

Global transport chains: focus on freight distribution between Far East Asia and Europe – rail connectivity potential and digitalization

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Abstract

The research paper elaborates on the analysis of the interviews dealing with the freight transport determinants such as service quality by transit times and costs between Far East Asia and Europe. The supply chains relying on the rail between the People's Republic China (PRC) and the European Union (EU) landlocked hinterland are 50 to 74 % less expensive compared to airfreight alternatives with less than two-thirds of the transit time of the dominant maritime shipping. The paper points the niche for Trans-Asian railway in comparison to maritime shipping or other modal options between PRC and the European Union (EU). The paper's research value resides in the challenging, supporting or complementing the reviewed studies dealing with the transport geography and the intercontinental connectivity. The paper outcomes interlink the current status and development of international rail transport between Far East Asia and the EU. It addresses the increasing role of electronic transport documentation distribution as part of the digitalization emergence. Despite being regionally scoped, the analysis of empirical data provides useful input within global supply chains research agenda. It deals with interdependent activities by a diverse set of freight transport market players at the local, regional and global level. Since the paper includes many acronyms, there is an acronym list preceding the references section.

1 Introduction and the literature review

Regarding international trade and its dynamics, ongoing innovations in the supply chains play a vital role in its facilitation. Such a development is identified, assessed, planned and implemented by the transport infrastructure improvements. They include new ways of communicating or distributing information related to freight transport. Concerning the development of the transport infrastructure, the key is to invest and modernize freight terminals and its connecting links affecting its quality and their capacity (Heilig, Lalla-Ruiz & Voss 2017). Without analysing and addressing of

physical transport infrastructure challenges, business culture and other relevant challenges or disruptions preventing the business processes from their streamlining, it is difficult to exploit the value-added of the digitalization at a local, regional or global level of the economy (Rodrigue 2017). Regarding freight transport as one of the logistics services component for global supply chains, rail transport provides a compelling case. It is as a transport mode enabling increased efficiency and resilience in global supply chains (Tavasszy 2018). Besides, rail transport as a mode is one of the possible directions while requiring the global freight distribution being greener and more sustainable (Organisation for Economic Cooperation and Development [OECD] 2017).

With the focus on Europe-Asian rail freight distribution and its legal background, two institutions – the Organisation concerning International Carriage by Rail (OTIF) and the Organisation for Cooperation of Railways (OSJD) set the rules for transport documentation. They are in charge of transport law regulations for their respective member countries (Calme 2016). For the OTIF member countries, Convention Concerning International Carriage by Rail (COTIF) is binding. For the OSJD member states, General Provisions on the Contract of Carriage of Goods in International Traffic (SMGS, Annex 1 to the Convention on International Through Railway Traffic) is applicable. OTIF and OSJD harmonize their regulations to foster European-Asian rail transport operations.

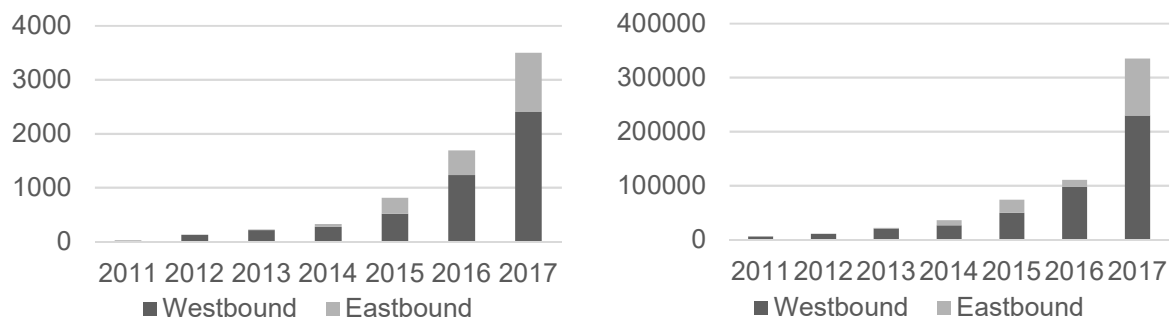
From a geopolitical viewpoint, the Belt Road Initiative (BRI) framework (National Development and Reform Commission [NDRC] 2015) affects the rail freight market between Far East Asia and the EU increasingly. It is a Chinese foreign policy strategic programme. It focuses on regional cooperation to develop and finance the transport infrastructure projects. Its objective is to boost the freight connectivity between the EU, the PRC and other BRI related regions and countries. The BRI consists of two key components – 21st century Maritime Silk Road (MSR) and the New Silk Road (NSR) Economic Belt. They both include infrastructure corridors, networks of seaports, airports, dry inland ports, roads, railways and technological utility grids (Lee et al. 2018). Despite its commercial opportunities, railway infrastructure within the NSR corridors between the EU and PRC is perceived by many researchers as a second-tier routing alternative with limited market potential in comparison to maritime shipping between Far East Asia and the EU (Beresford et al. 2012; Rodemann & Templar 2014; Yoon et al., 2012).

