European Commission

Report of the expert group on competitiveness of the European rail supply industry

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Table of Contents

Introduction

The rail supply industry (RSI) is a crucial industry for the EU. The turnover of the RSI amounts to fifty billion, while the value added amounts to one third of the turnover (approx. EUR 49 billion and EUR 15.2 billion in 2017, respectively). Since 2011, the sector has seen a continual growth. The EU RSI is a world leader having continuous net trade balance, but growing competition is visible. Technological and market evolutions have a great influence on the EU RSI.

The European Parliament adopted in May 2016 a resolution on the competitiveness of RSI, which calls for a strong and competitive EU RSI. In particular, the resolution stresses the specific nature and strategic relevance of the EU RSI, highlights the strong competition this industry faces globally, stresses the role of innovation and emphasises the challenges for SMEs.

An expert group on competitiveness of the EU rail supply industry[1] was set up to ensure the follow-up of this resolution. The group is composed of 60 members (Member States, trade organisations or national associations, manufacturers, system manufacturing corporates, innovation and technology clusters, and standardisation bodies). Six meetings of the expert group took place in 2018 and 2019.

The expert group identified 10 policy areas, which are considered highly relevant for maintaining global leadership of the rail supply sector. Those policy areas are:

- Digitalisation
- Innovation
- Skills and training
- Internal market
- Standardisation
- EU public procurement market
- EU supporting mechanisms
- Access to markets/finance for SMEs
- Access to international procurement market
- Intellectual property rights

EU policies address most of the current challenges of the EU RSI. Thus, the analysis of the existing instruments was carried out in order to identify recommendations for the industry to make greater use of those instruments and for the EU institution to envisage additional measures while ensuring synergies with the policy measures in place. This analysis focused in particular on instruments under the umbrella of the EU industrial strategy '*Investing in a smart, innovative and sustainable Industry - A renewed EU Industrial Policy Strategy (2017*)'.

[1] For list of members, see Register of Commission Expert Groups: https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=3536&NewSearch=1&NewSearch=1

Without prejudice to the exclusive competence of the EU in the area of trade policy and to the respect of the EU's international obligations, including WTO matters, across all areas mentioned in this document, the following chapters present the economic context then, for each policy area, summarise the most relevant instruments at EU level, include the assessment of the challenges and formulate 88 recommendations addressed to the European Commission, Member States, industry and European standardisation organisations.

List of main recommendations

Digitalisation, research, development and innovation and skills

For the Commission, EU bodies and the industry[2]

- Proceed as quickly as possible with the elaboration of the specifications, development, and demonstration of ERTMS Game changers, supported and coordinated by the European Union Agency for Railways (ERA) and steered by the Shift2Rail programme so as to allow the Commission to include them in the next version of the Technical Specification for Interoperability relating to the 'Control-Command and Signalling' (CCS) subsystems (CCS TSI) expected to be released in 2022.

For the Commission and Member States

- Build on the collaborative research-model set up within Shift2Rail Joint Undertaking and propose a rail research Programme within the Horizon Europe Framework Programme 2021-2027.
- Ensure adequate instruments and adequate regulatory framework, including standardisation, to facilitate the deployment of the innovative technologies developed within the current programme Shift2Rail and its potential successor.

For the industry and Member States

- Support the continuation of the collaborative research-model set up within Shift2Rail Joint Undertaking as an Institutionalised Partnership within the Horizon Europe Framework Programme 2021-2027.

For the industry

- Set up and implement the Blueprint for Sectoral Cooperation on Skills.

Internal market, standardisation, EU public procurement and EU financing policy

For Member States, the Commission and ERA

- Fully and swiftly implement the 4th railway package and further reduce the remaining number of national technical and operational rules.

For the Commission

- Monitor and ensure correct implementation of the 4th railway package. By 2022, evaluate whether the legislative framework has indeed led to a reduction of costs and time for granting vehicle authorisation for placing on the market. If not, propose the required corrective actions.

[2] For this report, the industry is to be understood as the whole industry including the rail supply industry, rail operators and infrastructure managers.

For the industry, the Commission and EU bodies

- Under the coordination of the Commission, ERA and Shift2Rail, develop modularisation of the rail system. Firstly, carry out proactive work on the CCS system architecture based on common European operational principles, which is to be specified in a modular way with common standardised interface specifications in order to take further steps towards the Single European Railway Area and drive the harmonization of CCS. This is to deliver an agile and flexible system able to accommodate future technologies and reduce costs.

For the European standardisation organisations, Member States, industry, the Commission and EU bodies

- Develop and implement a work plan to improve the convergence of European and international standards (through Sector Forum Rail in cooperation with RASCOP) and convert EN standards into IEC/ISO standards whenever desirable and possible.

For the industry and Member States

- Promote the CER-EIM-UNIFE recommendations on MEAT for the procurement of rail products by operators and infrastructure managers, including environmental, social and life-cycle elements in order to become objective award criteria and to minimize subjective interpretation. Plan regular updates of the recommendations to ensure its operational usability, while taking the latest (technological) developments into account.

For Member States and the Commission

- Promote the use of strategic approach to procurement for a wider uptake of quality criteria including environmental, social and innovation aspects.
- The European Commission to support Member States in their understanding and evaluation of abnormally low bids and the use of Article 85 of Directive 2014/25/EU.
- Member States to raise awareness among contracting authorities of the existence of Article 85 of Directive 2014/25/EU. Contracting authorities to use Article 85, where relevant and appropriate.
- Within the next 2021-2027 MFF, strengthen the EU programmes that help support the deployment of climate-neutral, energy-efficient and user oriented transport systems, especially railway and urban rail projects.

Access to international procurement market and IPR:

For Member States and the Commission

- As called for by the European Council, find an agreement with the European Parliament and the Commission to improve and adopt the International Procurement Instrument, as soon as possible and ensure that the Instrument is fit for purpose to achieve a more balanced and reciprocal economic relationship as stipulated in the objectives of the Joint Communication "EU-China – A Strategic Outlook".

For the Commission

- Continue opening third country procurement markets through bilateral agreements and work on the accession of third countries to the World Trade Organisation multilateral Government Procurement Agreement; continue working with the GPA Parties on improving the GPA in order to progressively reduce and eliminate discriminatory measures and achieving extension of its coverage among all Parties on the basis of mutual reciprocity.
- Propose new rules and disciplines on subsidies, including State-Owned Enterprises at WTO level to ensure fair competition among players.
- Continue to promote the protection and enforcement of IPR on third countries through the negotiation of ambitious IP Chapters in the FTAs.
- Appoint a Chief Trade Enforcement Officer to monitor and improve the compliance of EU trade agreements with third countries, who will report regularly on the state of play and keep the European Parliament and the Council abreast of all developments.

I. Economic context

Economic situation of the EU RSI: continuous growth of production and relatively lower level of gross investment than other manufacturing

In the European Union, approx. 4 500 enterprises can be assigned to the RSI[3]. They directly employ about 400 000 persons and support more than 1.2 million indirect jobs. The EU RSI accounts for nearly half of the world market for rail products and has a market share of more than 80 % in Europe.

Data on production shows a constant growth. Since 2011, the production value increased by approx. 11%. The largest share of the production growth can be attributed to the manufacture of locomotive and rolling stock (+15%), followed by signalling and electrification technology (+2%) and rail infrastructure (+0.3%)[4].

The analysis of the development between 2011 and 2015 shows that the manufacturing of locomotives and rolling stocks outperformed growth registered in the aggregate manufacturing industry in the EU both in terms of productivity (+11 percentage points difference) and value added (+12 percentage points difference). As such, the EU RSI has been able to generate higher efficiency in comparison to the average gains of the total manufacturing industry.

The level of gross investment in RSI appears to be below the average investment in EU manufacturing[5]. One of the reasons might be the longer lifespan of some rail supply products, such as locomotives and rail infrastructure, which in turn contributes to a longer period for return on investment.

SMEs play an essential role in promoting innovation through their flexibility and provision of highly specific knowledge. By applying the SME definition[6], around 16 % of companies in the segment of the manufacture of locomotives and rolling stock and around 20% companies in the segment of signalling and train control equipment can be categorised as SMEs.

A leading trade position under growing international competition

In terms of trade, the EU RSI is a top exporter accounting for approximately 20 % of world trade with railway products. The source of imports to the Union is highly concentrated on 10 countries: Switzerland, Japan, China, the United States, Ukraine, South Korea, Russia, Norway, Turkey and Serbia. These top ten amount for over 90% of the total import value. The

[3] Includes suppliers of infrastructure (tracks & electrification); signalling, communication systems and components; rolling stock, product related services. For purpose of the analysis, the supply chain of RSI includes Tier 2 operators (i.e. suppliers of raw materials and intermediate products), Tier 1 (e.g. suppliers of track material & equipment, suppliers of signalling, control and electrification systems) and Costumers (i.e. infrastructure managers – operators owning the tracks).

[4] ECORYS, 2018 preliminary data

[5] For example investment per 1000 person employed was EUR 6.8 million in manufacturing of rolling stock compared to EUR 8.4 million in the EU manufacturing average in 2015 (ECORYS 2019)

[6] Less than 250 employees combined with a turnover below EUR 50 million or balance sheet lower than EUR 43 million

destination of EU exports (extra EU) is less concentrated than imports. The top ten receiving countries are Switzerland, the United States, Brazil, Saudi Arabia, Russia, Canada, Turkey, China, South Africa and Norway, which together account for around 60% share.

In 2017, the EU recorded a positive trade balance for RSI products of around EUR 2.2 billion. The balance was positive for all the main trading partners except for Japan and Switzerland. The value of EU exports has been on the decline since 2012 largely due to the deteriorating accessibility of the third markets while, on the other hand, the total value of imports has been increasing since 2014.

The EU, US, Japan and Korea have been net exporters of rolling stock over past two decades whereas China became net exporter only as from 2010. The EU has had the highest net exports among the regions since 2000 with the only exception of 2005 when Japan presented a higher value.

However, in contrast to the stagnation of EU exports, the global RSI market has been growing by 1.2% per year from 2013 to 2017 and reached a value of EUR 163.2 billion[7] (Europe accounts for approximately 35%). The main drivers of growth on the world market include demography (rapid growth of urban population in Asia) and considerable investments in services, infrastructure and rail control-command and signalling. In addition, emerging rail markets, such as Africa/Middle East or Latin America, contribute to the market's growth through the continued development of their infrastructure and rail systems.

