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Issue 2020/01
January 2020

POLICY BRIEF

FSR TRANSPORT
Florence School of Regulation

EUROPEAN TRANSPORT REGULATION OBSERVER

How to Revitalise Rail Freight With Digitalisation?

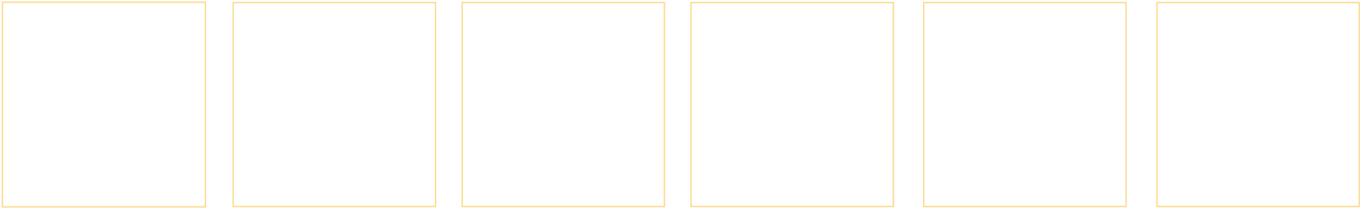
*by Matthias Finger, Juan Montero and Teodora
Serafimova, EUI*

Highlights

In its [2011 White Paper](#) the Commission set the objective of shifting 30% of road freight over 300 km to other modes, such as rail or waterborne transport, by 2030. By 2050 the share is to be increased to 50%. In addition to supporting these decarbonisation objectives, a shift from road to rail offers to ease congestion on roads, lower the pressure on road infrastructures by taking over the heaviest loads and by reducing the risks linked to transporting dangerous goods. Yet, the progress achieved to date in the Member States remains insufficient, as the share of rail freight stagnates at around 18%. To ensure that rail freight takes off, its performance needs to improve drastically in terms of quality and efficiency. The sector and the legislators need to think fresh and bold and to consider holistically what can be done to overcome this stagnation.

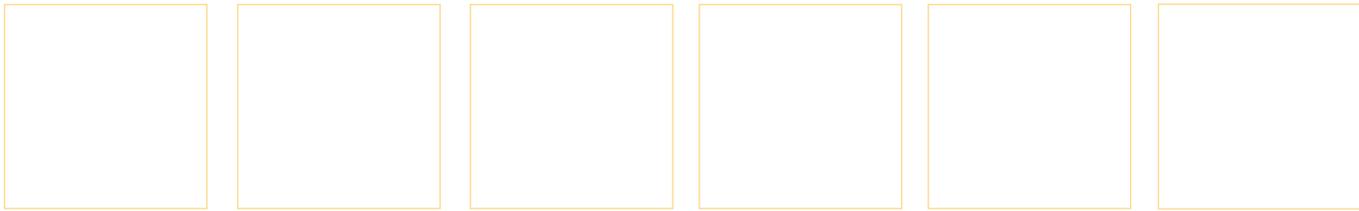
The development of Rail Freight Corridors (RFC) remains the key element of the European Commission's policy to boost rail freight. The future rail strategy would therefore also depend on the results of the ongoing evaluation of [Regulation \(EU\) 913/2010](#), which aims at improving the quality of international rail freight services by setting up a framework for international cooperation to provide high quality capacity for international freight services. This regulation entered into force in 2010 but the results have so far been modest.

The European Commission's [Long-Term Decarbonisation Strategy](#), which sets the objective of achieving net climate neutrality in Europe by 2050, as well as the European Green Deal, in which the von der Leyen Commission will elaborate policy measures to implement these objectives, offer new momentum to come up with a concrete strategy to revitalise rail freight. The [18th Florence Rail Forum](#), jointly hosted by the Florence School of Regulation and the European Commission's DG MOVE, discussed the opportunities and challenges of digitalisation of the rail sector, including how digital solutions can be used to better govern and operate RFCs.



Digitalisation is not a goal per se but rather a means to improve customer experience, operations and to increase capacity of the RFCs. Though positive changes are already happening, the consolidation of digital technologies and business processes in the sector remains a challenge. The 18th Florence Rail Forum therefore sought to answer the following four critical questions:

- How can sharing of operational data improve the efficiency of operations? What are the barriers for sharing such data? Experience and lessons learnt from other sectors.
- Is digitalisation contributing to the modernisation and simplification of the RFCs? What is the potential of digitalisation for better international rail freight capacity?
- What is the impact of deployment of digitalisation in rail freight? In particular regarding client interfaces and the integration of the logistics chain?
- What can we realistically achieve in the coming years?



How to Revitalise Rail Freight With Digitalisation?

A comment by Juan Montero and Matthias Finger, Florence School of Regulation – Transport Area

Digitalisation has the potential to overcome some of the inefficiencies derived from the fragmentation of European rail freight transport. Rail freight transport in Europe is fragmented because railway systems have historically evolved at a national level with little interaction among them. Furthermore, market opening has actually increased fragmentation, as the sector has been vertically unbundled (infrastructure managers versus railway undertakings). At a horizontal level, an increasing number of railway undertakings compete in the provision of freight transport services.

Fragmentation creates inefficiencies, particularly in cross-border freight services. Rail freight services are particularly competitive as distances increase above 500 km. Such distances are mostly reached in Europe when services stretch across national borders. But cross-border services require the coordination of more than one infrastructure manager (and sometimes several of them). Capacity is constrained, and capacity allocation needs to be coordinated. Further coordination is necessary when trains run behind schedule and incidents require the definition of alternative routes or new railway paths, sometimes passing via other countries. Railway Freight Corridors (RFCs) were constituted to eliminate such bottlenecks and to increase coordination, but delays are still too common and service quality is still too poor for modal shift to materialise.