The BRI corridors, the information and communication technologies (ICT) projects potentially link together the business development associated with emerging logistics 4.0 and the digitalization. It is challenging to provide single working definitions in the field of economics, still characterized by unclear and overlapping terminology. 'Digitization' is the process of converting analogue into digital data for further processing by electronic means. It serves as the prerequisite for 'digitalization' in the development and the applications of digital technologies. The digitalization is the economic process of using digital technologies for the development of new business models and disruptive transformation within supply chains (Berman 2012). 'Digitization' is the underlying fundament of this business transformation.

The rail transport within the NSR corridors represents only a small share of the total Twenty-foot Equivalent Unit (TEU) container volumes distributed between Far East Asia and the EU markets (Kolar & Rodrigue 2018). Statistically, the number of dispatched container block trains from PRC increased considerably from 308 in 2014

to 3,496 in 2017, see Figure 1. These FCL (full container load) block trains transported 339,930 TEU in 2017. Though, the rail transport connections within NSR corridors to contributed around 2 % of containerized trade volume between the PRC and the EU member countries in the same year. Based on the growth in rail freight transport along the NSR, the relevant trading routes have emerged as a minor yet significant alternative to maritime shipping in the PRC-EU (Westbound) and the EU-PRC direction (Eastbound) in recent years (Zhang et al. 2018).

Figure 1: China-Europe rail transport and its growing potential (no. of container block trains left, TEU volume p.a. right)



Source: Hafen Hamburg Marketing, 2019, Geis CZ Air+Sea, 2018 data set and own calculations.

A standard container block train from, e.g. from Chongqing in PRC to Duisburg in Germany (one of the NSR rail hubs in Europe together with Hamburg) takes 16 to 21 days. It is less than two-thirds of transit time compared to the time of shipments *via* maritime shipping routes. They take from 30 to 35 days, including the rail transit to the seaport in PRC and the transport to North Sea port range in Europe (Kolar & Rodrigue 2018).

The authors question if and how there is a linkage between the emerging importance of digitalization in the economy and the current development on Far East Asia – Europe rail freight market. Moreover, they elaborate on the policy role by BRI stakeholders and its importance regarding the digitalization emergence globally. There is an ongoing need for cross-border data flows and development of skills and knowledge by policymakers required for the development of the globalized digital economy (United Nations Conference on Trade and Development [UNCTAD] 2017).

The remainder of this paper is as follows. In section 2, the authors provide a review of the research scope and collected data together with the qualitative and the quantitative methodology overview. In section 3, they deal with the research findings. They conclude the paper with summary remarks in section 4, where they discuss potential further research directions together with the research limitations.

2 Methodology

The authors question if and how there is a linkage between the emerging importance of digital transformation and rail-related transport services. For the necessary geographical narrowing, they focus on the data related to the rail corridors between Far East Asia and the EU. The showcase is the landlocked Czech Republic, where empirical data were collected and analysed.

For the first stage of the research project, the authors selected a qualitative approach. Although limited to container transport chains' local stakeholders, the qualitative stage results provide useful empirical evidence for the policymakers, cargo beneficiaries and trade intermediaries well outside the Czech Republic or the EU borders. It may improve their understanding of the legal framework and the dynamics of intermodal and rail services, and digitalization in general.