The EU is the second biggest producer of rail products after China, followed by the United States, Japan, India, Russia and Korea. The EU and the United States show a similar growth pattern over past years: a stable growth between 2000 and 2017 interrupted only by decline in the years of economic crises. On the contrary, Asian countries (China, Japan and India) presented no significant losses over those years. The global industry has radically changed over the last decade due to rapid growth of production in China that has overtaken EU as the biggest producer of rolling stock in 2009. Supported by its strong internal demand, often of public investment nature, the Chinese RSI grew exponentially, more than quadruplicating its overall turnover in only one decade 2007-2017.

Societal and economic trends, towards more sustainable transport

The global urban population is increasing rapidly – about 70% of population are predicted to live in cities by 2050 compared to 51% in 2010. Rapid urbanisation puts pressure on the transport systems creating need for upgrading of the rail network.

The urbanisation trend compounded by aging of population is a factor that is likely to increase demand for safe and reliable transport. This trend is already apparent in the increasing demand for urban rail. On the other hand, self-driving automated cars may compete with rail to meet that demand.

[7] World Rail Market Study (Roland Berger/UNIFE 2018). Data for Europe include EU, Switzerland, Norway, Serbia and Turkey

Rapid economic growth in emerging economies leads to changes of the global demand for rail products. World Rail Market study 2018 expects a steady growth of the global market by 2023 with the highest growth rates expected on the markets of Latin America and Africa/Middle East. Although these markets are relatively small, passenger transportation is likely to continue increasing supported by high rates of population growth, rising urbanisation and increase of middle-income class. The significant investment programs in many developing regions indicate a dynamic investments-driven market for rail products and technologies.

Demand for clean transport is another trend that will benefit rail in years to come. Rail accounts for only 1.7% of total EU energy consumption in transport, while in 2016 it carried 11.2% of freight and 6.6% of passengers of all transport modes[8]. High capacity urban rail requires, on average, less than a tenth of the energy needed per kilometre travelled compared with passenger cars. The low environmental footprint compared to the other transport modes is an asset in view of the global efforts for reducing greenhouse gas emissions.

Environmental requirements benefit railways as energy-efficient transport mode with fewer emissions and are an important factor for both innovation and competitiveness. This is in line with the recent landmark initiatives put forward at global and European level to build a climate-neutral economy across all sectors – such as COP21 legally binding agreement and the EU long-term strategy for greenhouse gas (GHG) emissions reductions[9].

Europe's answer to the emission reduction challenge in the transport sector is an irreversible shift to low-emission mobility. Freight and passenger rail play a key role in reducing transport emissions. The 2011 Commission's White Paper on Transport[10] set ambitious targets: to shift 30 % of long-distance road freight to more energy-efficient transport modes such as rail or inland waterways by 2030 and 50 % by 2050; to triple the length of the existing high-speed rail network by 2030 and to complete a European high-speed rail network by 2050 so that the majority of medium-distance passenger transport should go by rail. Urban mobility is another key element to achieving climate neutrality.

The main drivers of competitiveness

The RSI is a distinctive sector - the most characteristic features include high capital intensity, long lifecycles, a significant dependence on public procurement and the obligation to comply with high safety and environmental standards. These features, determine the competitive strengths and weaknesses.

Amid increasing international competition, the EU RSI takes advantage of its traditional strengths. The sector maintains a leading position in advanced technologies, building on high level of innovativeness, qualified workforce and ability to deliver integrated transport solutions. The EU RSI benefits from the single European railway area. In addition, the 4th

[8] Percentages refer to modal split based on transport volumes (passenger-km and tonne- km).

[9] European Commission's Communication ''A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy''; 28th November 2018; COM(2018) 773 final

[10] COM(2011) 144 final

railway package and the cleaning-up of national rules is going to achieve a genuine EU internal market. These strengths explain why rail products from EU still meet nearly half of the global demand despite a strong competition from countries with lower labour costs.

Another key strength is the well-established supply chain and the close collaboration between different segments and actors on development of advanced products and solutions. One example is the European Rail Traffic Management System (ERTMS). Coming to light as a collaborative, cross-border project, ERTMS is the flagship of EU industry's innovative power, successfully conquering markets inside and outside Europe. The ERTMS is not a static technology. Future 'Game changers'[11] - these are currently under development with a target date 2022 - are expected to increase substantially the performance and safety. It will transform railways and the RSI. It will create significant market opportunities but also the necessity for rail to evolve.

The RSI is a technology driven sector. Emerging technologies along with digitalisation of the transport system will have an important role in helping rail meet rising demand for safe, reliable, passenger friendly and environmentally friendly transport. The capability of RSI to exploit opportunities of the digital age and at the same time ensure availability of qualified skills will be the key factor determining international competitiveness over the next decade.

II. The main challenges and opportunities shaping the competitiveness of European RSI

Embracing the technological change

To become more competitive than air and road transport, rail networks must become more attractive for passengers and freight transport. This means continual work to improve reliability, offer high quality services at affordable prices as well as to enable passengers to benefit from an integrated (intermodal) transport. Digitalisation of the transport system will allow for increasing further the capacity and safety of rail transport as well as enabling a smoother travelling by integrating different transport modes.

On the producers' side, emerging technologies hold the promise of building on the competitive strengths. Automation, big data and the digital transformation of the supply chain are transforming the manufacturing processes allowing for mass customisation, increased speed, better quality and improved productivity. To keep pace with the technological revolution, RSI companies are adjusting their business models and strategies. Such strategies might include increasing research and development (R&D) investments[12], refocusing R&D priorities or launching collaborative research via digital clusters and platforms. Opportunities brought by the digital transformation and the available support tools must be exploited to their full potential so that the RSI succeeds in delivering effective solutions for mobility. Fast technological change requires rail to facilitate and enable a faster and more flexible uptake of

[11] Specified in the Agency's report on ERTMS longer term perspective (ERA-REP-150).

[12] RSI invests about 3% of its annual turnover in R&D&I, which is lower than other transport sectors.

digital technologies. The rail industry has to develop future proof technologies and the system architecture serves that objective.

The capability of embracing new technologies largely depends on skills. Like many other sectors, the rail supply industry is confronted with difficulties to recruit engineers and IT experts. Aging of population along with an increasing inter-sectoral competition on job market might exacerbate the problem in the near future.

The skills mismatches will be increasingly affected by deployment of R&D. A recent study of Shift2Rail Joint Undertaking shows that implementation of S2R programme will lead to both quantitative and qualitative changes in demand for skills. The analysis shows that demand for Science, Technology, Engineering and Mathematics (STEM) and Information and Communication Technology (ICT) skills will be on the rise for the RSI and its clients.

Exploiting fully the benefits of the internal market

Over past decades, the EU has created the Single European Railway Area (SERA). The implementation of the 4th railway package[13] will foster the completion of the SERA by removing the remaining barriers such as the patchwork of national regulatory regimes and rules. The European Union Agency for Railways has conducted a programme to clean-up redundant and unnecessary national rules applicable to rail vehicle that came to its completion in June 2019.

The technical specifications for interoperability (TSIs) and European standards are key to the development of the SERA through harmonisation of technical requirements. The definition of international standards in the rail sector has an impact on external competitiveness and access on third country markets. Developing and advancing technological standards within the recognised standardisation organisations CEN, CENELEC and ETSI help maintain the European leadership and leads to a positive influence of the European knowhow on the technological standards at the international level.

Implementing the EU framework on public procurement is another key aspect related to opening of the internal market for rail products. The EU framework sets out minimum harmonised rules with a view of establishing a level playing field for businesses across Europe. Modern and well-functioning public procurement across the EU is instrumental for the RSI to reap the full benefits of the Single Market. Furthermore, referencing standards in the technical specifications of tendering documents will also enable a common understanding of procurement documents between buyers and suppliers[14].

The development of rail transport infrastructure is crucial for a strong and competitive rail transport industry. In addition, for the modal shift to materialise, considerable investment is needed to expand and upgrade the capacity and improve quality of the current network. Rail,

[13] The technical pillar of the 4th railway package is composed of Regulation (EU) 2016/796 and Directives (EU) 2016/797 and 2016/798

[14] Directive 2014/24/EU of 26 February 2014 on public procurement explicitly allows contracting authorities to reference standards in technical specifications in the procurement process.

being among the most energy-efficient and lowest-emitting transport modes, benefits from more than 70% of the funding from the Connecting Europe Facility.

Achieving level playing field amid growing international competition

While the EU public procurement market is in practice open to foreign competition, granting preferential treatment to national bidders is a standard practice on many major non-EU markets. Amid growing tensions on international trade, there is a certain tendency in some third countries to create or reinforce market access barriers, including in the field of public procurement[15] and in certain cases put in place complementary extensive state support to domestic competitors.

China remains one of the most restricted market having in place several active barriers to trade and market entry undermining the access of European companies to public procurement. At the same time, Chinese producers take benefit from the state economic policy.

In some market segments of the global rail sector today local content requirements (LCR) are as high as 80 percent and higher. LCR can lead to the relocation of production sides outside of the EU thus resulting in the loss of skills and knowledge, ultimately endangering European jobs. However, non-EU state owned enterprises can win rail projects within Europe, which might be financed by EU structural funds, with products that are manufactured almost entirely outside of the EU.

The EU policies aim to achieve reciprocal market access with third countries and preserve the EU market against unfair competition. The absence of level playing field requires urgent action.

Nowadays, SMEs are becoming more specialised within the rail sector building on their advantage of flexibility and capability to bring innovation in a shorter time-span. However, their competitiveness is affected by a limited capability to exploit international opportunities. For EU companies and in particular SMEs to accede international markets, access to finance and protection of intellectual property rights represent two critical areas.

The manufacture of locomotive and rolling stock can be characterised as a design and patent intensive industry[16] and European companies are important patent holders globally. Intellectual property rights (IPR) hence play an important role for the RSI.

[15] DG TRADE's annual reports on Trade and Investment Barriers

[16] IPR-intensive industries are defined as those having an above-average use of IPR per employee (EPO & EUIPO (2013)). The EPO/EUIPO study does not categorize NACE 33.17 "Repair and maintenance of other transport equipment" as an IPR intensive industry. Therefore, the analysis only applies to NACE 30.20 "Manufacture of railway locomotives and rolling stock" (source ECORYS).