Digitalisation holds the potential to make coordination better and more cost-effective. It reduces transaction costs, as the cost of generating data is reduced, data transmission is enhanced and sharing data across organisations and national borders is facilitated.

Lessons From Other Sectors

Data standardisation is a common theme across all transport modes. For data to be exchanged, it is necessary to standardise it. Firstly, it is necessary to identify the data that are relevant. Secondly, it is necessary to ensure that, across players, relevant data have the same meaning.

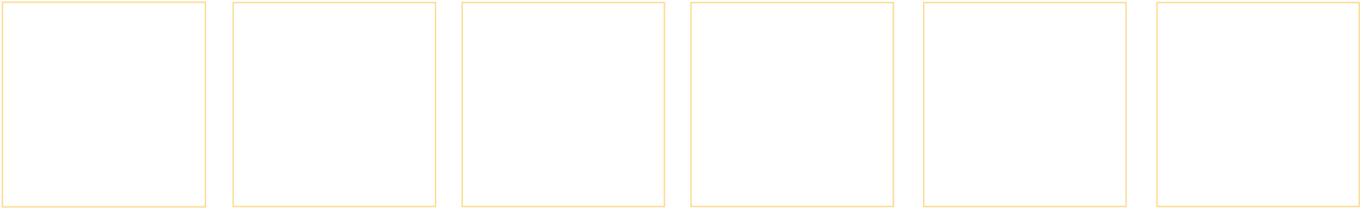
In particular, it is commonly underlined that standards defined at a global scale, if available, should be used, as to avoid new standards. Thirdly, data quality has to be ensured.

Data sharing is also key in all transport modes. Actors might share data on a voluntary basis. But it is often the case that market players are reluctant to do so. As data has become “the new oil”, some players are simply reluctant to share it, thinking that they are giving away a valuable asset. More sophisticated players might consider that sharing data might empower new players to disrupt the market and reduce the market power of the incumbent player(s). Data sharing obligations might therefore be necessary. However, data sharing is not neutral for the different actors involved; therefore, before imposing such an obligation, a proportionality analysis should be undertaken, and the impact on the market should be assessed. As a matter of fact, data sharing seems more disruptive in the B2C segments than in the B2B segments.

Data governance is also important. Here, it is necessary to identify not only which data have to be shared, but who will have access to the data and who will be managing the data. Different models are possible: a fully distributed model where everyone has access to all the data, a platform model whereby an entity centralises the management of the data. In such a centralised model, it will be necessary to identify who will act as the platform operator, as there are many candidates: a traditional player (for instance an IM), new start-ups, large traditional technology groups (i.e., Siemens and alike) and others more. The wrong governance might create distrust and block collaboration.

It is also important to understand that coordination is not automatically triggered by data sharing. Data sharing introduces transparency. This might generate some efficiencies in itself. It might also help to identify bottlenecks and inefficiencies. But coordination across different organisations requires a more active role, either of the players themselves to act in a coordinated way, or of a regulator setting the right incentives. As a matter of fact, debates about data sharing often hide deeper issues of past distrust or of a redefinition of the power relationships among the involved actors in the transport system.

For instance, port-calls can be optimised if data is exchanged between vessels (time of arrival) and ports (slots available for the provision of services). But data



will only provide transparency. Full optimisation requires time of arrival and available slots to become real commitments by the relevant players.

Finally, any policy around digitalisation and data sharing requires a deep understanding of the incentives and costs for each player. While digitalisation and data sharing improve the system, not all players benefit in the same way and not all players have to assume the same costs and consequences. Specific solutions have to be defined when the higher costs have to be assumed by players that will not benefit the most.

Digitalising Rail Freight Corridors (RFCs)

Digitalisation offers obvious opportunities for Rail Freight Corridors (RFCs). We see three such opportunities:

1. **Performance monitoring:** Digitalisation can facilitate the monitoring of performance in each RFC. However, in order to make this effective, it is necessary to fully implement the existing Train Information System (TIS), to ensure the quality of the data and to create the necessary interfaces.
2. **Capacity management:** Digitalisation can improve the management of capacity by better coordinating the allocation of existing capacity. Yet, this implies that the interfaces have to be improved for all the data, which will have to be centralised within a single point of contact.
3. **Traffic management:** Digitalisation can empower RFCs to manage traffic both under regular conditions but also when disruptions emerge. However, such a role of the RFC has to be better defined and the necessary interfaces have to be put into place.

Doubts are allowed as to whether digitalisation of RFC will be sufficient to solve the more pressing problems of rail freight transport.

- Firstly, the ability of the existing standardisation process (TAF TSI) to support digitalisation is in doubt, as implementation is too slow. There is also a risk to experience the same fate as ERTMS did (i.e. proliferation of national variants), as the technical specifications are not enforceable and do not yet contain clear obligations. Moreover, there is no guaranteed access to information.

- Secondly, the existing standardisation process regarding the digital exchange of data (TAF TSI) is not defined within the RFC, but more broadly within the RNE framework. It would be a mistake to fragment digitalisation by defining standards and procedures for each RFC. Players are increasingly dubious as to the role of the RFC as the most appropriate governance mechanism for overcoming fragmentation.
- Thirdly, the debate on data sharing hides a deeper debate about the allocation of capacity for international freight services. Indeed, capacity is scarce and priority is often given to passenger transport, as well as to national services over international services. This is one of the main reasons why quality of international rail freight services is poor. National infrastructure managers have little incentives to invest to increase capacity, as access charges paid for freight services are low, and in absolute terms represent a very small percentage of their revenue. Data sharing will not change this reality, even if it might increase transparency and help identify bottlenecks.

A centralised allocation of capacity is proposed as a solution. The creation of a centralised unit to allocate capacity for international freight services, making use of digital solutions, could substantially reinforce quality of the service. The EUROCONTROL model implemented in aviation could indeed be followed. The precondition, however, seems to be to make more capacity available for these services.

