



ASIAN INFRASTRUCTURE
INVESTMENT BANK

EVOLUTION OF CR EXPRESS IN CONTEXT OF POLICY SUPPORT, TRADE TRENDS & INFRASTRUCTURE SUPPLY



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26 September 2023

- I. INTRODUCTION TO AIIB**
- II. CR EXPRESS & POLICY SUPPORT
- III. TRADE TRENDS
- IV. INFRASTRUCTURE SUPPLY

Who We Are and What We Do

We are a multilateral development bank with a mission to finance the **Infrastructure for Tomorrow (i4t)**. We enable clients to build i4t—green infrastructure with sustainability, innovation and connectivity at its core. We do this by unlocking finance that brings this vision to fruition. As our clients succeed in building i4t, society shares in that success.



How We Do It

We adapt and innovate constantly to deliver customized investment solutions that overcome the challenges our clients face. Clients count on our responsiveness and resilience to help them meet their objective even during the most difficult times.



Why We Do It

Prosperity and economic development for Asia is our goal. To realize this, we facilitate the i4t that empowers regions and their people with access to physical, digital and social services. This in turn contributes to local, regional and global sustainability.



AIIB's Strategic Priorities in a Post-COVID World

1. Green infrastructure
2. Expanding into social infrastructure
3. Private capital mobilization
4. Connectivity and regional cooperation
5. Technology-enabled infrastructure

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China Railway (CR) Express



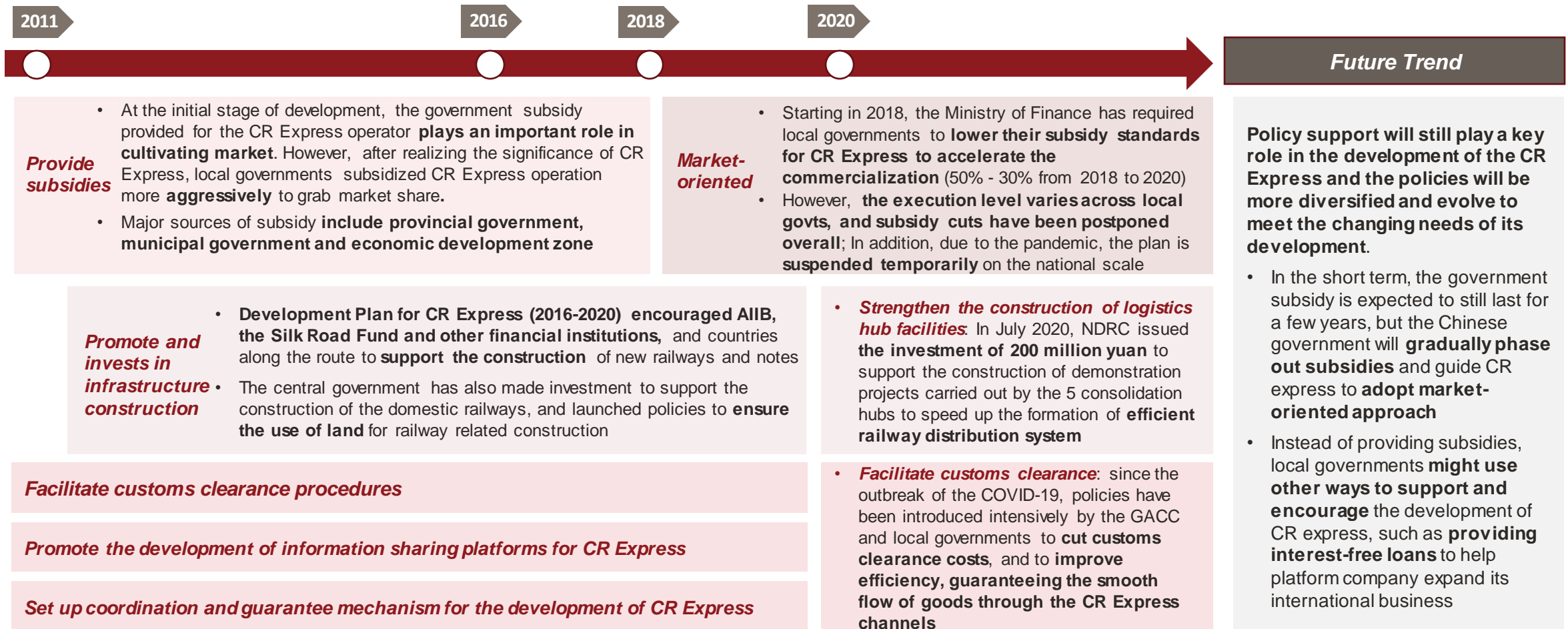
China Railway (CR) Express is a containerized Trans-Eurasia rail freight service provider

CR Express provides an alternative to container shipping between Europe and China, reduce shipping time by two-thirds, from 40-45 days by maritime freight to 12-15 days by rail