Vision for the RSI in 2030

By 2030, the EU RSI will strengthen its position of a global leader in development of high-tech products and solutions. This leadership will build on investment in R&D&I, the ability to transform research into marketable products and on exploiting fully the benefits of new cutting-edge technologies. The RSI will embrace the emerging business models such as automated operation or automated traffic management and benefit from its central role for creating an intelligent, multimodal transport system. Working successfully on improving public image, RSI will be an attractive employer for skilled workers. Modularisation will reduce costs and facilitate the uptake of innovation. The RSI will fully exploit opportunities resulting from demand for rail products driven by raising investments in transport worldwide. Implementation of an ambitious EU industrial policy will create conducive environment for companies to grow and innovate. A more strategic approach to procurement will result in a wider uptake of quality criteria, as well as reciprocal market access between the EU and third countries. Reformed EU and global rules on subsidies and market access will establish level-playing field with main partners. Taking full advantage of the capability to provide solutions to the environmental and societal challenges, the RSI will benefit from the trend of supporting clean transport. Given the capacity to push the technology limits and its economic importance, the RSI will make substantial contribution to achieving the EU goal of increasing employment in industry and the share of manufacturing in EU gross domestic product (GDP).

1. Digitalisation of rail transport and digital transformation of the rail supply industry

Relevant measures and policies at EU level:

The Digital Single Market is a strategy of the European Commission to ensure access to online activities for individuals and businesses under conditions of fair competition, consumer and data protection, removing geo-blocking and protecting copyright. The strategy includes a set of targeted actions, built on three pillars: (1) better access for consumers and businesses to digital goods and services across Europe; (2) creating the right conditions for digital networks and innovative services to flourish; (3) maximising the growth potential of the digital economy to solve interoperability problems. Digital traffic management systems, digital energy management solutions, ever-increasing infotainment offer, e-ticketing, digital tracking and tracing applications are just a few examples of how the rail sector is contributing to the Digital Single Market.

The Commission has proposed the creation of the Digital Europe programme (DEP) to align the next long-term EU budget 2021-2027 with increasing digital challenges. The DEP will focus on promoting uptake of artificial intelligence (AI), building up supercomputing capacity, boosting cybersecurity, enhancing digital skills and ensuring a wide use of digital technologies. The DEP will promote creation of Digital Innovation Hubs (DIH) on local and European level. The DIH will serve as 'one-stop shops' for SMEs and public administrations, providing practical support to the uptake of AI, high-performance computing and cybersecurity.

The combination of Automated Train Protection (ATP), Automated Train Operations (ATO), and automated traffic management as well as other ERTMS Game changers under development in the Shift2Rail JU (satellite positioning, ETCS Level 3, moving block, adaptable communication system) will increase capacity, performance (punctuality and speed), interoperability, safety as well as productivity. In view of the next Multiannual Financial Framework, the Shift2Rail programme should become the platform where different Union funding in line with the policy priorities of the EU would be made available. Cross cutting collaboration should be embedded in the different programmes to foster the leverage effect of the investments.

The future rail mobile communication system (FRMCS) is being developed and mainstreamed in the future (2022) technical specification for interoperability relating to the 'control-command and signalling'. Its full definition in terms of functional requirements and standardisation (via a mandate to ETSI) is urgent to fulfil the sector's needs.

Furthermore, the Commission has given to CEPT[17] a mandate on radio spectrum for FRMCS. A previous mandate on ITS, including spectrum for Urban Rail, has already been fulfilled by CEPT and the Commission is now starting negotiations with Member States in view of harmonising pertinent spectrum bands.

[17] The European Conference of Postal and Telecommunications Administrations

The Radio Equipment Directive applies to radio equipment, i.e. wireless equipment, including all 5G equipment and the vast majority of internet of things (IoT) equipment. The Commission carries out preparatory work, i.e. studies, so that delegated acts under the Directive can be prepared to ensure that the requirements relating to security risks apply to specific categories or classes of radio equipment.

1.1. Digitalisation of rail transport

Findings:

Over the last few years, technology and IT developments have been pushing the transport sector to the edge of great changes. Digital technology has, henceforth, a significant influence on mobility patterns and customers' expectations, affecting the way the transport sector is dealing with user information, payments, integration and automation. With the digitalisation, change in the rail sector has moved up a gear. Roles have been transformed and new business models have emerged – such as Mobility-as-a-Service – Emerging concepts and technologies bring new possibilities to the table, shortening the timeline of innovation and therefore shaking up the entire transport sector, including the RSI.

The most recent developments in the digital arena have certainly shown promising steps. Compared with other modes of transport, the deployment of IT and enabling technologies in rail is at an earlier stage. Therefore, it is fundamental for the whole sector to keep its commitment to make digitalisation, not merely an objective, but rather a mean to achieve more ambitious and paramount goals.

On the one hand, digital transformation and the flow of big data are creating unprecedented opportunities for all sectors, including rail transport, to enhance its overall operational and technical efficiency. On the other hand, this technological progress completely redefines the transport security environment as systems become vulnerable to new types of threats. Arguably, digitalisation is making rail transport more reliable, safer and more efficient but it also exposes rail systems to cybersecurity risks. As rail harnesses the benefits of digitalisation and internet of things, cyber-attacks are expected to become ever-more sophisticated, in particular since the system is evolving in a set of IP objects connected through radio technologies. The cyber threats are as versatile and dynamic as the digital world and its applications.

Data has become a key element of knowledge and continuous innovation in the sector. Sharing data and making it available have a positive effect on innovation opportunities and development of new solutions. Currently the approach towards data – open vs. non-open – varies from country to country and among individual stakeholders. This results in uneven opportunities within the EU internal market, affecting in particular smaller players.

In addition, the use of digital data has a great potential for improving the reliability of the rail system. Data used for predictive maintenance of railway infrastructure and rolling stock can help detect impending defects and ensure that parts are replaced only when required and before a defect occurs. For example, predictive "intelligent" maintenance concepts can be further enhanced by combining the monitoring of infrastructure using "travelling sensors"

with augmented virtual reality support[18]. AI technologies can support smart predictive maintenance making use of data analysis methods.

Improved access to operational data in the value chain can then accelerate innovation in the RSI, support reliability as well as it could reduce lifecycle costs (e.g. through development of algorithm and expert systems allowing for preventing failure and support an efficient maintenance). That improved access may be supported by a common IT vault where diverse data can be acceded to.

Recommendations:

Actions for the Commission and the industry:

- Proceed as quickly as possible with the elaboration of the specifications, development, and demonstration of ERTMS Game changers, supported and coordinated by ERA and steered by the Shift2Rail programme so as to allow the Commission to include them in the next version of the Technical Specification for Interoperability relating to the 'Control-Command and Signalling' (CCS) subsystems (CCS TSI) expected to be released in 2022.
- Secure the spectrum capacity for rail main line and urban radio communication system, enabling to ensure the right level of quality of service for rail transport systems.
- Initiate a dialogue with the whole industry (suppliers, manufacturers, infrastructure managers and operators) on facilitating the exchange of operational and maintenance data.
- Foster the development of a cybersecurity culture, raising the awareness and fostering the acquisition of cybersecurity skills in the rail sector. Strengthen cross-sectorial cooperation and promote the exchange of best practices between sectors in the field of cybersecurity.
- Advance the preparation of the certification schemes, based on the general framework established by the Cybersecurity Act.
- Define the rail-related essential data sets for Mobility called for the Public Service Information Directive.
- Explore creating a common IT vault where diverse data can be acceded to.

1.2. Digital transformation of the rail supply industry

Findings:

The digital transformation of manufacturing processes and tools is one of the key emerging industrial revolutions and the rail supply industry must fully embrace it. The ERRAC Rail

[18] Vision Paper on Digitalisation 2019, UNIFE

Vision 2050 mentions a situation where the entire supply chain is managed through machine-enhanced intelligent collaboration between customers and suppliers, who interact digitally and adapts dynamically to changing demand/supply cycles[19]. Digital technologies must bring substantial added value to the whole supply chain of the sector by improving quality of manufacture, reducing lead-time delivery, enabling manufacturing on demand, reducing warehouse storage, reducing goods transportation cost and enabling stronger collaboration between suppliers/manufacturers/railway operators.

Additive manufacturing, also known as 3D printing, offers the potential for reducing further the lead-times, enabling cost-effective production of replacement parts on demand and accelerating product development cycles. Furthermore, a widespread adoption of new technologies will lead to new services such as remote monitoring or real-time diagnostics of rolling stock, the exploitation of big data for forecasting of infrastructure conditions and predictive maintenance. Digital platforms for predictive maintenance, drawing on big data and internet of things technologies, are already becoming integral part of the rail supply chain. In building and maintenance of rail infrastructure, there is scope for further mechanisation and robotisation.

Other sectors such as aviation developed IT tools to digitalise the exchange of information between players within the whole supply chain. Such good practice may be duplicated in the rail sector.

Virtual and rapid prototyping and testing is another promising venue that Shift2Rail JU is currently investigating. This can eliminate the need for full-scale physical tests and allow for shorter time to market and lower cost of introducing innovative technologies.

Recommendations:

Actions industry

- Launch a pilot project to evaluate which digital technologies including 3D printing technologies appear the most mature for the rail supply industry and ensure the relevant safety level is maintained.
- Launch a pilot project to digitalise the exchange of information between players within the whole supply chain.

Actions for the Commission and industry:

- Explore the possibility for a project to improve and promote virtual and rapid prototyping within an EU programme such as Shift2Rail.
- Explore the possibility for a pilot project for virtual certification – such as greater use of simulation and lab based testing - within an EU programme, such as Shift2Rail.
- Explore the possibility for a pilot project for further digitalising the maintenance of the rail infrastructure - within an EU programme, such as Shift2Rail.

[19] Rail vision 2050 (ERRAC), 2017

2. Research, development and innovation

Relevant instruments and policies at EU level:

Shift2Rail is the rail joint undertaking under Horizon 2020. Shift2Rail (S2R) was formally established in 2014 with Council Regulation (EU) N° 642/2014. EUR 920 million are allocated for research, development and innovation (R&D&I) until 2024 to develop the necessary solutions to help completing the Single European Railway Area. It is a public-private partnership, which manages a multiannual work programme of targeted research and innovation to increase capacity and reliability and reduce life-cycle costs of rail services in Europe. Structuring rail research in the form of a Joint Undertaking has been key in overcoming the fragmentation and the lack of continuity of research in the rail sector, by developing a long-term strategy, in close cooperation with all stakeholders. The S2R JU is an important effort of the rail sector towards an overall rail system transformation to answer the evolving need of the passengers and shippers, through the involvement of representative of the staff. It is now moving towards the next level of collaboration, integrating a system of systems approach.

Rail stakeholders are calling for continuing joint R&D&I activities under "Horizon Europe" in an institutional partnership. The Commission presented its important EU R&I programme for 2021-2027 in June 2018 and the Council and Parliament reached a provisional agreement in March 2019. The Commission's proposal for the budget allocated to the "climate, energy and mobility" cluster within pillar 2 for Horizon Europe is EUR 15 billion, the same as the budget for the proposed cluster on "digital and industry". The Commission proposal for "sharing excellence" strengthens the European Research Area.