2.1 Qualitative stage

The value-added of the qualitative part of the study represents the analysis of empirical data that lacks in the research related to the emergence of digitalization (UNCTAD, 2017). Besides, it seeks to analyse impact by the BRI programme on the Euro-Asia and global trade (Lee et al. 2018). Marshall (1996) sees the key value-added of any qualitative research study in the understanding of complex issues answering humanistic "why?" or "how?" question. Based on the literature review section and upon explaining the research motivation, it is possible to formulate the research questions (RQ) for the stage:

- RQ 1: How is the BRI development framework (particularly NSR) affecting the containerized cargo trade dynamics between PRC and the EU, with the Czech Republic being the EU landlocked markets' showcase?
- RQ 2: What approaches (common CIM/SMGS consignment note – bill of freight for rail shipments, e-customs, SCM data sharing, etc.) within 'digitization' or 'digitalization', are used by the BRI and NSR related market parties such as railway operators, freight forwarders, carriers, multimodal transport operators (MTOs)?
- RQ 3: How to assess the current digitalization development in the Czech Republic while concerning the role of market actors active in the intermodal transport chains and policymakers providing its institutional and legal framework with the relevance to the NSR and its position to maritime shipping?

The authors conducted all eight semi-structured interviews with open-ended questions from August to October 2018. They explained the research objective together with its design. At the start of the conversation, the interviewer asked the grand tour questions related to the keywords such as BRI, NSR, Trans-Asian Railway (TAR), digitalization and logistics 4.0. Since the interviewer obtained comprehensive empirical data, the authors applied qualitative data analysis (Creswell 2007). It consists of the data collection, data organization, preliminary listening to the recordings and the notes reading, the data classification and the analysis. The authors contacted the country managers of two globally leading ocean carriers (by TEU fleet capacity), and locally (by loaded TEU shipped). Besides, the authors engaged three globally leading freight forwarders (by TEU arranged volume and regions of doing business). One of them is a leader in digitization (Burnson 2017), and the other two act as global freight forwarders/non-vessel operating common carriers (NVOCC). Besides, the authors arranged the interview with one of the Ministry of Transport of the Czech Republic high profile policymakers. The Ministry representative works in the division of rail transport encompassing the field of intermodal transport. Eventually, the authors contacted two global fast-moving consumer goods (FMCG) producers and traders. For the interviewee's distribution, see Table 1. All interviewees are experts in the researched field. The critical determinant of the expertise is their experience in the business or public policy sector (all over 15 years).

Table 1: Interviewees' distribution

Position title by organization	Organization
Country top manager	Ocean carrier (OC 1)
Country top manager	Ocean carrier (OC 2)
Ocean-freight head	Freight forwarder (FF 1)
Country FCL manager	Freight forwarder (FF 2)
Air+Sea branch manager	Freight forwarder (FF 3)
Procurement manager	Cargo beneficiary (CB 1)
EMEA SCM director	Cargo beneficiary (CB 2)
Rail transport department head	Ministry of Transport of the Czech Republic (MT)

2.2 Quantitative stage

For the quantitative part of the research, it was necessary to select the appropriate method and the data source. The authors decided for the scenario analysis as it deals with the factors of cargo type, including the delivery time-sensitivity and the shipment value.

It includes the value of transit time by inventory holding and depreciation costs as two determinants of (freight) transport service quality dimensions (Regmi & Hanaoka 2012). The authors did not include the TAR transit time reliability (in comparison to maritime shipping) in scenario analysis. The most essential hub terminal for TAR corridors – Brest (in Belarus) suffers from heavy congestion. It has resulted in delays for the past two years. Therefore, the rail operators and the 3PLs do not promote and publish service time reliability anymore (Van Leijen 2018). In other words, they have included the increased probability of delays in the transit time timetables they offer and promote to their potential customers (Lobyrev et al. 2018)

The data collection was a demanding task. The international rail freight market is a complex environment with many market players such as shippers, freight forwarders, container operators, railway infrastructure agencies, national railway companies, affiliated companies for container transport, container owners, terminal operators or customs agents (Davydenko et al. 2012). The intermodal transport market perceives the freight forwarders (NVOCCs) and the logistics providers (3PLs) as the dominant parties determining the cargo routing (Sramkova, Kolar & Hunak 2018). At the same time, they are the most advanced market parties regarding digital innovations (Burnson 2017). The scenario analysis uses the purchased data set from a freight forwarder active in all freight markets (rail, sea, air, sea and air). It includes all company data dealing with the mode shares for individual shipments and their development in time, shippers' (customers) distribution according to the TEU volumes, frequency of the shippers' bookings, type of booked shipment (and its value) and the type of booking (email, EDI standard, e-tools application).