The Full Picture: Rail in the Logistic System

Rail freight transport is only one piece in the European logistics system. If rail is to become the backbone of such a system, it will be necessary to first increase the quality of the service, secondly to ensure a better integration within the rail system, and thirdly to better coordinate with the entire logistics system.

Firstly, shippers are sending a clear message: rail freight transportation has to increase in quality, as it has to become more reliable. Business to Customer (B2C) data sharing might exactly do that. Indeed, railway undertakings



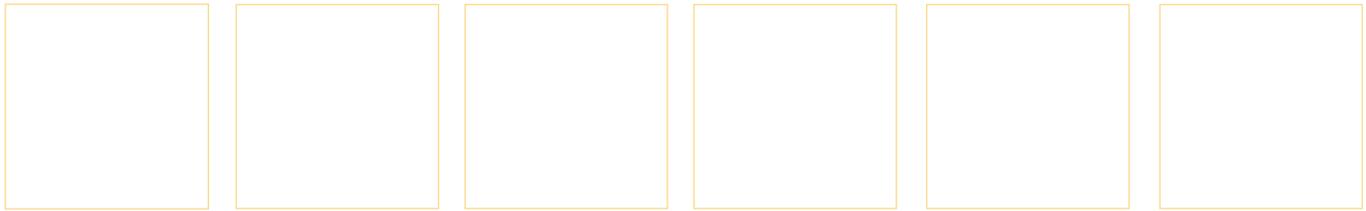
might well use digital tools to provide their customers more visibility about their services (location of rolling stock, wagons, cargo, etc.). There will also be increasing pressure on the infrastructure managers to share their data directly with final customers and the intermediaries, bypassing railway undertakings altogether. Being state-owned entities, IMs might be obliged to make public some of their data, including location data. Railway undertakings, in turn, will be reluctant to have data widely shared, in particular with digital platforms that might end up excluding service providers from the relationship with the customer thus commoditising their services. In any case, it is widely understood that data sharing would not include commercial data.

Secondly, it is necessary to better integrate rail freight infrastructure within the logistic system. It is not always the case that at the physical level terminals are well prepared to connect with other transport modes, including ports but also trucks. Digitalisation will hardly help to overcome this obstacle.

Thirdly, digitalisation will only be fully exploited when data is shared across transport modes so they can be better coordinated. Digitalisation can build a network of coordinated networks. However, if coordinating the players in the rail sector is not easy, coordinating the whole logistic sector will be even more complicated. It does not seem to be the role of public authorities to impose such coordination, but public authorities have a role to play. If data is standardised for each sector, and the Commission plays a role in such a coordination, it can be then left to market dynamics to define the most efficient model to manage all the available data and procedures for the coordination of the overall system. Different models and companies will then be competing to integrate the overall system. It does not seem to us to be the role of the public authorities to pick winners.

Public authorities, however, have a role to play in the standardisation of data and data-sharing across the transport modes. The Commission has been active in the definition of B2B data sharing ('Towards a common European data space', Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM/2018/232 final). For transport in particular, the Commission has established the Digital Transport and Logistics Forum (DTLF) as

the framework for the definition of common principles across transport modes. This is certainly an important first step.



Main Takeaways from the Discussion

By Teodora Serafimova, Florence School of Regulation – Transport Area

The European Commission's modal shift objectives, as defined in its [2011 White Paper](#), call for 30% of road freight over 300 km to be shifted to other modes, such as rail or waterborne transport by 2030. The share is to be increased to 50% by 2050. Shifting medium-long trips to rail constitutes an important element of the EU's decarbonisation strategy, given that European railways are up to nine times less CO₂ intensive than road for freight. Four out of five trains are already running on electricity. In addition to offering a much less CO₂-intensive means of transport and to helping cut air pollution levels in urban centres, a greater reliance on rail for the transportation of dangerous goods helps to minimise risks associated with road transport.

Despite the recognition of these benefits, the share of rail freight stagnates at around 18% and the sector is characterised by a lack of reliability and punctuality, as well as a chronic and deteriorating (under)performance and quality. What is more, customs and administrative barriers at the borders have persisted, whereas the resilience against major disruptions is highly inadequate. The poor quality has translated into inefficiency and high costs, thus winning the sector the label of the 'sick man of Europe'. This can, in part, be attributed to the fact that priority has been granted to passenger and national services over freight services, which oftentimes are cross-border in nature. In order to avoid conflicts and competition between freight and passenger transport, there is also a need for more capacity and a better utilisation of existing capacity. Digitalisation can play a key role in enabling more efficient operations, better utilisation of scarce capacities and thereby lower the environmental footprint of goods transport.

As foreseen by the Commission already back in 2012 in its [Directive 2012/34/EU](#), digitalisation can and will affect the development of the Single European Railway Area. Unlocking the full potential of new technologies and big data will however, necessitate a change in the way the entire logistics chain is organised and managed. What is more, a mental shift will be needed to break away from the current data-sharing reluctance and instil

trust and cooperation within the sector. In recognition of this, the European Commission initiated the creation of the Digital Transport and Logistics Forum (DTLF) in 2017. The DTLF is an open and collaborative platform that brings together Member States, public entities and other relevant organisations so as to exchange knowledge and develop policy and technical recommendations for the European Commission in the fields of transport and logistics digitalisation across all modes of transport.

In support of the Commission's focus on digitalisation, in 2016 the European trade associations CER, CIT, EIM and UIC presented the joint Roadmap for digital railways highlighting the opportunities and challenges of rail digitalisation. Subsequently, in 2017 an even broader set of stakeholders, including CER, EIM, ERFA, UIP, UITP and UNIFE signed the Joint Rail Sector Declaration reaffirming their commitment to the continued provision of products and services using digital technologies to the benefit of consumers and with a view to contributing to the Digital Single Market. Yet, these good intentions and high expectations, as manifested through the numerous declarations, have thus far not really been translated into concrete results.