Findings:

The world leadership of the European rail supply industry is largely due to its R&D&I capacities. While international competition constitutes a cause for concern for the European rail suppliers, staying at the forefront of research and innovation will be a key factor to ensure that the European RSI preserves its leadership and remains able to compete successfully against foreign suppliers.

New technologies in the rail sector have potential to further reduce environmental impact as well as infrastructure and operating costs, and at the same time improve the quality and reliability of passenger and freight services attracting more traffic to rail. The broader R&D&I orientation is closely interlinked with the trends of automation and digitalisation, use of big data, energy efficiency, rise of zero emission mobility solutions and multimodality. In terms of private funding, the European rail supply sector invests about 3.5% of turnover into R&D&I. However, according to the ERRAC RAIL VISION 2050, 'capturing the opportunities requires significantly greater financial investment in R&D&I.

Market uptake in first large-scale deployment of innovative solutions is challenging. Innovations need to be able to demonstrate their usefulness in real life conditions. Due to the development costs, new products and services tend to be still more expensive (in terms of acquisition price) than classical solutions, which makes it difficult to invest in them. The support to large-scale deployment of innovations is instrumental to market uptake. It can also

be of an administrative nature as some innovations are sometimes faced with the lack of adequate regulatory framework.

Recommendations:

Actions for the Commission:

- Build on the collaborative research-model set up within Shift2Rail Joint Undertaking and propose a rail research Programme within the Horizon Europe Framework Programme 2021-2027.
- Ensure adequate instruments and adequate regulatory framework, including standardisation, to facilitate the deployment of the innovative technologies developed within the current programme Shift2Rail and its potential successor.

Actions for the Commission and Member States:

- Strengthen cooperation and alignment between Commission and Member States regarding R&D&I support, notably to avoid redundancies and overlaps in the various available support schemes.

Actions for the Commission, industry and Member States:

- Monitor the implementation of innovations developed under Shift2Rail and its potential successor on the European rail network and converge Member States programmes in this respect.

Actions for the industry and Member States

- Support the continuation of the collaborative research-model set up within Shift2Rail Joint Undertaking as an Institutionalised Partnership within the Horizon Europe Framework Programme 2021-2027.

Actions for the Commission and industry:

- Explore cooperating with third countries on joint research projects under S2R when it brings added value to the EU rail sector and provided that these third countries ensure effective and reciprocal market access.

Actions for the industry:

- Strengthen the collaboration among rail stakeholders (academia, operators and infrastructure managers from all Member States) in the strategic R&D&I planning.
- Associate more urban and mainline operators and public transport authorities in the definition of priorities for the successor of Shift2Rail in order to agree on common needs and reflect the societal challenges and integration with the other transport modes.
- Work closely with European Rail Research Advisory Council and other stakeholders in the rail sector and the European standards organisations to make sure that innovations developed under Shift2Rail are successfully transferred to the rail market.

3. Skills and training

Relevant measures and policies at EU level:

The new Skills Agenda for Europe[20], adopted by the Commission on 10 June 2016, launched 10 actions to make the right training, skills and support available to people in the EU. It is centred on three key work strands: 1. Improving the quality and relevance of skills formation, 2. Making skills and qualifications more visible and comparable and 3. Improving skills intelligence and information for better career choices. Addressing the skills shortage requires a close co-operation between companies, Vocational Education and Training (VET) institutions, universities and research institutes. For example, to improve quality of skills and tackle skills shortages in sectors, the Commission launched a Blueprint for Sectoral Cooperation on Skills. In August 2019, the Commission adopted the 2020 Erasmus+ Annual Work Programme, which includes rail supply and transport industry as a sector eligible for the 4th Wave of Blueprint projects. It aims to mobilise and coordinate key players, encourage private investment and promote more strategic use of relevant EU and national funding programmes.

From the evidence that the transport sector is one of the most gender imbalanced sectors, the Commission has set up tools to encourage EU stakeholders from all transport modes to strengthen women's employment with the political backing of the European Parliament, Member States, the European Economic and Social Committee and the European social partners.

The Commission aims at integrating a gender-equality perspective into all EU activities and sectors. For transport, a non-legislative approach has been adopted to encourage transport companies to fight negative stereotypes and to improve their gender balance. It complements the legislative framework addressing working conditions in the various transport modes.

The measure implemented include: a business case to increase female employment in transport; the signature of the Declaration on equal opportunities from women and men in the transport sector; an inspiring list of possible measures that companies can take with an indication of their cost; an online module to exchange good practices and an action oriented Platform. Two studies will also be launched in 2019 to (1) develop a toolkit for primary and secondary school teachers to fight gender stereotypes and raise awareness about transport professions among young people; (2) identify good practices on how to organise rosters in the best family friendly way.

Findings:

In view of the ageing population, a significant cohort of employees is expected to retire within the coming years. At the same time, transformation related to digital and high-tech technologies creates mismatches between available and demanded skills.

Already now, enterprises in many Member States are reporting difficulties to find railway engineers. These difficulties also appear to be linked to low public awareness about the high-

[20] Working together to strengthen human capital, employability and competitiveness, COM/2016/0381 final

tech jobs opportunities that are offered by the sector in connection with deployment of increasingly sophisticated railway technologies. The ageing of population combined with the lack of technical skills might thus become a bottleneck in maintaining the competitive position of the EU RSI over the long term.

The digital transformation of the supply industry will have a strong impact on production, processes and skills needed in the rail supply industry. In terms of skill changes, virtually all the job categories show an increase in the need for more information and communication technology (ICT) and (broad) technical skills.

New challenges are best tackled with people of different skillset and mind-set, promoting diversity is essential in a sector which will undergo tremendous changes in the next years and which already faces labour force shortages. Transport is an ageing and male dominated sector, which suffers from negative stereotypes and often harsh working conditions (e.g. mobile jobs, atypical hours, violence and harassment). As a consequence, the sector is not appealing to young women and men and faces an increasing risk of workforce shortages. Only 22 % of the transport workers are women (most of which work in administrative positions). Women are also underrepresented in the rail sector, making up only about 21% of the total workforce in 2016. In particular, only 2.2% of locomotive drivers were women. With one third of its workforce about to retire and the profound transformations led by upcoming automation, young women should step in for the future of rail. Having more women in positions that shape policy and drive change will better address needs. By removing the glass ceiling, the invisible barriers preventing women from reaching top-level positions will produce more equality and efficiency gains.

Recommendations:

Actions for the industry:

- Set-up and implement the Blueprint for Sectoral Cooperation on Skills.
- Within the possible Blueprint project, identify the main existing skill gaps (including expected demand on EU priorities, for example ERTMS deployment and rail digitalisation – data analytics, semantics, signalling, ICT for rail, cybersecurity, system integration) and assess the future needs (including expected demand on EU priorities, for example ERTMS deployment and rail digitalisation).
- Improve public communication in order to enhance attractiveness of the sector for young talents and to increase employment of women, focusing on the role of RSI in addressing societal challenges - such as global warming, ageing of population and increased urbanisation.
- Propose adaptation of curricula of training and education programmes to address new technological developments and trends.

Actions for the industry and Member States:

- Adapt curricula of training and education programmes to address new technological developments and trends.
- Continue and reinforce the collaboration between companies, vocational education & training institutions, universities and research institutes, start-ups or accelerator

programs as well as public authorities, neighbourhood countries and standardisation organisation[21] focusing on the need to re-train/upskill current staff who will have to deal with new challenges and technologies (cf. cybersecurity, digitalisation).

Actions for the Commission, industry and Member States:

- Continue promoting and raising awareness about the tools already available to promote gender balance at EU level so that they can reach their full potential, and with a closer involvement of Member States. Include social considerations, including gender ones, in rail related activities. Set targets and indicators.

4. Internal market

Relevant instruments and policies at EU level:

Between 2001 and 2016, four legislative packages were adopted with the aim of gradually opening up rail transport service markets for competition and harmonising technical requirements. The RSI is then benefiting from a dynamic market and the harmonisation of rules in particular in the area of interoperability and safety requirements.

The 4th railway package which was adopted in 2016 (technical pillar in May and market pillar in December) is an important step forward into reducing the fragmentation of the internal market. Especially with the implementation of the technical pillar of the 4th railway package, a breakthrough in the simplification of the authorisation for the rolling stock and certification for railway undertakings is expected.

The implementation of the 4th railway package fosters the completion of the Single European Railway Area by removing the remaining barriers such as the patchwork of national regulatory regimes and rules. Furthermore, the 4th railway package creates a unique European process for obtaining an authorisation for placing a new vehicle or type of vehicle on the market. The European Union Agency for Railways issues vehicle authorisations and single safety certificates. The new processes bring more predictability and transparency as well as reduced costs.

Since 2016, the European Union Agency for Railways has conducted a programme to clean-up redundant and unnecessary national rules. Most national rules relating to rolling stock have been cleaned-up[22] and the Agency continues to work on the harmonisation of operational rules and national rules relating to the infrastructure (i.e. fixed installations).

The 2019 amendment to the TSI relating to the 'control-command and signalling' (CCS) subsystems of the rail system (CCS TSI) sets up the first milestone for a harmonised trackside and vehicle control-command and signalling system architecture. This has the objectives to

[21] Building on existing best practices such as the CWA on ICT-skills and competences http://www.ecompetences.eu/ict-professional-profiles/

[22] ERA report on the cleaning-up of national rules is available under https://www.era.europa.eu/sites/default/files/activities/docs/evaluation_report_va_national_rules_en.pdf

achieve a future proof design, facilitating the use of state-of-the-art technology and ensuring backward compatibility. Similar approach is to be considered for other subsystems as appropriate.

Findings:

The EU RSI accounts for more than 80 % of the supply in Europe. Creation of the internal market is one of the strengths that has been supporting the growth over past years.

National technical requirements for the certification or authorisation of rolling stock create significant costs for producers. Operational rules of the different national railway networks may impact the design of the rail system, in particular the CCS subsystem. The reduction of remaining national rules and further harmonisation of the Union rail system through TSIs are instrumental to the achievement of efficient and cost-effective railways.

The long-term strategy for TSIs should consider necessary evolution to ensure that TSIs remain fit for purpose. That means ensuring the appropriate level of harmonisation/detailed requirements to remove interoperability issues and making appropriate use of the related norms from the European standardisation organisations, namely CEN, CENELEC and ETSI. It should also ensure sufficient stability of requirements and predictability for their evolution.