Quantitative data obtained in the study also includes quotes of transport, transit time, the distance of each route for each mode (combination). See Table 2 with terminals in Germany (Hamburg), the Czech Republic (Uhrineves) and PRC (Shanghai). To keep the integrity of the collected data, the authors requested freight rates for rail and sea/air from container operators and two out of eight global ocean carriers (with a branch office in the Czech Republic, country's carrier haulage 60 % TEU). Besides, they

obtained the data from two freight forwarders (global top 2, top 2 in the country by % TEU share, Maritime Club seminar by Association of Forwarding and Logistics of the Czech Republic as International Federation of Freight Forwarders Associations [FIATA] member) through their direct country-level management contacts for the Czech Republic market. They retrieved average sea and air freight rates from WorldFreightRates.com. They used the transit time provided by ocean carriers at their web pages too. They triangulated the data with the interviews and the data available by MarineTraffic platform and Geis CZ company data set. The authors collected all the primary data from the companies' contacts and the secondary data from the databases in the first quarter of 2019. It is necessary to note that the freight rates and transit times are subject to possible change due to the volatility of the freight rates in the freight shipping market.

The authors calculated the distance for Shanghai – Hamburg routing. Shanghai is the no. 1 container port in PRC (Lloyds List 2019), and the port of Hamburg is the no. 1 port gate for containerized shipments to CEE region (Kolar & Rodrigue 2018). For the sea/air routings, they selected Dubai as no. 1 Middle East cargo hub (International Air Transport Association [IATA] 2019).

Both freight rates and transit times were averages based on a sample of quotations for each transport leg. A set of assumptions was set to make the comparison of different modes and mode combination possible:

1. The operators and the freight forwarders indicated terminal to terminal transit times. The calculation did not consider the occasional delays determined by congestions at rail terminals, (custom) border checkpoints or related documentation processing (Erokhin, Gao & Zhang 2019).
2. Freight rates for transport modes were for a Forty-foot (FEU) FCL Freight All-Kind (FAK). The cargo transported in an FEU by sea and rail was assumed 24 tonnes at maximum (due to the first and the last mile trucking weight load per axle limit regulations), and for sea/air up to 12 tonnes. The authors set a maximum unit capacity of 45 FEU per train and a maximum of 3 FEU per plane (Rodemann & Templar 2014).
3. Considered routes were all terminal-terminal intermodal, excluding local trucking service at both a place of receipt and a place of delivery. Accordingly, calculations did not include additional costs (such as fees for customs clearance, security checks, agency, insurance, document or container handling).

Table 2: Transport costs and average transit times for different transport modes in 2018

Transport mode	Distance (km)	Transit time (days)	Transport costs (USD/FEU)	Cost/distance (USD/km)
Rail	11,251	18	6,450	0.57
Sea	20,057	32	2,520	0.12
Air	8,893	4	33,150	3.72
Sea and air	16,200	19	16,700	1.03

Source: Ocean carriers' quotes, Geis CZ Air+Sea data set, Google maps, own calculations.

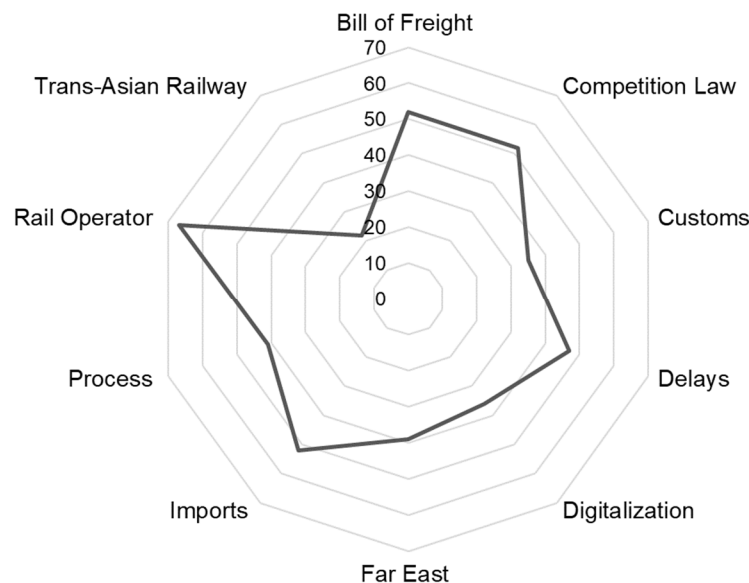
3 Research findings

Firstly, the authors discuss the research findings as to the results of qualitative analysis. Secondly, they deal with the scenario analysis results. For the quantitative research stage, a freight forwarder provided the data. Eventually, Geis CZ Air+Sea provided the data set in November 2018. It is a local subsidiary of traditional and regionally present German logistics provider. Since the purchased data is the subject of the non-disclosure agreement, the final research paper shall include only the scenario analysis outcome.