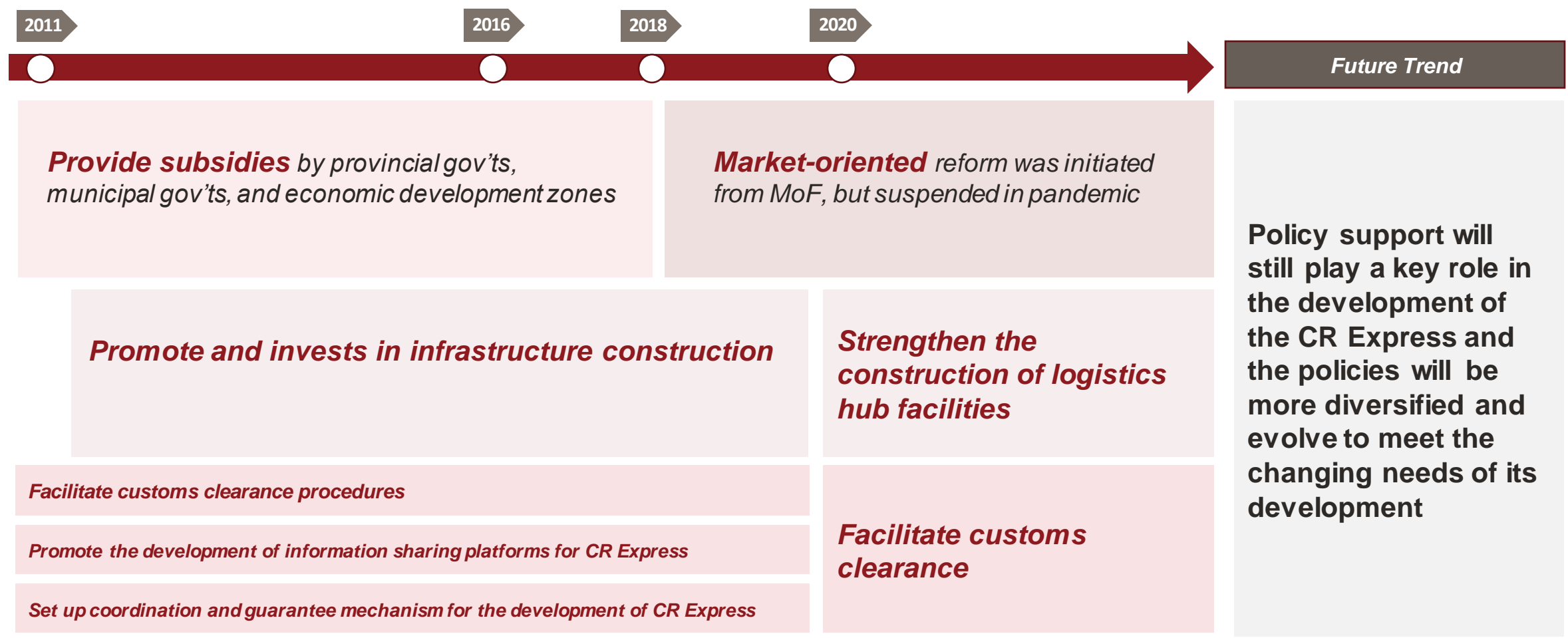
Established in 2011, CR Express has operated a total of 49,000 trains, transported 4.432 million TEUs of goods, and reached 180 cities in 23 European countries by the end of 2021



Policy support offers good preconditions for CR Express's growth through subsidies and infrastructure construction support and investment, etc.



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China attaches great importance to CR Express. Majority of the platform companies are state-owned, supported by aggressive subsidy

CR Express has the feature of semi-marketization. Government and state-owned enterprises have strong influence in CR Express market

- The national government (NDRC, Ministry of Transportation, etc.) provides policy support and high level guidance
- **Provincial governments, municipal governments and economic development zones** are the major sources of subsidy.

- **State-owned enterprise.**
- Provision of infrastructure, traction, wagons, tariff policy.
- **Decides the number of freight trips operated in each city.**
Receive the application from the platform companies and makes annual and monthly CR Express operation plan.
- Align with foreign national railway companies on the operational plan



- **State-owned enterprises.**
- Real operator of CR Express on behalf of China Railway.
Some platform companies (eg, Xi'an) only provide normal stop-to-stop transportation while other companies like ZIH, Chongqing International Hub **can provide value-added services** such as door-to-door service, custom declaration, etc.

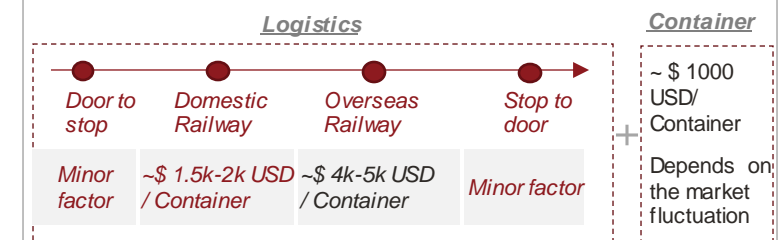
Aggressive Subsidies: China-EU as an example

Subsidy: 40%-70% of operating cost

- **The subsidy schemes and total amounts are different** among different cities, Xi'an is one of the most aggressive
- Normally it's about **40%-70%** of total operating cost



Operating Cost: ~\$ 7000 USD / Container



Operating Revenue: \$1800 to 3800 USD / container

- Platform companies normally adopt competition-oriented pricing strategy to remain competitive advantage
- The platform companies with adequate government support will achieve considerable price advantage

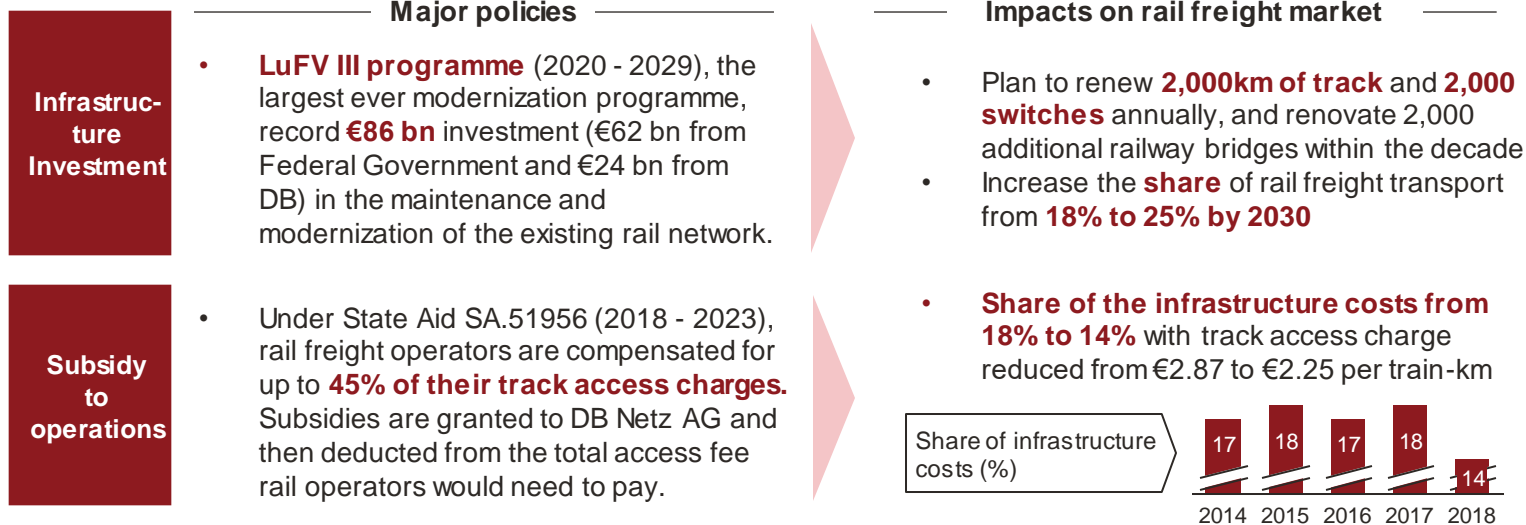
Outside China, EU countries invest in railway as a sustainable transport mode, while Russia's subsidies is granted for rail's strategic importance to the nation

Out of environmental concerns, European union and its members are increasingly focus on policies to increase rail competitiveness and develop infrastructure

Attributed to **reduction of road congestion, transport decarbonisation and EU climate objectives**, EU has been active in strengthening the position of railways as a sustainable and clean transport mode relative to other modes.