The rail system would benefit from quicker integration of new technologies and more standardised products that can be operated in different Member States. The RSI is characterised by relatively limited series and long life cycle of products (average life cycle of rolling stock is more than 30 years). This leads to lower amortisation of fixed costs and slow integration of innovations. The modular approach involves breaking down the railway system into different modules with standardised interfaces. Modularisation serves both the objectives to facilitate the evolution of parts of the railway system without changing all modules (once the complete new system is deployed) and to achieve economies of scale by lowering unit cost of series. It will help mitigate current deployment challenges and ensure flexibility in the system to allow for fast adoption of proven performance-enhancing technologies. Modularisation works by detailed definition of interfaces. The way those interfaces are defined must not hinder innovation.

Recommendations:

Actions for the Member States:

- Ensure the roll-out and deployment of ERTMS/ETCS in accordance with European deployment plan (including sections of the network to be equipped beyond 2023).

Actions for the Commission, ERA and Member States:

- Fully and swiftly implement the 4th railway package and further reduce the remaining number of national technical and operational rules.
- Explore opportunities for further simplification of the certification processes to reduce validation costs, such as through virtual testing (simulations or lab tests instead of on-site tests), possibly building on pilot projects (see section on digital transformation of the RSI).

Actions for the industry, the Commission and other EU bodies:

- Under the coordination of the Commission, ERA and Shift2Rail, develop modularisation of the rail system. Firstly, carry out proactive work on the CCS system architecture based on common European operational principles, which is to be specified in a modular way with common standardised interface specifications in order to take further steps towards the Single European Railway Area and drive the harmonization of CCS. This is to deliver an agile and flexible system able to accommodate future technologies and reduce costs.

Actions for the Commission:

- Monitor and ensure correct implementation of the 4th railway package. By 2022, evaluate whether the legislative framework has indeed led to a reduction of costs and time for granting vehicle authorisation for placing on the market. If not, propose the required corrective actions.
- Set out long-term strategy for predictable evolution of TSIs. Ensure that TSIs remain fit for purpose and enable fast adoption of proven performance-enhancing technologies, making appropriate use of European standards.

5. Standards

Relevant instruments and policies at EU level:

The EU rail system achieved a high level of harmonisation through the TSIs and European standards. These European standards are open and internationally recognised. Many European standards for the railways are already adopted in 15 countries[23] beyond CEN and CENELEC membership as well as at the regional level in the Gulf.

CEN, CENELEC and ETSI are developing a mechanism that will ensure systematic standardisation inputs to trade dialogues with the European Commission and the European Free Trade Association. Some of the main topics to be addressed by the European Commission in ongoing and future trade negotiations are the primacy of ISO and IEC standards, promotion of 'home-grown' European Standards, presentation of the strengths of the European standardisation system and how this system addresses evolving market needs. With this formal mechanism to be developed by CEN and CENELEC, European standards and standardisation activities will be better incorporated in trade discussions and agreements.

The European Commission launched the Rail Standardisation Coordination Platform for Europe (RASCOP) in 2016. The platform gathers all relevant stakeholders (European Commission, European Union Agency for Railways, European Standardisation Organisations, Sector Forum Rail, Shift2Rail Joint Undertaking and associations - CER, EIM, EPTTOLA,

[23] China, Mongolia, Kazakhstan, Georgia, Ukraine, Moldova, Belarus, Egypt, Tunisia, Morocco, Albania, Montenegro, Bosnia & Herzegovina, South Africa and Botswana

ERFA, NB-Rail, UIC, UIRR, UIP, UITP, UNIFE) and focuses on the following main objectives:

- To contribute to streamlining the European standardisation landscape;
- To promote EU interests and positions in international standardisation activities.

Findings

The European standards when used in a global context, provide a clear benefit for European companies and in particular SMEs that do not have the necessary resources to comply with different standards. The bigger the uptake of European standards worldwide, the greater is the opportunity of European companies to reach non-EU markets and remain competitive at international level.

Countries such as Japan, South Korea and China are now very active in international standardisation organisations with an increased interest in influencing the railway sector at a global level.

Standards programming and development at the level of European standardisation organisations (ESOs) and international standardisation bodies (ISO-IEC) is a time and resource intensive process. Given the limited resources (experts and budget wise), priority is often given to the European standardisation working groups, weakening the influence of European actors in the international working groups. To avoid fragmentation of the efforts, standardisation planning needs to be based on clear objectives and priorities.

Conversion of EN standards into IEC/ISO standards provide an advantage for the EU RSI. This conversion works both ways - allowing access of EU products in third markets but also facilitating third market competitors' products on the EU market. Because EN standards are fully accessible while third market standards may not be, it is likely that such conversion would be for the benefits of the EU RSI. The migration from EN standards to international ones bears however some risks of loss of control on future developments of those standards.

Innovation is the next challenge for standardisation. The S2R joint undertaking is providing innovative solutions for the rail sector. However, once the technical work is completed, the implementation of the new product and/or technologically innovative solution on the market should not be hampered by existing standards or lack of standards. There are expectations to keep the pace of standardisation with the R&D&I progress. S2R has established a standardisation roadmap aiming to identify standardisation needs and opportunities, analyse the standardisation potential and benefits in the context of research priorities so that eventually standardisation activities could be launched in parallel with R&D activities when appropriate. Furthermore, addressing standardization early in the innovation lifecycle has demonstrated under Horizon 2020 a smoother market deployment of innovations.

Recommendations:

Actions for the European standardisation organisations (CEN, CENELEC and ETSI), ERA, the Commission, Member States and the industry:

- In cooperation with RASCOP, elaborate a strategy supported by Sector Forum Rail to better promote EU interests and positions in international standardisation activities.

- Enhance the prioritisation and co-ordination of the standardisation process at EU level.
- Identify and develop a work plan to improve the convergence of European and international standards (through Sector Forum Rail in cooperation with RASCOP) and convert EN standards into IEC/ISO standards whenever desirable and possible.
- Promote the application of European and relevant international standards in third countries and their participation in the work of international standardisation organisations.
- Speed up standards programming at the level of CEN-CENELEC/ETSI based on R&D&I initiatives and enhance the cooperation between the EU R&D&I initiatives, in particular Shift2Rail JU, and ESOs.

Actions for the European Standardisation Organisations (CEN, CENELEC and ETSI):

- Set up mirror groups within ESOs to mirror international standardisation and improve coordination (streamline) activities of European delegates at international standardisation working groups.

Actions for the Commission and Member States:

- Support industry to increase the presence of European representatives in international standardisation bodies.

Actions for the Commission:

- Provide (financial) support to CEN, CENELEC and ETSI for the organization of dedicated groups mirroring international standardisation activities.

6. Public procurement in the EU

Relevant instruments and policies at EU level:

To create a level playing field for all businesses across Europe, EU law sets out minimum harmonised public procurement rules. By 18 April 2016, EU Member States had to transpose three directives on public procurement into national law[24]. Today, almost all Member States have finalised the transposition. These new rules aim to simplify public procurement procedures and make them more flexible which benefits public purchasers and businesses, particularly SMEs. Simpler procedures for contracting authorities aim to open up the EU's public procurement market, prevent "buy national" policies at Member States' level and promote the free movement of goods and services.

The Directives 2014/24/EU and 2014/25/EU also established the Most Economically Advantageous Tender (MEAT) principle that enables the contracting authority to take account of criteria that reflect qualitative, technical and sustainability aspects as well as price.

[24] Directive 2014/24/EU on public procurement, Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors, Directive 2014/23/EU on the award of concession contracts

In 2017, the Commission adopted a strategy[25] to improve the effective implementation of public procurement practice in the EU. The strategy clearly calls for a more strategical approach to procurement, in order to achieve wider policy objectives. One of the priorities identified is the increased use by contracting authorities and entities of quality criteria (including environmental, social and innovation considerations). The Commission has published guidelines for green procurement[26] and innovation procurement[27] and is currently developing an update of those on socially responsible procurement[28] and methodologies for life-cycle costing. To ensure that not only price but also high levels of labour and environmental standards are taken into account, the Commission has published guidance on 24 July 2019 on the participation of foreign bidders and goods in the EU procurement market[29].

The Commission also set up a 'voluntary ex-ante mechanism for assessment of the procurement aspects for large infrastructure projects'[30] to support Member States in the process of implementing big infrastructure projects, by checking and advising on the compliance with the EU acquis of the procurement procedures they plan to implement. This tool should contribute to reducing delays in the planning phase of big infrastructure projects and the risk of litigation once the project is launched.

In 2019, CER, EIM and UNIFE developed joint 'Recommendations to apply the MEAT and Good practices in the domain of railway procurement'. The document includes concrete recommendations addressed to the rail sector aiming to encourage further work on practical instruments (additional criteria and guidance) and to continue promoting actively the recommendations towards European railway undertakings and infrastructure managers.

Furthermore, referencing standards in technical specifications of tendering documents can help to increase common understanding of procurement documents between buyers and suppliers. It may also help to contribute to reducing total costs, increase transparency and make it easier to develop procurement documents. A guide for 'referencing standards in public procurement in Europe'[31] was developed in 2018 in the frame of the Joint Initiative on Standardisation (JIS) as a tool aiming to provide general recommendations and to reflect best practice.

The EU public procurement market is, in practice, open, but the EU legal framework provides for certain possibilities to restrict market access to economic operators, including from third countries. The EU Public Procurement Directives provide for a mechanism allowing contracting authorities to reject, under specific conditions, a tender where they have established that the tender is 'abnormally low'. In addition, Article 85 of the Directive 2014/25/EU provides that 'any tender submitted for the award of a supply contract may be

[25] COM (2017) 572 final "Making public procurement work in and for Europe"

[26] https://ec.europa.eu/info/policies/public-procurement/support-tools-public-buyers_en

[27] Ibid

[28] For public procurement of accessible ICT, there is explicit reliance on standards to be referred in the tender, notably EN 301 549 'Accessibility requirements suitable for public procurement of ICT products and services in Europe'

[29] Guidance on the participation of third country bidders and goods in the EU, C(2019) 5494 final

[30] The tool consists of three elements: helpdesk, notification system and information exchange mechanism.

[31] https://www.cencenelec.eu/news/brief_news/Documents/190102-guide_standards_Public_Procurement.pdf

rejected where the proportion of the products originating in third countries (…) exceeds 50 % of the total value of the products constituting the tender'. This provision applies to tenders covering products originating in third countries with which the EU has not concluded an agreement ensuring comparable and effective access for Union undertakings to the markets of those third countries.