How Can Sharing of Operational Data Improve the Efficiency of Operations? What Are the Barriers for Sharing Such Data? Experience and Lessons Learnt from Other Sectors.

The notion of 'data as the new gold' has brought about an overestimation of the value of the data at the disposal of a given company or sector. What needs to be acknowledged, however, is that the biggest value lies not in the data, but rather in the *sharing* and *exchange* of such data. Indeed, participants pointed out that the sharing of operational data is an enabler of innovation, and holds potential to improve the efficiency of operations, which in turn translates in empowered staff, improved safety, reduced costs, and continuous process optimisation.

A number of important barriers, however, stand in the way of data sharing, which will have to be addressed in order to reap the above-mentioned benefits. Firstly, a high quality of data inputs needs to be ensured. While the precise level of quality is highly dependent upon the type of input (e.g. manual input or via sensors), in general it can be said that a high level of quality is particularly



important in the case of daily operations. Currently there are many different platforms seeking to control the quality of the data, leading to a misalignment of quality parameters. In light of this, an overarching governance mechanism will be needed to ensure that the issue of data quality is addressed in a consistent manner.

Furthermore, in order for data to be effectively exchanged, data needs to be standardised. To this end, participants stressed the need to identify the type of data that needs to be shared, as well as to draw up a common definition of this data. Today ERA's so-called Technical Specification for Interoperability on 'Telematics Applications for Freight' (TAF TSI) dictates the protocols for data exchange for path requests, train running forecasts, service disruption information, as well as shipments' estimated times of arrive (ETA). The TAF TSI, furthermore, mandates databases to be implemented by RUs, infrastructure managers (IMs) or freight customers, which include reference files and rolling stock reference databases among others. The provisions of the TAF TSI are however voluntary and have thus been poorly enforced. To address this, participants called for the adoption of future-proof and enforceable standards.

Having said this, it was underlined that standards defined at the global level, where available, should be used, as to avoid new standards. For instance, in the maritime sector, data sharing standards have already been developed at the IMO level. However, their enforcement is yet to be secured. Guaranteeing enforcement of data sharing obligations will require a clarification of governance models, which in turn will be key to defining who is responsible for managing and coordinating the data.

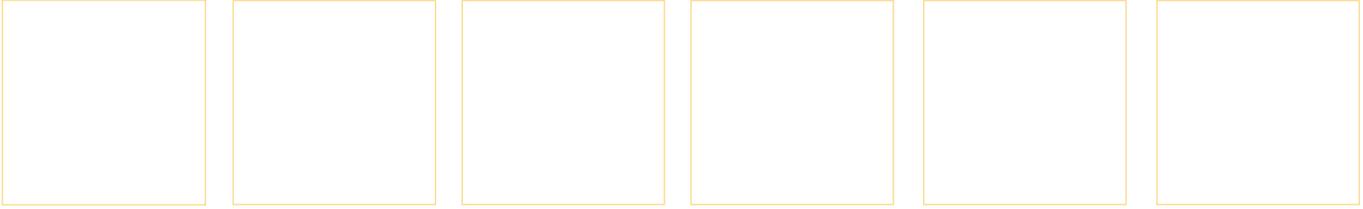
While digitalisation contributes to making rail transport more efficient and more convenient for both passengers and freight, it also exposes rail systems to cybersecurity risks. In a data sharing context, ensuring the integrity and the security of data are therefore of crucial importance. To this end, it was suggested that uploading operational data on a shared platform should come with a guarantee that such data is only accessible to authorised people and for well-defined purposes. In parallel, clear data governance rules will need to be agreed upon, so as to ensure usage and data visibility only to appropriate users. These are key pre-conditions to building trust and to overcoming the current 'data sharing anxiety'.

While data exchange is already a reality and happening in some contexts, it is very much internally- and incumbents-focused. This needs to be taken a step further – namely, by opening up the data and by sharing it with other modes and with newcomers (i.e. SMEs). Here, a key challenge will be the integration of smaller players with much lighter IT systems. As in any fragmented system, participants agreed that an EU-wide entity will need to be set up and tasked with the supervision and coordination of rail freight, so as to ensure a level playing field. This is particularly important in view of the fact that the costs and benefits of digitalising rail freight may not be proportionately shared among the big and the small operators.

To avoid such problems, participants stressed that any regulation will need to be preceded by a market analysis and an impact assessment, in particular in the B2C segments, where data sharing appears to be more disruptive. In other words, any policy on digitalisation should be grounded upon a solid understanding of the interactions between the various market players, their incentives and costs associated with collaborating and data sharing. What is more, in order to correct what may currently be an unfair business environment and to ensure that the benefits of data sharing are spread evenly, it was stressed that the Commission should prioritise the implementation of the polluter pays principle with a view to [internalising the external costs of transport](#).

Participants agreed that the aviation sector could provide a source of inspiration for rail, despite the presence of clear differences in terms of number of players, international dimension and structural characteristics. A clear takeaway from the discussion was that there is a need to resolve existing conflicts between local/national and regional/international priorities. Here analogies were drawn to the aviation sector, where, in particular, the EUROCONTROL model was referred to as a useful reference for the de-nationalisation of rail freight. EUROCONTROL does not act as a replacement of national coordination bodies, rather these two levels work in parallel. In fact, the support of national authorities was highlighted as indispensable for collaboration and data sharing to materialise.

In the maritime sector, the critical nature of data sharing becomes evident when looking at the interaction between shipping companies and ports. The lack of knowledge



regarding the availability of ports to serve vessels today results in excessive CO₂ emissions, fuel consumption and wasted time. Effective data sharing between vessels and ports can enable greater transparency and port-call optimisation, if coupled with commitments and a willingness to collaborate among the parties involved.