- Post pandemics, €1.6 Bn has been allocated out of €2.2 Bn transport fund to rail projects

Case Study: Germany



Russia with high state subvention

- Regarding railway as an integral part of **national defense** and emphasizing the **strategic importance to economy**, Russian government has provided substantial subsidies and invested heavily in rail sector:

Infrastructure Investment:

- According to Development Strategy of the Railway Transport, up to **20,730 km** of new routes will be built between 2016 and 2030, costing RUB 4.2 tn (€45 bn), of which 70.5% from Russian Federation and its constituent entities.
- Russian Railways plans to invest RUB **460 bn (€5 bn)** in transportation projects in the far east, including **modernization of Trans-Siberian Railway** by 2035

Aggressive subsidies:

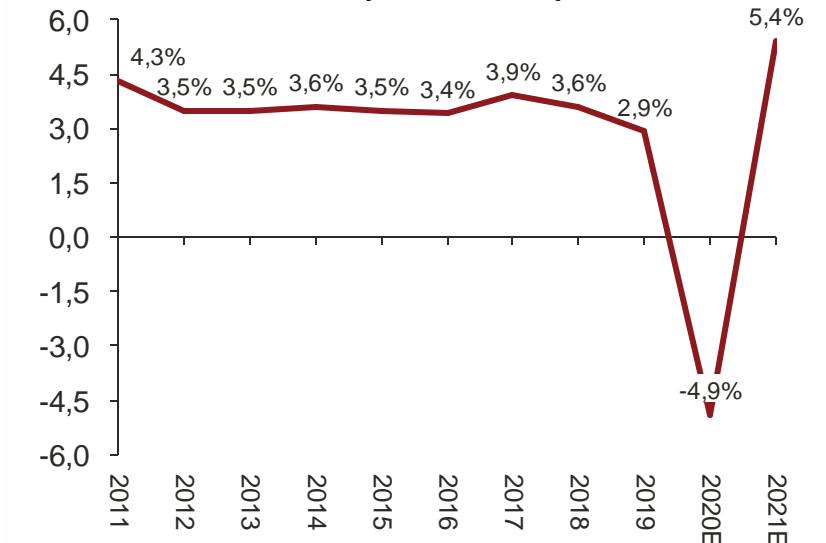
- In 2020, Russia implemented state subsidies ranging between 290 to 860 euros per unit for local operators focusing on transit transportation, depending on the type and destination of the transit cargo: **€870 per FEU** for westbound connections and **€580 per FEU** for eastbound connections

- Supportive policies in railway sector is expected to **expand rail network, increase transport efficiency and capacity, stimulate competition, and reduce operating costs as well as transportation tariff**, and consequently improve railway's competitiveness position in transport market.

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The COVID-19 represents an unprecedented disruption to the global economy and world trade, while the trade with the BRI¹ countries has demonstrated strong resilience

World Real GDP Growth Rate
(2011-2022)



- Amid the backdrop of the COVID-19 pandemic, the global economy is expected to trough and has already started to recovery in the mid 2020, which presents a **U-shaped pattern**
- In the long term, the degree of disruption and impact of the COVID-19 on the global economy will largely depends on the **evolution and duration of the pandemic**

Changes in Global Trade Landscape

Reconstruction of global industrial chain accelerates



- COVID-19 will cause global value chain to **decentralize**, and many companies will gradually build up an **“using but not relying on GVC”** approach

International trade growth further contracts



- Global trade was already stalling in 2019, weighted down by **trade tensions** and **slowing economic growth**, and is expected to further plummet by 11.9% due to the COVID-19
- The international trading system has been affected by the prevalence of **anti-globalization, trade protectionism** and **unilateralism**