3.1 Qualitative stage research findings and comments

Figure 2 shows the qualitative analysis outcome with the application of MAXQDA software tool (Hatani 2015). Regarding the top 10 keywords identified as used in the interviewees' responses, Figure 2 illustrates their relative importance by their total occurrence in the transcribed answers for RQ 1, RQ 2 and RQ 2 combined. Several keywords were in the RQs, yet the interviewees uncovered a few terms important for the industry (by their numbers in the responses). Originally, the authors did not consider them as the keywords to review or include the RQs. The terms include competition law, delays and processes.

Figure 2: Top 10 keywords in response by the occurrence



Source: based on transcripts and data analysis in MAXQDA.

Regarding the RQ1, all interviewees were familiar with the existence of the BRI framework. OC 1, OC 2 and FF 1, FF 2 interviewees labelled the market forces being ahead of the decision-making agility and public policies implementation. They were aware of the NSR project, but they lacked any knowledge on other BRI corridors. The FF 3 interviewee perceived the promotion of the BRI and NSR within the transport industry as a tool that shall explain the role and benefits of TAR for the cargo beneficiaries. They were hesitant to consider the inland routing alternatives within the NSR while calculating total transport and warehousing costs between Far East Asia and the Czech Republic. Both OCs and FF 1, FF 3 managers voiced scepticism regarding the impact of the BRI projects implementation on PRC-EU trade facilitation.

FF 1 and FF 2 explained the planned BRI rail infrastructure projects improvement could have had the potential for their customers (acting as goods suppliers). They book dedicated container block trains. This decision is the result of financial disruption by often delayed deliveries via maritime shipping. They believe its unreliability in many shipments exceeds the savings on ocean freight. FF 3, OC 1 and OC 2 as business practitioners confirmed reviewed literature (Beresford et al. 2012; Rodemann & Templar 2014) mentioning NSR corridors as a second-tier alternative to maritime shipping. For the PRC-EU trade facilitation, the MT interviewee viewed the role of BRI and NSR mostly as a political driving force to accelerate removing non-tariff trade barriers between PRC and the EU.

For RQ 2, the FFs' managers pointed out the facilitation of e-customs procedures in most NSR corridors countries. Moreover, they mentioned the possibility to use an electronic equivalent of the common CIM-SMGS consignment note as the latest rail market development. It makes the NSR rail links competitive in comparison to maritime shipping. The common CIM-SMGS consignment note is internationally recognized as a customs document with the letter of credit (L/C) as a payment instrument. Concerning overall BRI scope, FF 1 and FF 3 stressed the increasing importance of online monitoring of shipments with an active transponder. Many local cargo beneficiaries have already requested this service. At the same time, OC 1 introduced new e-system in cooperation with local authorities (pilot version in Europe) monitoring the location of empty containers to optimize their repositioning. The MT interviewee was unable to differentiate the term of digitization from digitalization. He related it mostly to the e-documentation and the applicability of the common CIM-SMGS consignment note.

Regarding RQ 3, both OCs, FF 1 and FF 3 as service providers confirmed that the approaches within digital transformation of the shipping industry were still in testing versions. In other words, they have not implemented them at the local or global scale yet. They expressed concern about their ability to change their business models and timely data management. They knew they had to address customer requirements in time not to be leapfrogged by them, their customers or e-commerce companies in terms of digital innovations. Regarding the perception of the policymakers in the field of digitalization, both FF 2 and both CBs stated the inability of national, European or global level policymakers to 'catch up' with the industry changes and innovations. Furthermore, FF 1 and FF 2 stated that the pace of digitization of documents linked to customs procedures and shipments via NSR corridors is higher compared to the shipments' documentation via maritime shipping. From the perspective of MT, the organization reflected the need to accelerate legal regulations related to intermodal transport e-documents.