Is Digitalisation Contributing to the Modernisation and Simplification of the RFCs? What Is the Potential of Digitalisation for Better Internatizzional Rail Freight Capacity?

To start with, participants agreed that Rail Freight Corridors (RFCs) have helped raise awareness of existing problems, as well as of the specific needs of international traffic and customers within IMs. What is more, RFCs have been instrumental in improving the dialogue between customers and IMs, as well as in catalysing the implementation of pilot projects. They have, moreover, provided a platform for the resolution of international issues, with one notable example being the International Contingency processes, which RFCs have helped create. Last but not least, RFCs improve service in the form of a single tool to make a path reservation while traveling through multiple countries and multiple IMs. This is also referred to as the Corridor One Stop Shop, the C-OSS.

Despite these positive experiences, the overall trend in modal share in the past few years suggests that RFCs have altogether not been a ‘game changer’. Digital solutions have only helped to improve small or partial elements. The reasons behind this remain yet to be analysed but are likely linked to RFCs’ own mandates, as well as to the more general conditions of the regulatory environment in which rail freight operates. RFCs do not carry any responsibility as regards to safety, nor to accountability for operational processes. At the same time, RFCs are not a distinct European body that would be in charge of organising, financing, and controlling the railway system, given that the current legal framework, along with existing tools and procedures do not make this possible.

Interoperability remains a key challenge for RFCs while posing a hindrance to greater rail freight uptake. This relates to both physical and technical bottlenecks, the absence of common European service-oriented tools, the persisting issue around availability and quality of data, as well as the diversity of processes from one country to another. While the TAF/TAP technical specifications of

interoperability (TSI) have helped to provide a common communication format, their implementation has been voluntary and therefore poorly enforced. As a result, the TSIs have not guaranteed access to information and their overall ability to support digitalisation has been limited.

Achieving cross-border communication will require all provisions of the TAF TSI to be implemented. Participants were unanimous in calling for a holistic approach, for the definition of a common language and technical standard (i.e. ‘rules of the game’), as well as for the enactment of a clear and supportive legal framework. European laws and regulations will play a crucial role in securing enforcement of data sharing, which today remains largely voluntary. The ongoing work of the Railway Interoperability and Safety Committee (RISC) was underlined as particularly critical in this respect.

IT tools for capacity management and path attribution remain largely national. While a growing number of IMs are undergoing modernisation of their IT tools, these are oftentimes not coordinated among the IMs. While the prospect of all IMs using the same IT tools in near future may be slim, participants stressed the importance of greater coordination among national tools. The work of the Platform for Rail Infrastructure Managers (PRIME) was stressed as being particularly helpful in this regard, given that it seeks to promote digital solutions for European rail capacity and traffic management in support of European cross-border rail traffic. More specifically, its goal is to ensure consistency and complementarity between international and national IT development and deployment, thereby avoiding redundancies and increasing coordination across various ongoing activities. The Timetable Redesign (TTR) project, on the other hand, offers a good opportunity to achieve interoperability between processes and tools.

Digitalisation certainly holds the potential to improve the monitoring of RFCs’ performance. This, however, will largely depend upon the full implementation of the existing Train Information System (TIS), the provision of high quality data and the creation of interfaces. Digitalisation can, moreover, improve both capacity and traffic management by optimising the use of existing scarce capacity and by enabling swifter identification of alternative routes, thus minimising disruptions in cases of incidents.



What Is the Impact of Deployment of Digitalisation in Rail Freight? In Particular Regarding Client Interfaces and the Integration of the Logistics Chain?

A drastic improvement of reliability and efficiency of rail freight was underlined as a critical precondition for achieving a greater modal shift from road to rail. This, in turn, necessitates a comprehensive network of intermodal terminals for combined transport and marshalling yards. Sufficient frequency of train departures with an adequate accessibility to all hubs and nodes throughout the RFC network will have to be ensured. This will have to be accompanied by more flexible capacity along the network of international freight trains, capable of absorbing demand peaks. Participants called for enhanced transparency of performance, based on agreed Key Performance Indicators (KPIs), in particular end-to-end measurement of reliability, based on a uniform punctuality KPI.

Such an indicator must include a clear identification of delay causes, pinpointing not only the kind of event, but also the party that has caused the delays. If freight trains are delayed, it is crucial for shippers to receive proactive information with a reliable revised ETA. Information relating to the KPIs should be made available in a uniform manner for all TEN-T RFCs. Lastly, such KPIs, it was argued, will help reinstall shippers' confidence in rail and trigger further modal shift.

A rail network that is resilient to disruptions and offers sufficient capacity will be of crucial importance. Real-time information about trains, wagons, goods and loading units, and which is available to all involved partners, was highlighted as a key success factor. At the moment, however, access to such real-time information is challenged by the requirement to establish a contractual agreement between all partners involved, which in turn entails a high administrative burden and legal uncertainty. Customers require quick and accurate information about train runs and a reliable expected time of arrival (ETA). The IMs, on the other hand, need to receive necessary, required and defined data. Lastly, RUs require efficient data exchange with their partners and customers, as well as a standard way of digital communication which in turn allows for reduced costs of interfaces.

Digitalisation is not an objective in itself; rather, it is a tool that can enable better customer service, as well as

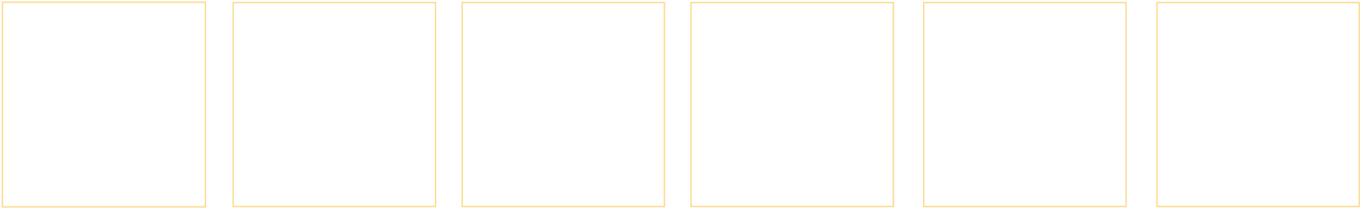
closer integration of modes, services and stakeholders. As such, digitalisation not only transforms all parts within a company, but also its interface and interaction with other companies. It holds potential to increase the speed and quality of service provision in the sector and to reduce transaction costs (i.e., costs linked to generating, transmitting and sharing data across organisations and borders).