New trade channels are emerging

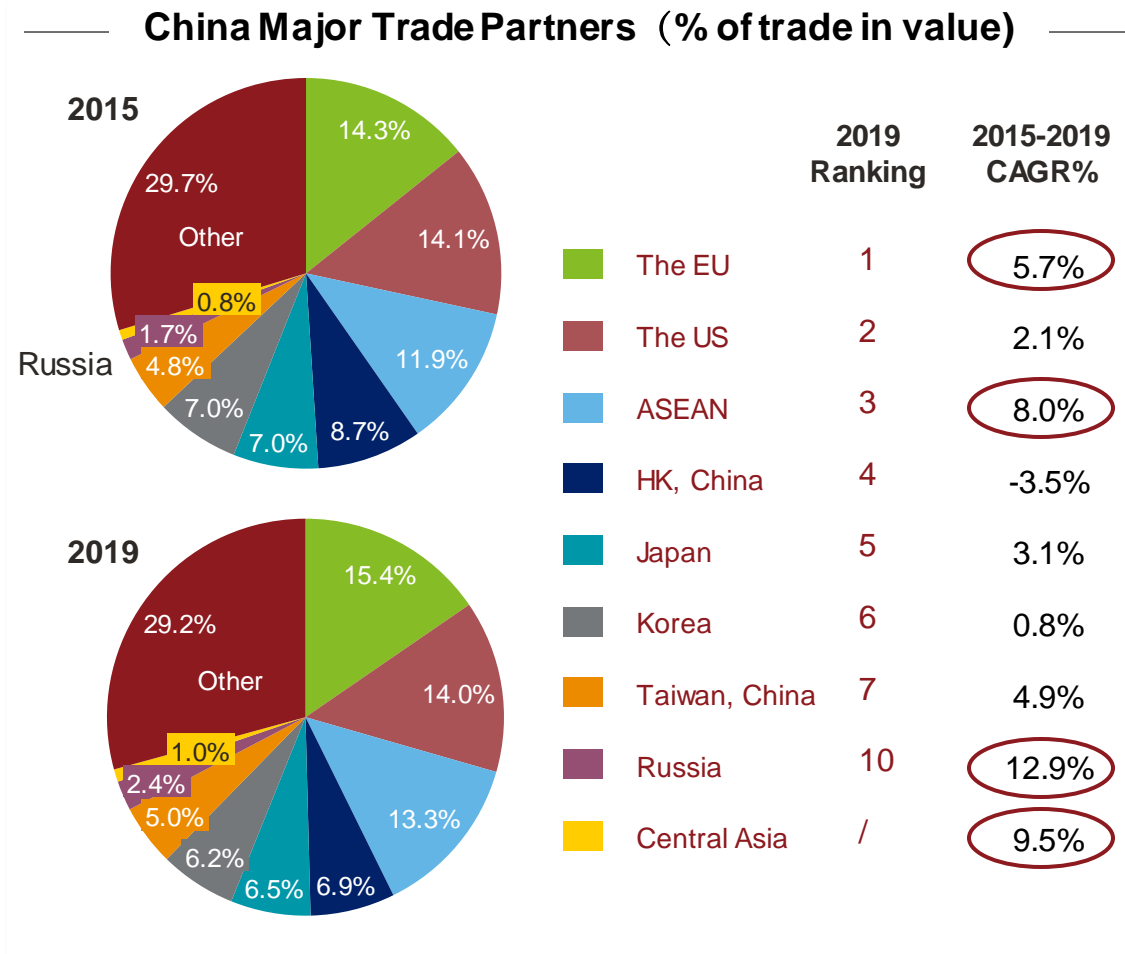


- Despite world trade decline in 2019, the share of China even increase to 12%
- The trade with the BRI countries **demonstrated strong resilience and still maintained growth** amid the pandemic

Implications for China

- Promote multilateral cooperation, esp. with BRI countries:** Amid the backdrop of trade war with the US and the pandemic, BRI countries are of great strategic importance. China should proactively keep the momentum of positive development of economic and trade relations with BRI countries to seek new growth opportunities
- Develop logistics capability for new channels:** China needs to actively develop logistics network and transportation infrastructure to ensure the new channel development and establish a china-based global supply chain

BRI countries have been playing a more important role in China's international trade, with the EU being the largest trade partner and core objects of CR Express



The EU

- The EU remains China's largest trading partner for the past 16 consecutive years, while its share of China's foreign trade has also increased

ASEAN

- ASEAN has replaced the US to emerge as China's second largest trade partner in 2019, China-ASEAN trade continues to boom amid global growth slowdown and the pandemics

Russia

- The China-Russia economic and trade cooperation has seen continuous breakthroughs in recent years, and bilateral trade has achieved strong growth

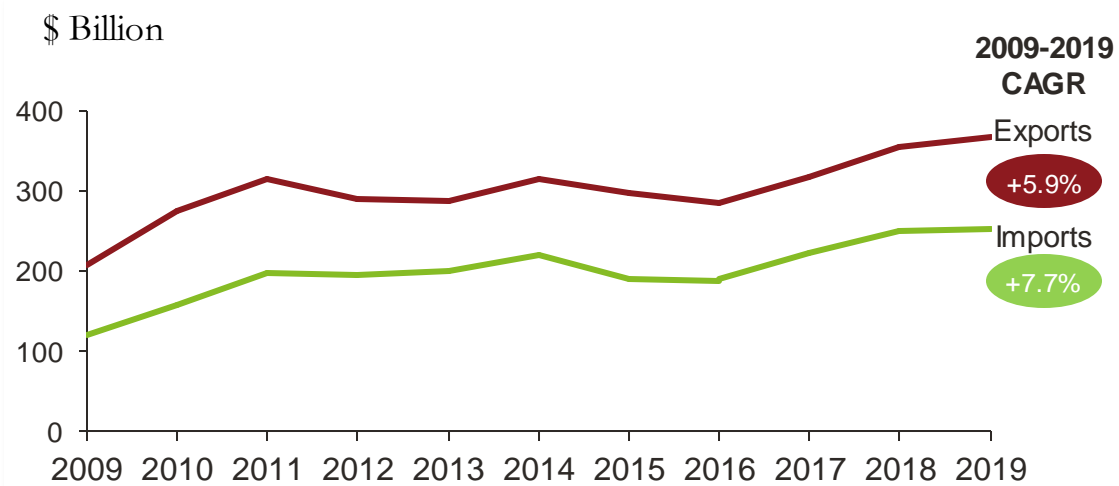
CA

- China-CA trade presents an upward promising trend, but has large fluctuations and it still accounts for a relatively small share of China's foreign trade

- BRI participants become more important in China's total trade, with contribution to CR Express growth**
- The EU being the largest trade partner and main objects of CR Express, will play the decisive role for CR Express future development**

The EU has been China's largest trading partner for the past 16 consecutive years and will continue to be its complementary partner esp. when China moves up the GVC

China Trade with EU-27, 2009-2019



- **Key trading partner:** China is the EU's **second largest trading partner** for 14 years, while the EU was China's **largest trading partner** for 16 years
- **China-EU trade volume increased steadily; exports and imports exhibited same trend with exports keeping a larger size**
- **Promising trade prospect:** if China and the EU27 can effectively promote structural reform and economic transition over the next few years, then the bilateral annual trade volume between the EU and China **could exceed \$814 bn in 2025.**

Key Drivers



Bilateral investment and free trade negotiations are expected to significantly increase trade volume and improve trade imbalance

- China and the EU are expected to conclude a high-level investment agreement by 2020, following by free trade negotiations
- Within 5 years after the FTA is concluded, **EU exports to China will increase by one-third and Chinese exports to the EU by 20%**, thus improving the trade imbalance between China and the EU



The EU will continue to be China's complementary partner especially at a time when China moves up the value chain

- **Strong complementarity & low degree of competition :** China mainly exports 3C products and clothing, and imports automobiles, aircrafts and their spare parts from Europe, with few overlapping areas
- The EU can drive China's objective of becoming **a higher value-added producer** by supplying technology and business services while the EU is likely to remain a source of **high-end goods and services** for affluent Chinese consumer class

