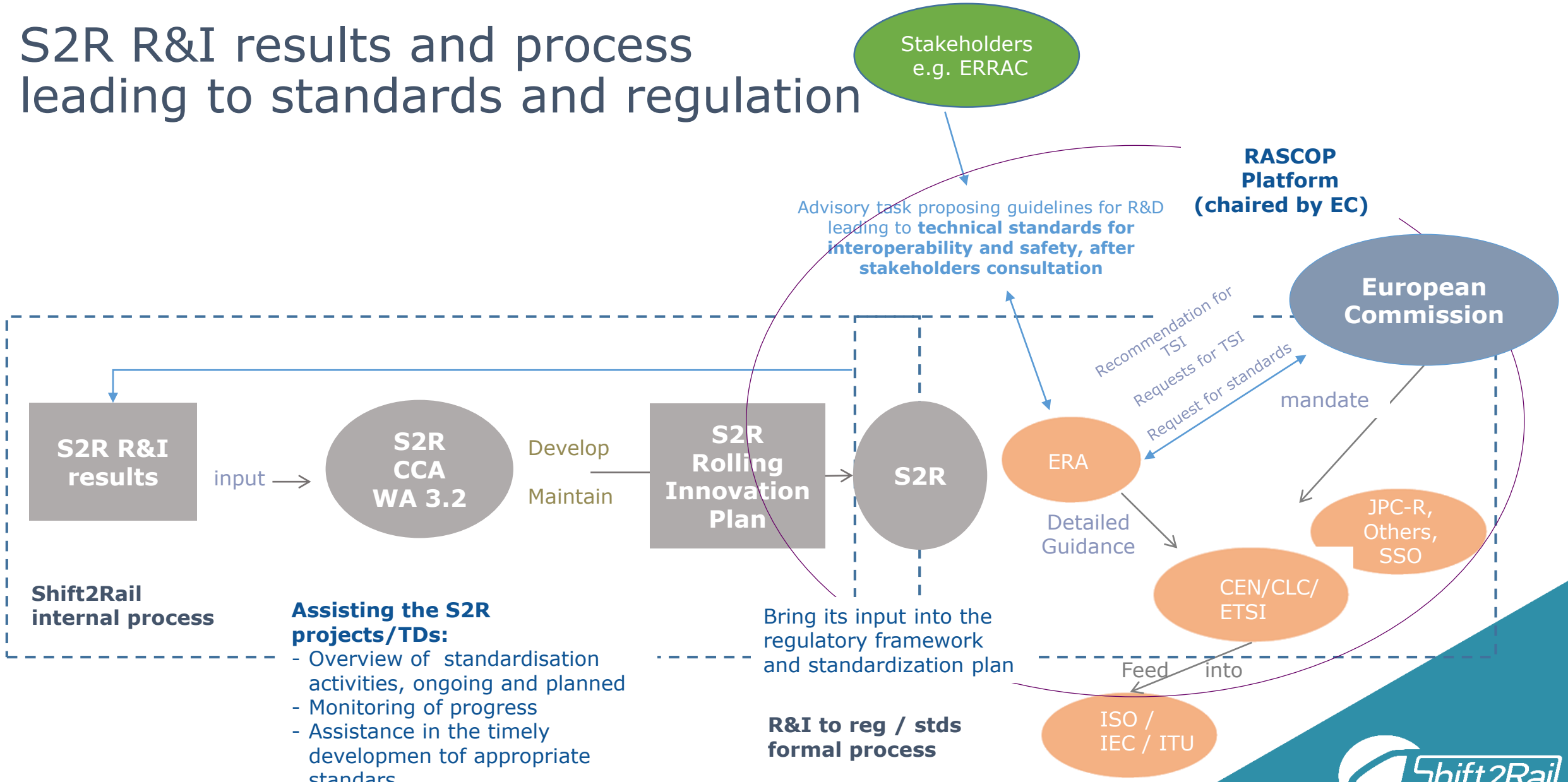
Driver assistance, hybridization and advanced propulsion technologies
Significantly reducing energy consumption and emissions