Findings:

The use of quality criteria allows for achieving the highest value for money over long term and can bring benefits not only to the EU RSI but also to direct customers (rail undertakings/infrastructure managers) and eventually to passengers. However, it is still possible to award on the basis of the lowest price only, although this is not recommendable for complex projects based on life-cycle costing and becoming increasingly digital. Currently, only about 50 % of EU tenders are awarded based on the use of quality criteria. This particularly has a strategic importance in Member States where some factors such as limited funds and administrative capacity issues set the strongest incentives for contracting entities to stay with lowest price wins. The joint recommendations on MEAT developed by the rail industry associations are an important first step to promote use of the best-price quality ratio in procurement for rail products. This initiative needs to continue in order to develop further instruments on the side of the industry, which could increase effectively the proportion of tenders based on the best-price quality ratio, as well as to improve awareness among contracting authorities.

The members of the expert group consider that the level of protection of European suppliers facing unfair competition on costs in EU tenders might be currently insufficient. The procurement market appears to be confronted with occurrence of abnormally low bids. Such low bids may appear to be attractive, but they can result in costs increase over long-term, low quality and contract delays. The rejection of abnormally low tenders is only mandatory whereby the proposed abnormally low price or costs results from non-compliance with mandatory EU law or national law compatible with it in the fields of social, labour or environmental law or international labour law provisions. Contracting authorities may reject abnormally low tenders in a number of other cases, including if the tenderer received state aid incompatible with the internal market.

As part of competition policy, the European Union sets strict rules for its Member States regarding mergers and state aid within the single market – a major component of economic order in a free market to protect the interests of consumers, the economy and society. Third countries however do not fall under such rules. Domestic producers are disadvantaged when the production outside of the EU is highly subsidised and thereby allows extra cheap offers in the EU. State aid law has so far only been applied for added value in the EU. EU policy tools do not fully address the effects within the EU internal market of subsidies granted by foreign governments. EU competition policy instruments apply without discrimination to all economic operators, irrespective of their origin. EU state aid rules only cover aid granted by Member States. Further, EU merger control does not allow the Commission to intervene against the acquisition of a European company solely on the grounds that the buyer benefitted from foreign subsidies. Trade defence instruments address subsidies that affect the price of products imported into the EU. However, these instruments do not cover all potential effects of unfair subsidies or support by third countries. To close this gap, it is necessary to identify

how the EU could appropriately deal with the distortive effects of foreign state ownership and state financing of foreign companies on the EU internal market.

The use of Article 85 of the Directive 2014/25/EU appears to be limited. However, up to date, there is no data available on actual use of this provision by contracting authorities in different Member States and it is impossible to assess to what extent it created any incentive for third countries to enable market access for EU companies (which was the intended objective of this Article). While the reasons for the only limited use are not known, contracting authorities may have questions about the practical implementation. The Commission has included explanations in the guidance on the participation of foreign bidders and goods in the EU procurement market, mentioned above.

Recommendations:

Actions for the industry and Member States

- Promote the CER-EIM-UNIFE recommendations on MEAT for the procurement of rail products by operators and infrastructure managers, including environmental, social and life-cycle elements in order to become objective award criteria and to minimize subjective interpretation. Plan regular updates of the recommendations to ensure its operational usability, while taking the latest (technological) developments into account.
- Exchange good practices on the implementation of provisions in the Directive 2014/24/EU and 2014/25/EU that are dealing with abnormally low bids.

Actions for the industry:

- Enshrine performance or life-cycle cost parameters in recognised standards in order to facilitate their incorporation in a non-discriminatory fashion into technical specifications and instructions to bidders in tenders.

Actions for the Commission

- To fully address the distortive effects of foreign state ownership and state financing in the internal market, identify before the end of 2019 how to fill existing gaps in EU law (Joint Communication “EU - China - A Strategic Outlook” of 12 March 2019, Action 8).

Actions for the Member States and the Commission:

- Conduct, together with Member States, an overview of the implementation of the current EU public procurement framework to identify shortcomings before the end of 2019. (Joint Communication “EU-China – A Strategic Outlook” of 12 March 2019, Action 7b).
- Continue to promote the use of strategic approach to procurement for a wider uptake of quality criteria including environmental, social and innovation aspects.
- Promote awareness towards contracting authorities of the recommendations developed by the rail industry to encourage use of MEAT and quality criteria in public

procurement for rail products, for example through a dedicated workshop with contracting authorities.

- Promote the use of quality criteria in EU funds and financial instruments of the forthcoming Multiannual Financial Framework (e.g. Connecting Europe Facility, Structural Funds, European Fund for Strategic Investments, EIB instruments), but also through other instruments.
- The European Commission to support Member States in their understanding and evaluation of abnormally low bids and the use of Article 85 of Directive 2014/25/EU.
- Promote professionalisation of public procurement practice including the sharing of good practices.
- Use the guide for referencing standards in public procurement in Europe - output from the Joint Initiative on standardisation.[32]

Actions for the Member States and contracting authorities

- Use more frequently the voluntary ex-ante mechanism for assessment of the procurement aspects for large infrastructure projects.[33]
- Member States to raise awareness among contracting authorities of the existence of Article 85 of Directive 2014/25/EU. Contracting authorities to use Article 85, where relevant and appropriate.
- Implement guidance on the participation of foreign bidders and goods in the EU procurement market, for example through the organisation of dissemination events.

7. EU funding and sustainable development policy

Relevant measures and policies at EU level:

The Trans-European Transport Network (TEN–T) is the key instrument that supports the completion of priority railway infrastructure projects in the EU, including the deployment of ERTMS. The following funding instruments make financial support available to projects implementing the TEN-T: The Connecting Europe Facility (CEF), the European Fund for Strategic Investment (EFSI), Horizon 2020, the European Structural and Investment Funds (ESIFs), including notably the Cohesion Fund (CF) and the European Regional Development Fund (ERDF).

The CEF possesses a grant budget of EUR 22.4 billion for TEN-T projects for the period 2014 to 2020. It aims at developing strategic cross-border infrastructure by providing support to

[32] In this respect, several national standardisation bodies have developed a guidance document under the EC 'Joint Initiative on Standardization' on 'Referencing Standards in Public Procurement', which can be used as a basis. https://www.cencenelec.eu/news/brief_news/Documents/190102-Guide_standards_Public_Procurement.pdf

[33] COM(2017) 573 final

project promoters who will in turn launch public procurement tenders to select suppliers (railway suppliers rarely are the applicant).

The Cohesion Policy in 2014-2020 addresses the diverse development needs in all EU regions. Under the theme "Network Infrastructures in Transport and Energy", the ERDF and CF invest in a range of priorities to promote sustainable transport and remove bottlenecks in key network infrastructures. For the period 2014-2020, EUR 69.4 billion has been allocated for this theme.

The EFSI is a joined initiative by the EC and the EIB, based on a guarantee provided by the European Commission and EIB's capital. The combined of risk capacity of the initiative facilitates the EIB Group to provide additional financing to eligible infrastructure projects, including TEN-T, and increased access to finance for entities up to 3,000 employees, with a target investment volume of EUR 500 billion to be supported by end 2020.

In the context of the multiannual financial framework (MFF) for the 2021-2027 period, the Commission proposed the continuation of the above-mentioned instruments, the creation of a new InvestEU Programme that will bring together the EFSI and 13 EU financial instruments, as well as a Regulation establishing the Neighbourhood, Development and International Cooperation Instrument (NDICI). The instrument will be the EU's main tool to contribute to eradicating poverty and promoting sustainable development, prosperity, peace and stability.

The European Investment Bank (EIB) supports sustainable projects that contribute to growth and employment in Europe as well as outside the EU (when operating under the external lending mandate). Therefore, some of the investments by the EU industry in third countries may use the EIB financing as well. Since its founding in 1958, transport is by far the largest sector of EIB activity accounting for approximately 23% of all lending. About 10% of EIB lending activity takes place outside the EU.

In addition, JASPERS (Joint Assistance to Support Projects in European Regions) has a unique role in providing technical assistance to project promoters that apply for EU funding and Cohesion funding in particular. Other relevant advisory services include the European Investment Advisory Hub (EIAH), established as part of the Investment Plan for Europe offering a wide range of advisory support to public and private project promoters with investment projects serving EU policy priorities regardless of the source of funding and financing.

Findings:

The EU funding and the framework for project financing is crucial because it promotes achieving the EU's industrial policy objectives as well as achieving of Sustainable Development Goals. In addition, it provides long-term visibility, which is essential for the transport infrastructure sector.

The NDICI and the EIB finance instruments are guided by EU policy, including commitments to the Paris Agreement on Climate Action and the UN Sustainable Development Goals. For example, the ambitious target of the new NDICI instrument to allocate 25% of its budget to tackling climate change will help to ensure coherent and efficient way for achieving this objective across the EU's long-term development cooperation.

The high-speed rail plays a key role in reducing transport emissions by absorbing much medium distance traffic. With more than sevenfold growth since 2000, high-speed rail has been the main area of infrastructure growth in the global rail network. This was however mainly due to construction of many new lines in China. As the growth will continue, part of short haul aviation activity (trips up to 1000 km) will shift to high-speed rail towards 2060.[34]

Furthermore, emission reduction scenarios developed by the International Energy Agency (IEA) for reaching the objective of limiting global worming below 2°C show that a significant modal shift in urban transport will be needed from private vehicles (passenger cars especially) to efficient public transport modes. Between 2015 and 2060, IEA projects the global demand for urban rail services to grow by a factor 6 in the 2DS scenario and by a factor 8 in the B2DS[35] scenario, reaching 4.3 and 6.5 trillion passenger-km respectively in 2060[36].

Synergies should be enhanced between the external budget instruments and the EU internal policy programmes in order to maximise impact on key sectors such as transport and energy connectivity. In this context, it is important to maximise the involvement of the European rail supply industry in the EU's efforts to strengthen transport networks and promote sustainable transport policies in the EU neighbourhood[37] and partner countries.

Recommendations

Actions for the rail supply industry:

- Establish dialogue between rail supply industry, JASPERS and EIAH experts to serve as market sounding exercise and help their analysis of project proposals. Such an exchange of views with rail supply industry would allow for exchanging experience as regards technical difficulties identified at the project preparation stage and for informing the experts on the latest technological trends in the sector.