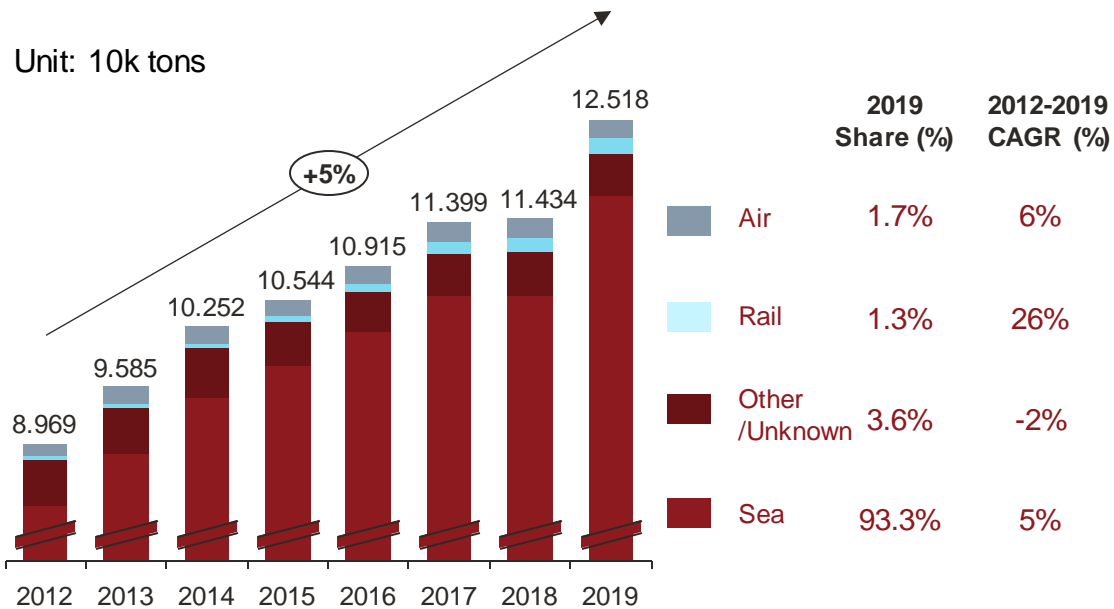


China and the EU keep relatively good bilateral relations with low likelihood of trade war and other disruptive events

- The EU might also be divided if trade relations between China and the US deteriorate. However, EU is a **strong supporter of free trade**, making trade war unlikely to happen as it did between China and the US

The share of CR Express has increased dramatically over the years and is expected to further encroach on that of maritime transport, reaching 5% of the market in the long term

China-Europe Trade by Transport Mode



- The share of rail transport, together with its volume, **has risen rapidly** over the years, faster than any other transport mode
- Rail transport has taken some share from maritime transport, showing its **strong growth potential** in the China-EU trade market

Comparison between Different Transport Mode

	Air	Rail	Sea	Road
Cost and Time between China and EU (SH-Hamburg)				
Time	3 ~ 7 days	15 ~ 18 days	30~35 days	15 days in winter 12 days in summer
Cost	20 RMB/KG in off seasons 40 RMB/KG in peak time	10 ~ 12 RMB/KG	~10 RMB/ KG	12 RMB/KG
Reliability	<ul style="list-style-type: none"> Stable lead time Vulnerable to bad weather conditions 	<ul style="list-style-type: none"> Stable lead time Least affected by weather turbulences 	<ul style="list-style-type: none"> More likely to have a delay Affected by seasonal variations 	<ul style="list-style-type: none"> Less stable lead time Relatively higher chance of accidents or breakdowns

- Railway is a **supplementary means** of transport between air and sea transport. It is two to three times cheaper than air transport, and **only takes half of time** maritime transport.
- Rail transport is ideal for **high value-added products** that requires **relatively shorter lead time**. Those types of products will form the **rigid demand** that drives the growth of CR Express, which is expected to **encroach on the share of maritime transport and a small part of air transport share** (due to consolidation service provided by railway)
- CR Express is expected to **reach 5%** of the total market share based on expert view

With free competition (without subsidy in future), CR Express is still an attractive option for the categories with high value or time-sensitiveness

Basic Assumption

Cost Elasticity Analysis

Total Cost = 1. Logistics Cost + 2. Investment Loss due to Frozen Stock + 3. Loss Due to Price Reduction

1. Time & Transportation Cost (No Subsidy)

	Transit Time(days)	Price (\$USD/container)
Maritime	35	3000
Railway	15	6000 (no subsidy)

2. Investment Loss = Transit Time * Cargo Value * Return on Cargo Value/360,

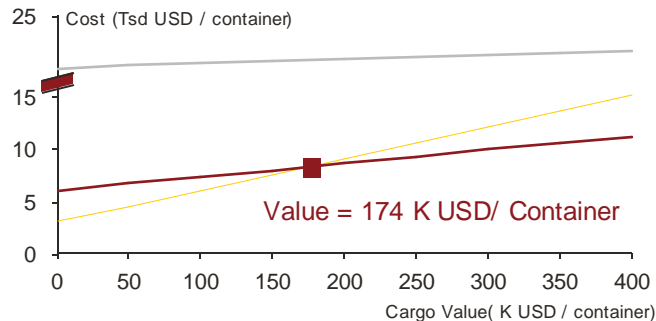
— Return on investment (Annualized): 7%

3. Price Reduction Loss (caused by product delay in listing and resultant product price decline) = Price Reduction (% , month): * Transit Time/30* Cargo Value

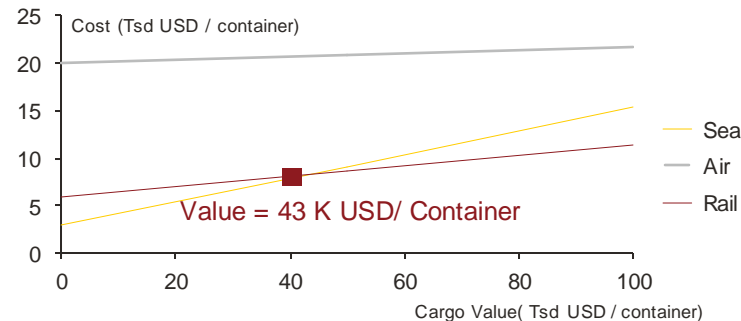
— Price Reduction (% , month): high price sensitivity scenario: 10%/ month, low price sensitivity scenario: 2%/ month

Breakeven Analysis

Low Time Sensitivity Scenario



High Time Sensitivity Scenario



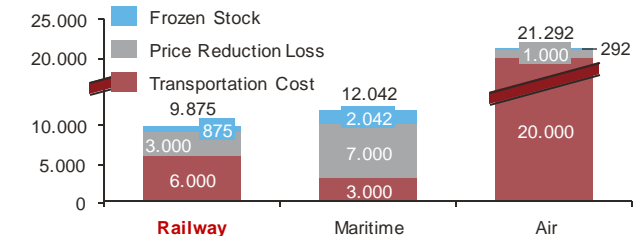
Conclusion

Target categories for CR Express

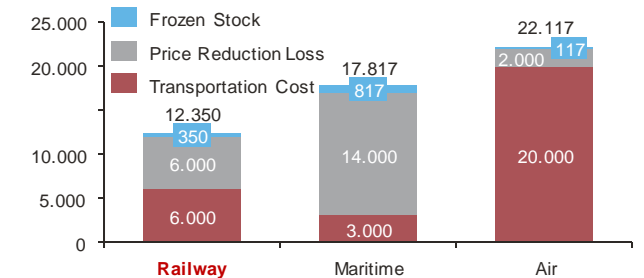
High value	Electronics; auto parts; high-end clothing & accessories, machinery, High-end furniture, artwork.....
Time-sensitive	Common clothing (seasonable); fresh food; toys (seasonable), ...