3.2 Scenario analysis results and discussion

Consumer goods are defined as time-sensitive while being the subject of inventory holding costs, capital costs with uncertain demand, depreciation costs and the potential of spoilage and technological outdated (Hummels & Schaur 2013). Together with the 1 % estimate of the tariff per day levied on the value of the cargo and along with the findings in Table 2, the estimated cost of time per day in transit is used for scenario analysis. It includes the time-sensitivity and value of a shipment. The value of transit time assesses the relation between transport costs, transit time and overall logistics costs possible. The average shipment weight is 12 tons in an FCL container.

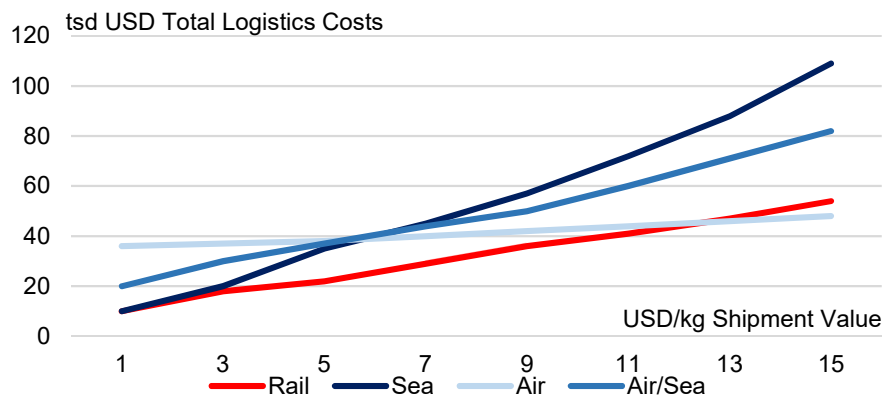
Therefore, the shipment value in USD/kg can be calculated and compared across the modes (or their combinations).

When combining the data set together with the research data from Table 2, the estimate of transit time per day is set and used in scenario analysis. The value of transit time is employed to assess the relations of transit time and transport costs for the goods with different time-sensitivity while using different transport modes. Tariff cost is the combination of the inventory holding together with the depreciation costs with the 1 % of cargo value/day for lower sensitivity scenario, 2 % for cargo value/day for higher time sensitivity. The estimated overall logistics costs include the transport costs together with inventory holding and depreciation costs. There are results for high vs. low-value scenarios along with the scenario analysis for high vs. low time delivery sensitivity.

For the combination of high-value goods and high-time sensitivity with the shipment value equal or over 12 USD/kg (Chamber of Commerce United States of America [USCC], 2006), the goods such as automotive parts and final high-tech products are the typical example demanding frequent (every week) stock deliveries. The air transport with the fastest transit time of just several days (3 to 5) and (most of the time) the lowest total logistics costs is the most suitable routing solution in such cases. If there are any space or weight air freight limits, the rail with higher flexibility on goods type and higher capacity is a possible alternative. For the high-value cargo with low-time sensitivity including the luxury goods with long-term low demand, the rail competes for a diverse set of shipments with the value from 2.23 USD/kg to 23.79 USD/kg with the lowest total logistics costs with two up to three weeks terminal to terminal transit time. In the case of the low-value cargo combined with high-time sensitivity and the average value of goods 6 USD/kg or lower, the products are low-value cargo (clothes or electronic appliances). The rail scenario provides the lowest total logistics cost for a range from 1.29 USD/kg to 11.57 USD/kg.

Figure 3 illustrates the results of the high-time sensitivity and high-value shipments. The NSR rail corridors are less expensive compared to maritime shipping for the cargo values higher than 10.21 USD/kg while addressing time sensitivity. If transported goods have a high-time sensitivity, the rail option is the less expensive than maritime shipping for cargo values of higher than 1.29 USD/kg. Air transport is less costly when the shipment value is higher than 12.65 USD/kg. The rail is less expensive mode for shipment values ranging from relative average and high-value products with air/sea having higher overall logistics costs.

Figure 3: High-time sensitivity scenario for containerized goods shipments



Source: authors.