Actions for the Commission and Member States:

- Within the next 2021-2027 MFF, continue and strengthen EU programmes that support the deployment of climate-neutral, energy-efficient and user-oriented transport infrastructure, especially railway and urban rail projects.
- Provide advisory and technical assistance to ensure that projects are implemented in a sound way and EU rail technologies and standards are promoted.
- Continue to ensure that EIB's lending inside and outside the EU is fully coherent with EU trade policy. When considering support for rail projects, the EIB should take into consideration the approach adopted for shipping within the EIB *Transport Lending Policy*, which foresees that the prices in projects should be in line with market prices and that the EIB should check, in close cooperation with the Commission services

[34] Railway Handbook 2016, IEA, UIC

[35] 2°C Scenario [2DS] and a Beyond 2°C Scenario [B2DS], consistent with a 50% chance of limiting global warming (to 2°C and 1.75°C, respectively)

[36] Railway Handbook 2016, IEA, UIC

[37] The European Neighbourhood policy include 16 partner countries in North Africa, Middle East and Eastern Europe

responsible and in line with its policies and procedures such as the EIB Guide to Procurement, for the existence of any outstanding issues concerning (i) Intellectual Property Rights, (ii) potential breaches of trade agreements and, (iii) as far as possible, the risk of distortions caused by anti-competitive practices (including, inter alia, state aid, direct subsidisation, injurious or below-cost pricing, or subsequent public rescue of bankrupt companies); continue to consider local content requirements and other market-entry barriers in relation to projects to be financed. Continue discussion on incorporation of the EIB's external lending mandate into the NDICI.

- In view of the establishment of NDICI, ensure that the investments in the transport sector are made only in long-term projects and sustainable transport modes helping to achieve the Paris Agreement on Climate Change objectives.

Actions for the Commission:

- Ensure that there is coherence and complementarity between the Instrument for Pre-Accession Assistance and the new NDICI with regard to the investments in the transport sector, and the EU support is given only to sustainable transport projects contributing to greater connectivity in the neighbourhood and the achievement of climate objectives.
- Ensure that NDICI is implemented in such a way that provides maximum transparency and user-friendly information about the planned investments and calls for tenders, so that the European rail supply industry could provide its products and services helping to foster the sustainable economic, social and environmental development of the partner countries and providing greater connectivity and mobility.

8. SMEs

Relevant instruments and policies at EU level:

8.1. Access to finance

The EU offers several instruments to support loans which otherwise would not have taken place due to e.g. perceived higher risk associated with financing of SME. The COSME 2014-2020 Loan Guarantee Facility supported 380 thousand SMEs out of which 90% were micro-companies (10 employees). The COSME Equity Facility for Growth Access supports equity for SMEs. The programme is expected to leverage up to EUR 4 billion in equity finance and runs from 2014 to 2020.

The successor of the Investment Plan for Europe - Invest EU - under the future EU budget (MFF 2021-2027) will simplify the existing system bringing the EU support instruments currently available under one roof. The procedures will be streamlined by applying a single set of coherent requirements. Thanks to the centralised nature of InvestEU, overlaps are minimised and synergies ensured. The InvestEU Advisory Hub will integrate the 13 existing advisory services into a one-stop-shop.

8.2. Access of SMEs to international markets

Promoting and supporting SMEs' economic activities outside the EU is an important part of the Industrial policy strategy and Market Access Strategy.

Direct organisation and promotion of business missions (complementary with EU MS efforts on trade promotion) to Korea, South East Asia, China and Japan, is managed by ''EU-Gateway Business Avenues". Launched in 2016, the EU Gateway programme helps SMEs to seize new opportunities on markets that can be challenging to access due to business culture or regulatory constraints. In 2017, the RSI participated as the key sector in the first Rail Technologies Gateway mission to Japan. A new mission will be organized for the railway sector in November 2019.

The EU also established instruments providing an advice on legal issues (contracts /joint ventures), as well as on trade access (Trade Defence Helpdesk[38]and IPR Helpdesk[39]). Further support to internationalization is provided by instruments such as the "Market Access Database"[40]with information on market access in over 130 export markets, "EU Centre for Support to European SMEs in China", "EU-Japan Centre for Industrial Cooperation", "EUROMED Trade Help Desk". The European standardization organisation also have put in place specific projects to support the exchange on standardisation with China (SESEC Project) and India (SESEI Project). Furthermore dedicated task forces have been established by CEN and CENELEC with China, India, Africa, the Gulf region and Japan to enable exchange information and support to European industry in entering these markets. These mechanisms can also be exploited to the benefit of SMEs, which have a direct link to European standardisation through SBS – Small Business Standards – organization.

The EU is supporting the internationalisation of SMEs of the RSI also through a long-term strategic instrument - the EU Cluster Policy. As a strategic tool of EU industrial policy, Cluster Policy falls under the COSME programme and others like INTERREG EUROPE. These services enable SMEs to find international partners for research and prototyping as well as to bring products and services to new markets. Cluster organisations can thus support SMEs to identify growth opportunities worldwide, raise their excellence, innovation capacity and their overall competitiveness.

In the field of strategic and long-term internationalisation support to SMEs through Clusters, the main EU tool is the "European Strategic Clusters Partnerships for Internationalisation" (ESCP-4i). In the field of rail, a dedicated ESCP-4i "PERES Promoting European Rail Excellence outside EU" is promoted by clusters in Italy, France, Germany, United Kingdom and South-Eastern Europe countries. Its preparatory actions fall under the COSME programme. This includes the development of the business and organisation model of a to-be-established European legal entity whose mission will be the delivery of internationalisation support services to European SMEs following a joint internationalization strategy. PERES will address USA and India markets in its start-up phase.

[38] http://ec.europa.eu/trade/policy/accessing-markets/trade-defence/actions-against-imports-into-the-eu/help-for-smes/

[39] http://www.iprhelpdesk.eu/

[40] https://madb.europa.eu/madb/indexPubli.htm

Findings

SMEs play a crucial role in reaching the objectives of the Europe 2020 Strategy. They are crucial engines for growth and job creation, though their competitiveness is affected by a limited exploitation of international opportunities and innovation prospects in the Single Market and beyond.

Although international markets, both private and public, offer opportunities for European companies, SMEs face particular obstacles to tapping the global market, not least when it comes to information on market access, locating possible customers and finding the right partners. They also face more complex issues such as compliance with foreign laws, for example mandatory rules of contract law, customs rules, technical regulations and standards, managing technology transfer and protecting intellectual or industrial property rights. SMEs do not have the necessary resources to comply with different standards (see standardisation part). In dealing with such challenges SMEs are usually less equipped with in-house expertise and financial or human resources than larger enterprises.

Concerning access to finance, it is still an exhausting procedure for SMEs associated with bureaucracy and long terms between the loan application dates and announcement of the decision. Furthermore, the multitude of often overlapping support instruments at EU level makes it often difficult for SMEs to choose the most convenient option.

Recommendations:

Actions for the Commission:

- Promote European programmes supporting the internationalization of SMEs, such as the currently existing "EU Gateway │Business Avenues" trade missions and consider extending their geographical scope to more countries and beyond only Asia.
- Continue supporting the participation of SMEs and other stakeholders in the European standardisation foreseen in the standardisation Regulation (EU) 1025/2012. Fund Enterprise Europe Network (EEN) outside EU to provide SMEs with the same level of services and reliability as within the EU.
- Continue supporting the Cluster Policy and in particular the cluster initiatives for SMEs internationalisation such as the "ESCP-4i" and their economic sustainability while making use of the ongoing standardisation projects, notably SESEC with China and SESEI with India.

Actions for the European Standardisation Organisations (CEN, CENELEC and ETSI), the Commission, Member States and industry:

- Enhance participation of SMEs in development of global standards by encouraging their participation in National Standardization Bodies or National Committees, thus enabling them to access national standardization work, or contribute to CEN and CENELEC or ISO and IEC standardization.[41]

[41] A range of tools to facilitate the contribution of SMEs in standardization is in place which can be further exploited https://www.cencenelec.eu/sme/Pages/default.aspx

9. Access to International procurement Markets and project financing

Relevant instruments and policies at EU and international level:

The Market Access Strategy is part of the EU's efforts to improve conditions for European firms to export around the world and ensure the enforcement of international trade rules. The Commission analyses trade and investment barriers reported by businesses and Member States and publishes annually a Trade and Investment Barriers report. Several instruments are currently available to support exporters, such as Market Access Database that provides product specific information on import conditions in over 100 non-EU countries.

The public procurement Directives provide, for public buyers in the EU, to accord to the works, supplies, services and economic operators of the signatories to several international agreements (such as the Agreement on Government Procurement and bilateral Free Trade Agreements with Procurement Chapters) treatment that is no less favourable than the treatment accorded to the works, supplies, services and economic operators of the EU, in so far as these are covered by these agreements[42]. Beyond that obligation, economic operators from third countries, which do not have any agreement providing for the opening of the EU procurement market or whose goods, services and works are not covered by such an agreement, do not have secured access to procurement procedures in the EU and may be excluded[43].

The Commission is working to ensure that reciprocal access is granted to the EU companies and, therefore, it continues to support the accession of new members to the WTO Agreement on Government Procurement (GPA) in a reciprocal way in order to ensure more open, transparent and non-discriminatory tender procedures. The GPA remains the crucial instrument for opening up international procurement markets. This plurilateral agreement is the only legally binding agreement in the context of the WTO aiming at the opening of the procurement markets of its 20 Parties (the EU and its 28 Member States count as one). The revised GPA also clearly sets out that, no later than three years after the entry into force of the revised GPA and periodically thereafter, the parties shall undertake further negotiations to progressively reduce and eliminate discriminatory measures and to achieve the greatest possible extension of the coverage[44].

Another tool for the opening up of procurement markets are the bilateral negotiations with third countries. To provide a level playing field for EU suppliers when bidding for contracts abroad, rules about public procurement have been included in many Free Trade Agreements (FTAs) negotiated by the EU.

[42] See Article 25 of Directive 2014/24/EU, Article 43 of Directive 2014/25/EU

[43] See Communication from the Commission, Guidance on the participation of third country bidders and goods in the EU procurement market, C(2019) 5494 final

[44] WTO official website

With the aim of achieving reciprocity with third countries, on 29 January 2016, the Commission presented a revised proposal for an International Procurement Instrument (IPI). The proposal on the IPI is the EU response to the lack of level playing field in world procurement markets and aims at encouraging partners to engage in negotiations and opening participation for EU bidders and goods in third countries' tendering procedures.

The EU- China connectivity platform was established in 2016 in the light of China's Belt and Road initiative. It serves to promote policy exchanges, encourage cooperation between the EU and China in a transparent and consistent manner and promote a level playing field and reciprocity. The European Commission and the Chinese National Development and Reform Commission are co-chair of the platform. An expert group on financing and investments has been established under the EU-China connectivity platform. It focuses on exchange of information on infrastructure projects from both sides.