Examples

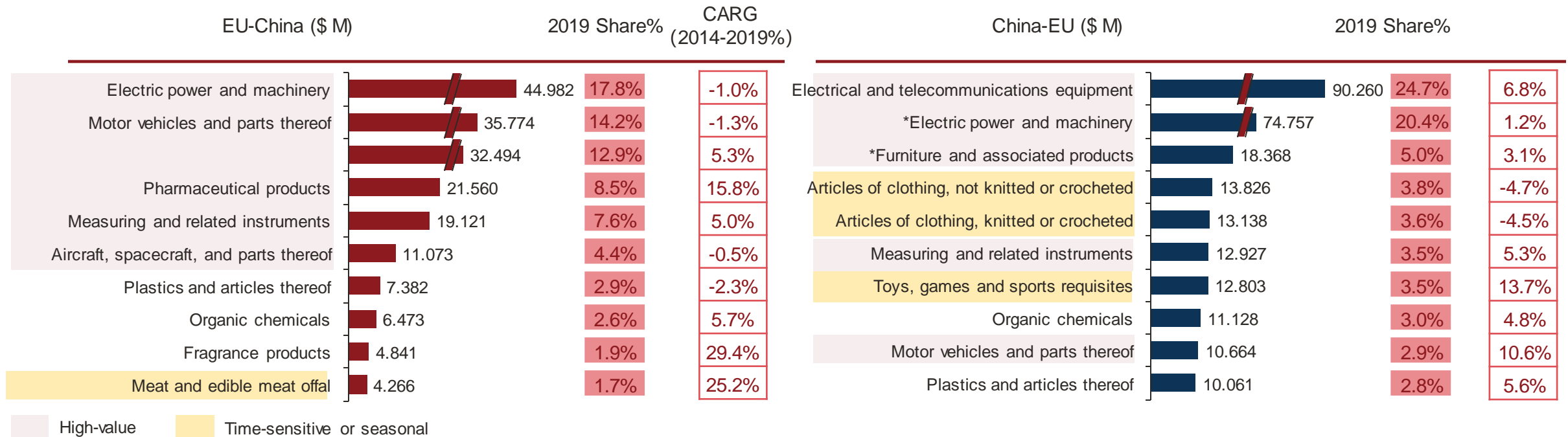
Auto Parts (low time-sensitivity, cargo value = 30K\$ USD)



Clothing (high time-sensitivity, cargo value = 12K \$ USD)



The target categories for CR Express is expected to be more diversified, with the share of high value-added goods increasing



- Majority of top traded categories of goods in the China-EU trade are suitable for CR Express, among which **machineries, electronic products, motor vehicles and auto parts** are the key categories.
- Due to industrial upgrade, those key categories of goods are expected to be **more value-added** and **maintain growth momentum**, which will still **be the key categories** for CR express

- Overall, the target goods for CR Express is expected to be more diversified with more **mid- to high-end goods**, and **provided strong demand base for CR Express growth**

- Driven by consumption upgrade, there is soaring demand from Chinese customers for products associated with **cold chain logistics** and **cross border e-commerce**, and other mid- to high-end products
- Pharmaceutical products** are also emerging with strong growth potential, suitable for CR Express

Through our interview with CR Express main customers, CR Express is highly recognized for its advantages and future prospects

Forwarders commented on railway advantages:



- ① **High reliability**
 - In peak season, there would be congestion in transit and loading zones, but mostly CR Express has **reliable arrival and departures**, least affected by bad weather conditions
- ② **Short Lead time**
 - CR Express only **takes half of the time** of maritime transport
- ③ **Cost**
 - CR Express is **much cheaper than air** transport. With subsidy, CR is **more competitive than maritime** transport. It's ideal for products that are **relatively insensitive to the cost and requires short lead time**
- ④ **Environmental friendly**
 - Due to low-carbon environmental protection requirement and economic development along the route, **European companies allocate some portion for CR Express**, and with the **acceptance of CR Express has been increasing** year by year, the portion is increasing

Customer Voice



Forwarders thought the future prospects would be:



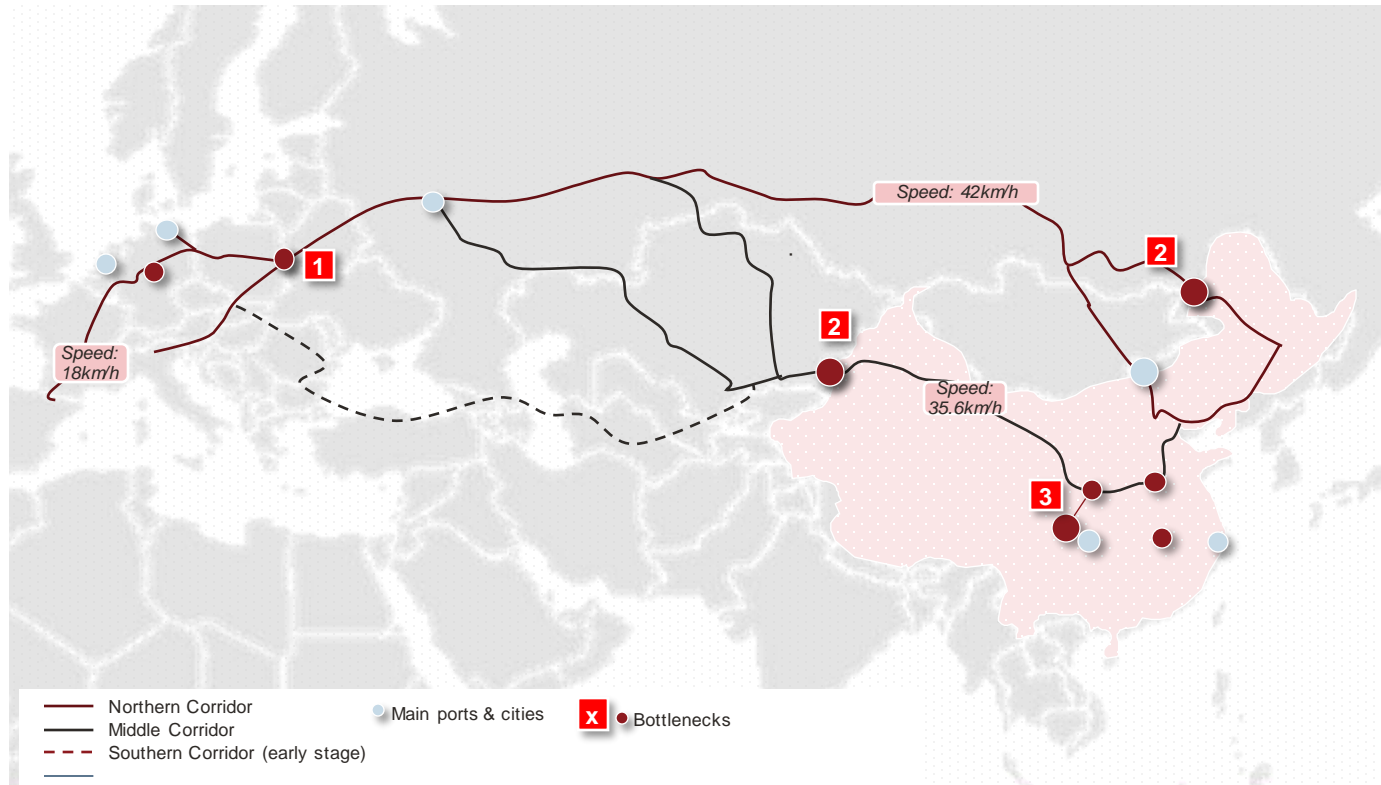
- ① • China is not competitive in the maritime transport market, but **its railway is the world leader**, with promising future
- ② • Railway transport has become an important supply chain channel. In the future, even though the size is still small, but it has become **an important choice for forwarders when doing the route planning**
- ③ • Policy is still an **important driving force**, but market demand is also rising. **Rigid demand has gradually formed**, especially for machinery, electronic products, clothing and other products with high added value
- ④ • **Cross-border e-commerce, cold chain** will form the new demands in the future
- ⑤ • CR Express is **attracting more participants**, and we are actively seeking the opportunities



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With booming demand, the infrastructural constraint is obvious. Targeted improvement of certain infrastructural bottlenecks would increase the capacity remarkably

Key Constraints alongside the Routes: Selective elimination of infrastructure bottlenecks can greatly increase the efficiency without large amount of investment



1 Port of Belarus–Małaszewicze (Belarusian–Polish border)

- The most significant bottleneck. Included in almost all CR Express routes, the Polish side processes less than 14 trains/day, resulting in 5-10 days delay in peak time.
- Logistics service providers are seeking other ports, but the new ones are immature. (in 2019, the total utilization rate of all the ports entering EU. is 24%, if the other ports come into use, the CR Express capacity will increase substantially)

▪ **Duisburg, Germany, also faces space limitation in 2020.**

2 The overloaded railways, insufficient supply of rolling stocks in CA. in Russia

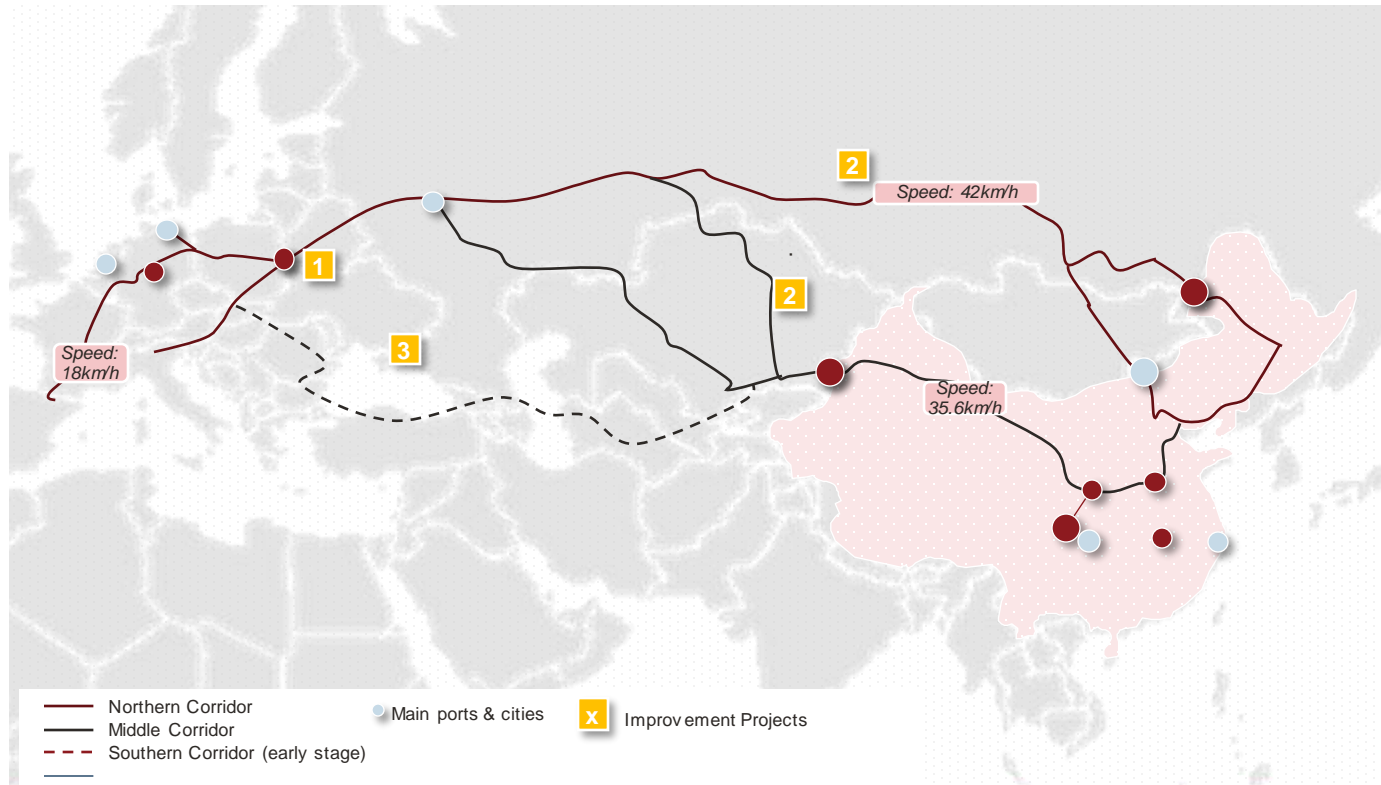
- In 2020, the lack of rolling stocks in Kazakhstan & Russia caused block trains congestions and cancellation in Alataw, Horgos, Manchuria with passage soaring.
- Trans-Siberian Railway is almost overloaded with a limit of 2.5 m to 3 m TEU / year; the extreme weather post another challenge.