It was furthermore agreed that digitalisation is a key instrument for alleviating fragmentation within the rail freight sector and, in this way, for reducing inefficiencies. Moreover, digitalisation can foster collaboration and promote the implementation of RFCs. Having said that, participants argued that digitalisation is not a silver bullet and needs to be complemented with other measures aimed at tackling physical and technical barriers and at harmonising processes. In particular, additional measures will be needed to ensure that products and services respond to customer needs throughout all stages of the logistics chain. The need to build a common understanding of concepts and processes will moreover be crucial for encouraging the willingness to share operational information and to safeguard the commitment of resources.

The shared nature of infrastructures calls for a holistic overview of traffic, as well as for a multimodal approach to data sharing and digitalisation. Given that the "individual optimum" rarely coincides with the "global optimum", participants stressed the need for regulators to take a systems approach to digitalising transport.

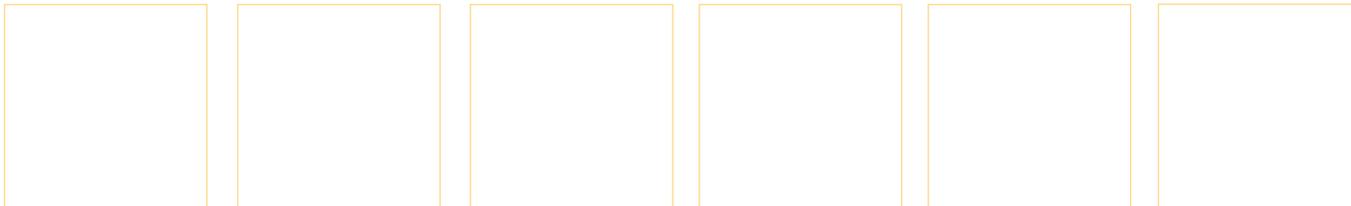
What Can We Realistically Achieve in the Coming Years?

There was overwhelming agreement among the participants that digitalisation can play an important enabling role in boosting the share of goods transported on rail and thus in reaping the associated environmental and safety benefits. More specifically, digital tools offer a means of relieving fragmentation, of facilitating the implementation of RFCs and of fostering multimodality by means of a closer coordination between stakeholders. Digitalisation should, however, meet a number of requirements so as to enable efficient and effective information exchange, namely, data availability, data quality, standards, data governance and interfaces.



To achieve all this, there is first a need for a mental shift, rather than for a technological breakthrough. Participants emphasised the need to break national resistance and foster collaboration, involving all stakeholders in the chain by embracing a partnership approach and cooperative decision-making and by providing end-to-end solutions. Business will have a leading role to play in driving the change under a clear strategy and with concrete benefits. To this end, one practical recommendation that was put forward was to produce a joint paper outlining the benefits linked to data sharing and digitalisation, with a view to raise awareness and build consensus on the issue and need for timely action.

In more concrete terms, participants called for an accelerated implementation of European action plans, including the Rotterdam Sector Statement Priorities and Rastatt Learnings. These are key to improving international risk management and contingency plans, to strengthening international coordination of construction work and to harmonising operational procedures and systems. Last but not least, the ERTMS deployment, the centerpiece of the Rail Digital EU Strategy, needs to be dramatically accelerated. The required investments, amounting to more than €100 billion, shall be pursued through a dedicated European Commission initiative, with a strong EU budgetary commitment, concrete support from Member States and substantial private capital (InvestEU).



Living In a World of (Rail Freight) Data

A comment by Katrien De Langhe, University of Antwerp

Digitalisation, blockchain, big data: these are all terms that we hear everywhere in 2019 and that are often brought forward as the solution for many problems the rail freight industry is facing. But are these trends really the solution and aren't we using them to hide some other problems?

Let's start with some data. Road freight transport in the EU-28 grew from 1,289 billion tonne-kilometres in 1995 to 1,870 billion tonne-kilometres in 2017 (Statistical pocketbook EC, 2019). Rail freight transport increased from 388 billion tonne-kilometres to 421 billion tonne-kilometres between the same years. However, if we then look at the modal share, it is clear that the share of rail transport in the EU-28 gradually declined from 13.6% in 1995 to 11.3% in 2017, whereas the share of road transport increased from 45.3% to 50.1% in the same period. Hence, rail transport seems not to be moving in the right direction. On the other hand, recent initiatives such as Rail Freight Forward ('30 by 2030') and the Vienna Declaration ('Progress on boosting rail freight') show the willingness of the rail sector to get rail back on the right track. Could digitalisation be used as a tool for this?

In recent years, many processes in other sectors, such as the road sector, have been digitalised. Innovative fleet management systems are for instance incorporated, allowing to track and trace road vehicles and to get additional data from them, often in real-time. Introducing digitalisation in the rail freight industry could for instance assist in achieving a better integration with other transport modes and a better use of rail capacity. If customers know the expected time of arrival (ETA) of the train transporting their goods, they can optimise their own planning accordingly. Different actors along the supply chain can become more efficient if they are connected to each other by sharing data. Hence, this would lead to a win-win.