9.1. Access to International Markets

Findings:

The rail supply industry is integrated within global value chains and depends on predictable, rules-based international trade. Access of EU companies in the rail supply industry to procurement markets of third countries therefore has a great potential in terms of growth, jobs and investment as well as innovation in the EU. The worldwide public procurement market is worth at minimum some EUR 8 trillion each year, but more than half of it is closed to EU companies — which win only about EUR 10 billion of contracts in third countries[45]. Only the commitments under WTO's plurilateral GPA offered an estimated EUR 1.5 trillion a year of additional business opportunities by further opening up the public procurement markets[46]. The EU has been continuously advocating at all levels for an ambitious opening of international procurement markets, such as through the GPA.

While EU's procurement market is in practice open to third country bidders, the procurement markets of third countries remain to a large extent closed. Over the years, the EU has opened up to a large degree its public procurement markets to third countries, but EU companies often encounter difficulties in gaining access to procurement opportunities in some foreign markets.

The rail supply industry is faced with a growing number of barriers in the field of international public procurement and investment (e.g. forced Joint Ventures, forced transfers of technology). As a result, and despite the many policy initiatives listed above, market accessibility as defined by the UNIFE/Roland Berger World Rail Market Study has been

[45] Preparing for a more united, stronger and more democratic Union in an increasingly uncertain world - The European Commission's contribution to the informal EU27 leaders' meeting in Sibiu (Romania) on 9 May 2019

[46] WTO estimates https://www.wto.org/english/tratop_e/gproc_e/gp_gpa_e.htm

continuously decreasing over time. This situation is aggravated by the rising protectionism globally[47].

To ensure a fair competition between EU and non-EU suppliers on the global market, it is essential to succeed in revising the WTO rules on subsidies and the role of state-owned enterprises, as recently proposed by the EU, Japan and the US.

Public procurement has been included into many recent FTAs. However, monitoring the implementation of commitments made by third countries is also becoming more resource-intensive as the FTAs evolve in increasingly complex documents. The overall assessment of the expert group with regards to access to international markets is a decline of market access and an increase in barriers. Urgent action, beyond existing policy initiatives, is required to address this situation and to strengthen Europe's ability to protect itself from unfair trade practices. This means making better use of our trade defence instruments, seeking a level playing field in procurement and implementing the new system for screening Foreign Direct Investment.

Recommendations

Actions for the rail supply industry:

- In the framework of the Market Access Partnership, continue informing the Commission and Member States on the difficulties encountered by the European Rail Supply Industry in accessing the markets of third countries to allow for an effective monitoring of third country commitments, as also provided for in Article 86 of the Utilities Directive.
- Contribute to discussions in the framework of the Market Access Advisory Committee (MAAC) with regard to the monitoring of the implementation of existing Free Trade Agreements.

Actions for the Member States:

- As called for by the European Council, find an agreement with the European Parliament and the Commission to improve and adopt the International Procurement Instrument, as soon as possible and ensure that the Instrument is fit for purpose to achieve a more balanced and reciprocal economic relationship as stipulated in the objectives of the Joint Communication "EU-China – A Strategic Outlook".

Actions for the Commission:

- Continue to negotiate opening of third country procurement markets, including in the rail sector, in the bilateral free trade and investment agreements and implement the new framework for screening Foreign Direct Investments.

[47] The 2018 eighth annual Trade and Investment Barriers Report (TIBR) (http://trade.ec.europa.eu/doclib/docs/2018/june/tradoc_156978.pdf) analyses trade and investment barriers reported by businesses and Member States to the Commission through the Market Access Partnership.

- Continue promoting the use of environmental, social and labour-related considerations, provided that they are applied in a non-discriminatory way when negotiating free trade agreements with third countries.
- Continue to work on the accession of third countries, including China, to the WTO GPA; continue working with the GPA Parties on improving the GPA in order to progressively reduce and eliminate discriminatory measures and achieving the greatest possible extension of its coverage among all Parties on the basis of mutual reciprocity.
- Encourage the use of European or relevant international standards developed by ISO or IEC in procurement in third countries for example by establishing a link to European and international standards in future trade agreements when public procurement is concerned and by practical application of a guide on the use of standards in public procurement.
- Propose and enforce effective remedies when market access barriers are identified by the RSI as part of the Market Access Partnership and Market Access Advisory Committee.
- Propose new WTO rules on subsidies, including State-Owned Enterprises, to ensure fair competition among players.
- Continue monitoring third country commitments under FTAs in order to establish which national procurement markets are closed to European companies. Commit dedicated resources in EU delegations to monitor the implementation by third countries of their market access commitments.
- Appoint a Chief Trade Enforcement Officer to monitor and improve the compliance of EU trade agreements with third countries, who will report regularly on the state of play and keep the European Parliament and the Council abreast of all developments.
- Promote expertise within industry with respect to the reporting and facilitate documentation of market access barriers Industry as part of the Market Access Partnership and Market Access Advisory Committee.
- Support the general adoption of e-tendering that can improve the opportunities for European companies, in particular for SMEs.

9.2. Project financing

Findings:

Export finance mechanisms have been introduced in virtually all the Member States. However, these national mechanisms lack harmonisation on the lending terms and conditions or the applicable interest rates.

Large differences exist with respect to the lending capacity (rates, pay back times and other financial terms and conditions) applied by the EU and by non-OECD countries. The fact that some export credit agencies do not have to comply with OECD rules[48] often leads to situation that financing in those countries is offered under much more advantageous conditions compared to the EU.

Core of the OECD rules on financing is to foster competition for the best and most innovative technology rather than a race for the cheapest financing. However, even within the OECD, a variation of interpretation and application of the rules exists. Some countries grant tied aid for infrastructure projects on the basis of development aid exemptions on financing.

At a global level, the Chinese Belt and Road Initiative (BRI) represents an important part of China's outbound investments and it constitutes one of the most significant infrastructure initiatives of recent times. The initiative is funded namely by large state owned banks and funds and often entails lending to sovereign borrowers. The current financing of BRI projects[49] is mainly based on tied financing under government to government agreements with loans conditioned on the use of Chinese companies. In many cases, projects that are financed are part of larger 'packages' involving various sectors.

Recommendations:

Actions for the Commission:

- Ensure appropriate dialogue between the relevant Directorate-Generals, the European External Action Service (EEAS), the EIB and the EBRD and the European rail supply industry and the European Standardisation organisations, focusing on the EU support for sustainable transport projects outside the EU.
- Promote further adoption of OECD rules and deepen rules-based multilateral system**.**
- Use the future Joint European Commission – National Development and Reform Commission study[50] on sustainable railway-based corridors between Europe and China to incentivise international financial institutions (IFIs) to finance projects in the region while ensuring open and fair access to BRI projects for EU companies.
- Explore ways to enhance export finance capability, as part of the EU economic diplomacy on export finance, in view of matching the offers made by third countries (without a relaxation of OECD guidelines in that respect). That may include promoting the harmonisation of export finance support mechanisms, creating a one-stop-shop for export finance allocation for large projects or flagship projects, or establishing a European guarantee.

[48] For example, the payback period in the EU is 14 to 15 year, while in China this period is 20 to 25 years

[49] Mostly through China Development Bank and Exim Bank; the percentage of projects financed by multilateral development banks is still extremely low

[50] Developed in the framework of the EU-China Connectivity Platform, this study must identify the most efficient, interoperable as well as economically and environmentally sustainable railway corridors linking China to the EU. The study may serve as basis for the identification of priority investments (outside the EU) and will also consider the relevant market access and technical issues

- Encourage the exchange within the EU of best practices in terms of financing instruments and financing conditions. That may include best practices on direct lending, stabilisation of interest rate, the development of investment desk or measures to preserve suppliers' cash flow.

10. Intellectual property rights

Relevant instruments and policies at EU level:

The EU has a range of instruments to address intellectual property (IP) infringements, such as working multilaterally through international organisations or bilaterally through the negotiation of IP chapters in the FTAs, monitoring and reporting on the adequacy of IP protection and enforcement in third countries and cooperating with third countries to address specific IP problems. In some cases, the EU enforce legal rights e.g. through dispute settlement procedures in other cases, the EU's ability to achieve results depends on the diplomacy and co-operation with third countries.

Many key technologies that are part of global industry standards (such as Wi-Fi or 4G) are protected by standard essential patents (SEPs). In November 2017, the Commission published guidance and recommendations for a balanced and efficient SEPs system. The system aims to reconcile two objectives: product manufacturers can access technologies under transparent and predictable licensing rules; and at the same time patent-holders are rewarded for their investments in R&D and standardisation activities so that they are incentivised to offer their best technologies for inclusion in standards.

On 1 July 2014, the Commission adopted Communication on "Trade, growth and intellectual property – Strategy for the protection and enforcement of intellectual property rights in third countries". The Strategy aims at further increasing the effectiveness of the fight against IP infringements on a global scale[51]. The Commission also works closely together with likeminded trading partners like the US and Japan to co-ordinate actions in relation to third countries.

Findings

Economic evidence suggests that intellectual property protection is a significant determinant of economic growth. A joint study by the EUIPO and the European Patent Office (EPO) from October 2016 mentions that the IPR-intensive industries generated approximately 42.3 % of EU's total GDP worth EUR 5.7 trillion.

The Rail supply industry is an innovative sector and it submits an important share globally of the patents and industrial designs for rail products. Protection and enforcement of intellectual property both at national and international level are crucial for the EU's ability to innovate and to stay competitive on the global market.

[51] COM(2014)204 final, with staff working document Com(2014) 389 final

To allow innovative manufacturers to provide consumers with products incorporating new functionalities and to stay competitive in the quickly evolving technological markets, the licensing of SEPs needs to take place under predictable and transparent conditions. The interlink between standards and those patents which may be considered essential for their implementation. SEPs can have a significant impact on innovation and the access to new technologies. Therefore, alignment of relevant legislations and the policies of the Standardisation Organisations with the implementation of FRAND (fair, reasonable and non-discriminatory) licencing conditions could further facilitate the growth of the RSI

Recommendations:

Actions for the Commission:

- Continue to promote the protection and enforcement of IPR on third countries through the negotiation of ambitious IP Chapters in the FTAs and for similar progress through the bilateral IP dialogues and IP working groups.
- Support enquiries by the RSI companies on possible infringements of their IPR.

Actions for the industry, the Commission and Member States:

- Ensure an optimal identification of relevant European standards and implementation of good practices and policies for the licensing of intellectual property rights in compliance with antitrust rules and case law, including support for FRAND[52] conditions for licencing Standards Essential Patents.

Implementation and follow-up

The report of the expert group on the competitiveness of the EU RSI formulates 88 recommendations addressed to EU institutions, Member States and, industry and European standardisation organisations. To monitor the progress on the implementation of recommendations included in the report and discuss the evolution of global competition, the expert group may meet annually.

[52] Fair, reasonable, and non-discriminatory terms