4 Conclusions

The quantitative research outcomes show that PRC-EU rail freight transport is an emerging competitive solution. It is faster than the sea and with much lower transport costs than air transport. Rather than seen as a threat by ocean carriers, it provides an alternative for companies that no longer can see air or air and sea combination as the only options for high-value and more time-sensitive shipments from Far East Asia to Europe. Besides, the rail with an average speed advantage over maritime shipping can provide the service for a wide range of cargo value. Instead of replacing the relatively cheap and slow maritime shipping by expensive and fast air transport (or sea/air option), the rail provides the shipper with the chance to meet the sales contract delivery deadlines but without bearing the high cost of air transport.

In this research study, the authors focused on the perception of the driving forces, challenges and opportunities in logistics 4.0 or digitalization and BRI potential in future trade dynamics between Far East Asia and the EU. In the qualitative stage of the study, the authors analysed the research problem from the viewpoint of freight forwarders as the key intermodal transport intermediaries, ocean carriers as the necessary overseas transport providers, and multinational cargo beneficiaries. Besides the private sector players, the scope and pace of digital transformation will be affected by the state sector and policy players' approach. The qualitative part of the research study complements existing Asia-Europe transport geography literature mostly centred on quantitative methods and modelling assumptions challenged by the authors.

There is a significant limitation of the qualitative part of the study as it focuses on interviews with country top managers in only one of the EU landlocked member countries. Besides, the selected FFs and OCs managers represent mainly multinational market players. The research did not collect or analyse the opinions of the managers of small and medium-sized companies. Regarding the quantitative research outcomes, there are some research limitations too. If focused on just two quantitative factors – transport costs and the transit time. Besides, other important factors contribute to the transport service quality, such as transit time reliability or service availability. The scenario analysis did not consider them. Besides, the PRC government provides subsidies to PRC-EU rail freight (Qiwen & Xianliang 2017). It distorts the market costs of transport service, including the margin by a carrier or a logistics provider.

The study highlights policy and managerial notes regarding Asia-Europe rail freight market development. On strategic management and policy level, the cooperation between countries' governments related to the BRI and inland logistics (rail) stakeholders has to start to develop further a legal framework to facilitate the rail operations. It shall result in boosting rail freight transport activities between Far East Asia and Europe. On business (operational) level, it is necessary to keep the rail freight rates as low as possible to maintain rail market competitiveness. It will further optimize the routing to lower transit times based on the decision making by rail operators and logistics providers. The paper analysed the digitalization in rail freight transport together with the geographically scoped case study. It identified the key challenges in the field of paperless trade environment when it comes to data sharing and optimizing the freight shipments between Far East Asia and Europe. Their planning, booking and organizing include a wide range of complex activities by different market players active in local, regional and global (digital) supply chains.

List of acronyms and definitions

3PL	Logistics Provider
4.0	The term results from the software nomenclature. The software has different versions. Every version characterizes a revolutionary change in comparison to the previous version. The “4” stands for a new software version as the 4th industrial revolution. The “0” marks the starting point of the latest version as the starting point of the fourth industrial revolution applied within the logistics industry (Logistics 4.0).
BRI	Belt Road Initiative
CB	Cargo Beneficiary
CEE	Central and Eastern Europe
CIM	Uniform Rules concerning the Contract of International Carriage of Goods by Rail
EDI	Electronic Data Interchange
EU	European Union
FAK	Freight All Kind
FCL	Full Container Load
FEU	Forty-foot Equivalent Unit
FF	Freight Forwarder
FIATA	International Federation of Freight Forwarders Associations
FMCG	Fast Moving Consumer Goods
IATA	International Air Transport Association
ICT	Information and Communication Technologies
L/C	Letter of Credit
MSR	Maritime Silk Road
MT	Ministry of Transport of the Czech Republic
MTO	Multimodal Transport Operator
NSR	New Silk Road
NVOCC	Non-Vessel Operating Common Carrier
OC	Ocean Carrier
OSJD	Organisation for Cooperation of Railways responsible for rail waybill rules for the international carriage of goods (SMGS)
OTIF	Organisation concerning International Carriage by Rail responsible for the rules regarding the contracts of carriage for the international carriage of goods (CIM)
PRC	People’s Republic of China
RQ	Research Question
SCM	Supply Chain Management
TAR	Trans-Asia Railway
TEU	Twenty-foot Equivalent Unit
UNCTAD	United Nations Conference on Trade and Development

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