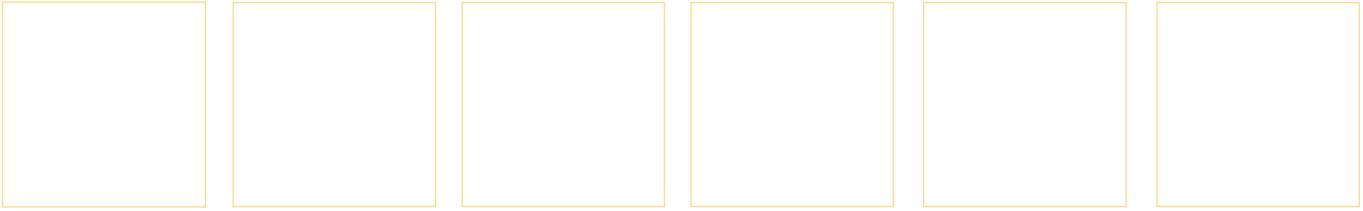
But... increasing digitalisation alone is not enough! Some barriers cannot be solved by digitalisation alone. Processes have to be coordinated from a logistics perspective as well. Moreover, the rail freight product has to be sold in a customer-oriented way at all stages

of the supply chain and different European countries need to adopt a common perspective in order to facilitate international rail freight transport.

Furthermore, in order to increase the level of digitalisation in the rail freight industry, a mental shift has to take place. Data and information sharing will be key and in order to achieve this, different stakeholders have to understand their gains when doing so. As long as different actors do not see the advantages of sharing data, only local optima are reached, which do not necessarily correspond to global optima for the rail industry as a whole. In order to achieve this mental shift by convincing actors to share their data, data management is needed. Here is a role for neutral, overarching bodies, which can take the lead in collecting, managing and sharing data and providing the benefits of the shared knowledge to all contributing actors.

Next to the willingness to share data, the quality and availability of electronic data is another aspect that has to be considered. Different stakeholders measure data in their own way, for example by using their own definitions, with as a result that many data are not available in a standardised way. Data collection should be performed in a continuous and consistent way. Ideally, data collection also happens in a standardised way, making it easier to coordinate and to avoid mistakes. Additionally, some data are only manually available, leading to potential mistakes and hence, lower quality, when digitalising them.

In sum, is digitalisation in the rail freight industry the solution for all problems? No. Can digitalisation contribute to innovation in the rail freight sector and hence, improve its competitive position? Yes, given that organisational issues are also dealt with.



Digitalisation of the (International Freight) Capacity Planning/Production Process: Challenges and Solutions

A comment by Eric Cosandey, SMA and Partners Ltd.

First Reduce Complexity, Then Digitalise...

The Industrial Revolution 4.0 (digitalisation) is highly dependent on the adaptability and efficiency of the systems. Although innovations are also regularly introduced to the railways, the system is nevertheless shaped by technical and organisational principles, which tend to develop more slowly than other competing transport systems.

Without going into the intricate institutional processes that vary from country to country, it can be seen that institutional complexity, fixed costs and length of long-term investment and maintenance cycles in the railway system make it often difficult to remain compatible with the principle of adaptability and short-term effectiveness.

Three basic processes can be distinguished:

- System Planning: The investigation of scenarios or several variants, the long-term dimensioning of resources in an evolving political, institutional and macroeconomic context
- Production Planning: The allocation of pre-dimensioned resources into an execution model to meet both the commercial needs as well as the short term production requirements
- System Operation: The use of available resources in real time, which are necessary for the whole or partial execution of the pre-determined production plan

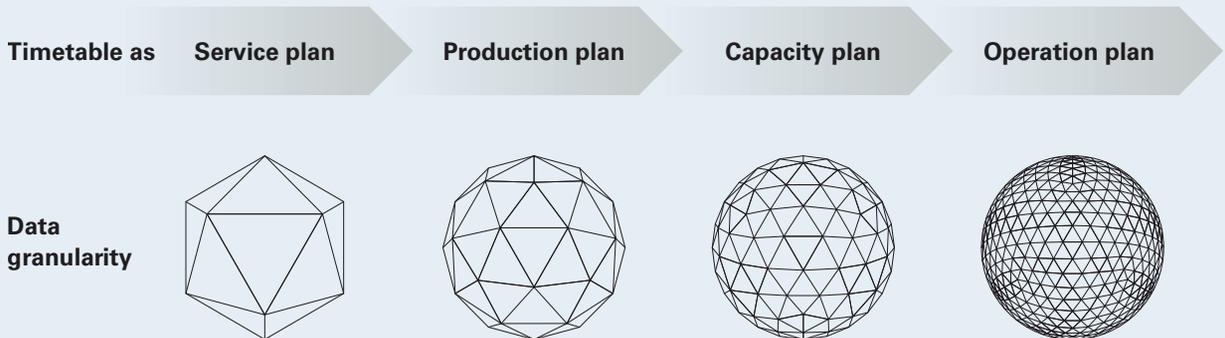
While the unclear and evolving political, institutional and macroeconomic environment at least partially limits the possibilities of automating the process of system planning, the two other processes are predestined for digitalisation and automation.

Railways must be able to rapidly develop their business model and build scenarios. A scenario-based approach involves modelling work. In generic terms modelling can be considered as the rationalisation and reduction of the complexity of a system with the aim of better understanding it, and as a result of this modelling process it becomes possible to predict the behaviour of the system. But... to quote a famous (possible mis-) quote of Albert Einstein, "Everything should be as simple as possible, but not simpler".

The best way to automate production planning and operation is through planning methods and systems/tools (digitalisation) that allow numerous scenarios and variants to be anticipated and developed through the simplification and systemisation of the processes.