IP5 Technologies for Sustainable & Attractive European Rail Freight

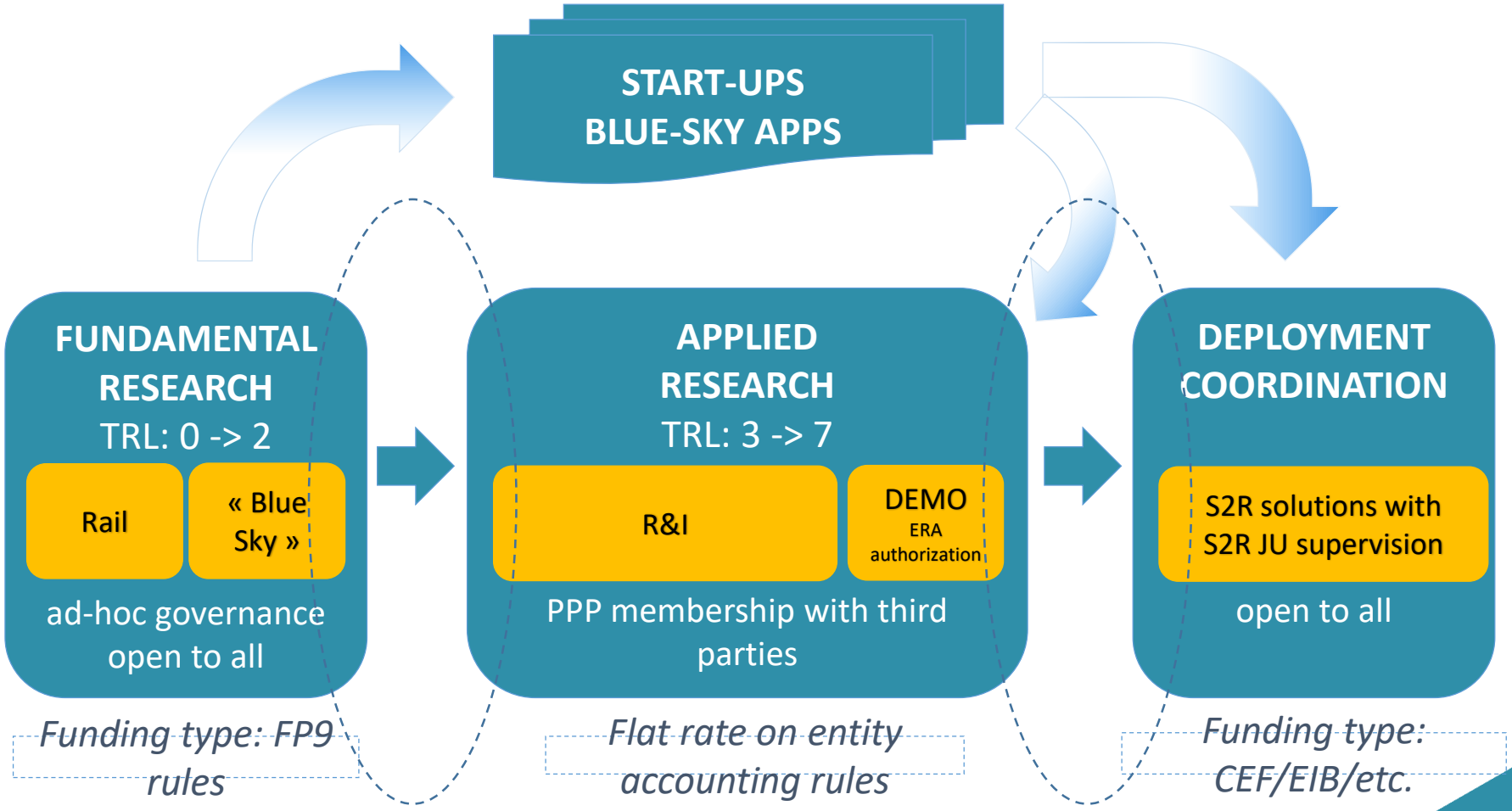




S2R R&I results and process leading to standards and regulation



S2R 2 Research and Innovation beyond 2020



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