To do so the stakeholders have to understand the transversal element spanning the railway system process landscape: The timetable. Understanding the timetable and its various forms means understanding a large part of the railway system: its totality, its interactions, its organisation and its complexity. The timetable is not an end in itself but a means to an end for continuous and integrated implementation across the core processes of planning, production and operation of the railway system. What we need in this matter is data continuity and consistency, across the processes and the stakeholders:

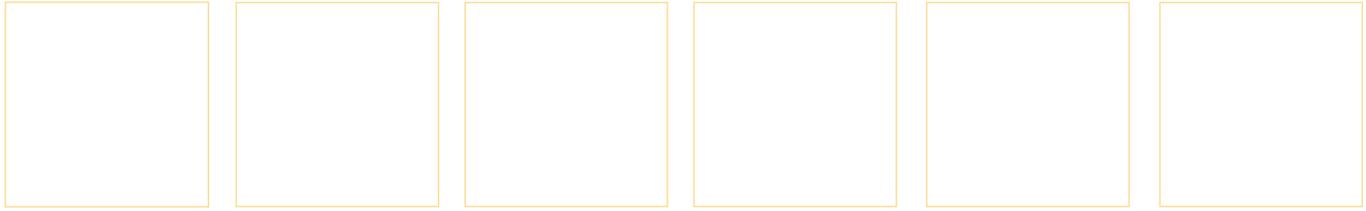
- Continuous refinement of infrastructure models and train definitions with the appropriate precision for the task. Sort of metamorphosis (with different granularities of the data used)
- Temporal and spatial coherence of the system.





As a result, the resources (infrastructure, capacity, rolling stock, ...) insights derived in the preliminary stage of the service planning remain consistent throughout the processes. The ability to adapt the granularity of the timetable is a powerful means of placing the railway system in an optimal state for each planning phase and most importantly to manage this development coherently through the various phases, despite the overall complexity. In summary:

- A Scenario based approach is the key to adaptability and short-term effectiveness
- The real innovation is to put the timetable - the ultimate promise to the customer - at the heart of the system.
- Methods and tools that guarantee data continuity (continuous refinement) and consistency (spatial and temporal coherence) throughout the processes should be implemented at international level.



Is Digitalisation Contributing to the Modernisation and Simplification of the RFCs? What Is the Potential of Digitalisation for Better International Rail Freight Capacity?

A comment by Dariush Kowsar, SNCF Réseau

At a time of growing consciousness of the urgency to act swiftly to mitigate the effects of climate change, the need for a strong modal shift towards rail transport of freight appears now self-evident. However, despite the efforts of stakeholders, it is honest to acknowledge that modal share has only slightly changed in the last ten years, with an average of 18% of freight traveling on trains in 2018.

Physical and technical bottlenecks have been identified, as well as solutions. Vast renewal and enhancement projects are being undertaken on the infrastructure and on sensitive equipment. Vast, but not always sufficient amounts of national and European funding have been made available. Yet the work undertaken will take time to be fully operational and to bring the expected results. These ongoing projects are fundamental in the long term for the future of our industry, but they do not bring short term solutions. They are also vital for rail in general.

But then, the question is: what are the short-term solutions that can be implemented? Is digitalisation the solution or at least a part of the solution to improve rail freight transport as an alternative to other modes?

Digital transformation goes beyond the mere 'translation of information into a digital format'. It is a tool that can improve efficiency, but even more so enhance creativity and innovation, whether this be in the creation of new services, in the establishment of new processes or in the definition of new solutions and innovative tools. Platforms that interact and make information available to all no matter what the stage of the process are to be opposed to a system where information is delivered in a sequence, like in a relay race, are an extraordinary opportunity to improve performance from every point of view, in a systemic approach: expected time of arrival estimation, stocks management, alternative solutions in case of early information on disruption, optimal use of capacity which can be considered at times as a rare resource.

Data is therefore a key issue. If the Technical Specifications of Interoperability have created very welcome foundations, the actual sharing of sufficient data and its quality are

definitely the next steps. But then, in a framework based on open competition, there can be a certain amount of resistance to sharing data, perceived as a commercial asset.

Data of course makes sense within a goal and a process, supported by appropriate tools. The multiplicity of tools and processes as opposed to the extreme standardisation in other industries are seen as a cause for the lack of effectiveness and of quality. All participants seem to agree that, at a time when many infrastructure managers and railway undertakings are modernising their tools, the capacity of these to communicate amongst each other should be the first of specifications.

Common tools have been (i.e. PCS, TIS...) or are being (i.e. TCR Tool, Service Facility Portal...), developed. Common multi-IM (infrastructure manager) European projects, creating processes for capacity allocation that particularly suit long distance trains, such as the Time Tabling Redesign Project (TTR), are also ongoing. Some of these projects represent a major achievement. Everybody agrees that the use of single European tools and processes should be improved and extended in specific key fields.

Where capacity is a key issue, timing is capital. The capacity strategy and the capacity models that structure the relationships between infrastructure works and available paths years before trains actually run, are a key milestone the freight stakeholders should not neglect. Here again, there is a question of modelisation and data.

Other modes' experiences of a common European space management, common processes and common tools in specific areas related to international and cross-border transport, co-existing with national frameworks and features, are mentioned, as examples. Such is the case of Eurocontrol.

Much progress has been made by all stakeholders. Amongst them, the Rail Freight Corridors have certainly introduced improvements in the system. Yet somehow none of the experiences mentioned have truly proven to be the expected game changer.

The future of Rail Freight Corridors is also in all minds at a time when the Commission is evaluating the results of 913/2010. Should the regulation evolve? If yes, in which direction?

All agree that a new momentum is needed.

Florence School of Regulation, Transport Area
Robert Schuman Centre
for Advanced Studies

European University Institute
Via Boccaccio, 121
50133 Florence
Italy

Contact:
FSR-Transport:
fsr.transport@eui.eu

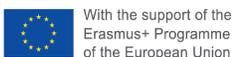
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FSR Transport

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doi:10.2870/881266
ISSN:2467-4540
ISBN:978-92-9084-814-1