3 Logistics hubs in China, Xi'an, Zhengzhou, Chengdu, Wuhan report infrastructure limitations

- the capacity of each is as follows: Zhengzhou: 1800 trains/yr. ;Xi'an: 3000 trains / yr. ;Chengdu: 1 m TEU / yr. (incl. domestic railways); Wuhan: 500 trains/yr.

The joint efforts have been made by countries, associations and service providers to improve capacity, the total capacity will experience more than 4-fold increase till 2040

Major Improvement Projects for the next 20 years



1 **Małaszewicze Station Improvement:**

- Poland State Railways , the dominant railway operator in Poland, is planning **the enlargement of the station**. The passage / day will increase from 14 to 55 by 2028, Storage capacity will increase from 2.5 to 15+ million TEUs in 2026.
- **New ports, such as Kaliningrad and other ports to enter EU**. will be good alternatives. But they are still immature and may be sensitive to political environment.

2 **Railway Upgrade in CA. and Russia:**

- **Kazakhstan – 2050:** large national infrastructure projects are being implemented that will enable Kazakhstan to double its transit transport capacity by 2020 and increase it tenfold by 2050.
- **Russia launched railway modernization planning (2008-2030).** The volume of international carriages of goods in transit will be 76 million tons by 2030. Speed will run up to 1200 KM/day (692 km/day as reported in 2017).

3 **New Route — South Corridor:**

- **South Corridor is still immature.** The BTK railway (Baku–Tiflis–Kars) hasn't been completed till 2017. Xi'an launched first train in 2019. The exploration of new corridor will be particularly sensitive to subsidy reduction due to high operational risk.
- The BTK line is expected to handle 6.5 million of freight at its inception, eventually reaching a capacity of over 17 million tons

Besides, insufficient standardization, technical limitations and managerial issues also post bottlenecks to CR Express operations

1. Insufficient standardization



Differences between legal systems

- Different countries along the route require using local customs codes. Adapting to different systems is both time and cost consuming.
- European countries are regulated by COTIF using CIM, while the others are CIS countries using SMGS, leading to legal inconsistencies and disputes



Hinders the combination with financing

- The billings of lading still lacks standardization, making it hard to develop property right and develop derivative functions such as proof for shipment insurance or logistics financing.

- Customs clearance process has been reduced to 4 hours, 2 hours & 1 hour respectively in EU, Russia and China.
- The CIM/SMGS consignment has been widely used in CR Express since 2017, showing potential to remove regulatory discrepancies.
- Some platform companies are having pilot trial of logistics financing.

2. Technical Limitations



Lack of visibility

- The target clients of CR express, especially those in EU., pay much attention to supply chain stability and visibility. However, due to the complexity of multimode transportation. The process still lacks real time visibility.



Insufficient digitalization

- The digitalization of Railway is insufficient compared to other transportation modes. The online payment is still

- The GPS and temperature-control devices are used by some operators, but haven't been spreading to a large scale. Meanwhile, today's solution focuses mainly on location, but lack real-time information of shipment status (eg, customs clearance, gauge conversion).

3. Managerial Issues



Service in need of improvement

- The service level lagged behind fast-growing market.
- Many countries alongside demonstrate poor record in logistics services, scoring particularly low in custom clearance procedures, according to World Bank. Many believe that the congestion in Marashevich is caused by not only infrastructural incapability, but also managerial issues.

- The logistics service providers are trying hard to improve their services. Some have teams overseas to deal with any possible unexpected conditions and maintain the logistics stability.

Investment opportunities lie in (1) infrastructure construction and modernization, and (2) digitalization, including online system, intelligent decision-making and information-sharing

Construction, modernization and upgrade of rail infrastructure



Port

- **Ports' capacity enlargement:**
 - **Belarus–Małaszewicze:** most significant bottleneck, processing less than 14 trains/day, resulting in 5-10 days delay in peak time. Expansion to 55 trains/day by 2028 is planned
 - **Duisburg:** involved in 30% of China-Europe trade, Duisburg Port faces space limitation, processing up to 50 trains/week (35-40 with China). Expansion to 100 China-bound trains/week by 2022 is planned
- **Smart ports:**
 - system update & practices include OCR, automated guided vehicle (AGV), real-time navigation, etc.



Railway

- **Railway capacity enlargement:**
 - **Trans-Siberian Railway:** almost overloaded with a limit of 2.5 m to 3 m TEU / year. Modernization project would be in progress until 2035
 - **South Corridor:** BTK Railway's capacity is expected to grow to 30 m TEUs / yr. by 2028, yet the expansion plan has been stymied by political climate, and public resistance in countries alongside
- **Modernization:**
 - **Railway speed up:** rail lines in Europe have been in operation for a long time and possess a low efficiency. Speed of railway falls to only 18 km/h entering EU. Russia is also planning for "High speed railway"
 - **Greenification:** replace diesel with electricity powered by renewable energy, such as wind (e.g., Netherlands) and solar (e.g., Italy, UK)

New technologies and digital solutions for railways

Online system improves customer service

- **Automation:** order processing has not been fully automated. Online payment is still in its early stage of development
- **Real time visibility:** GPS and temperature-control devices haven't been spreading to a large scale. Today's solution focuses mainly on location, but lack real-time information of shipment status (eg., customs clearance, gauge conversion)

Data analytics facilitates operation

- **Predictive maintenance:** sensors collect real-time data and identify repairs at an early stage; centralize measurements to make the maintenance processes more efficient
- **Intelligent decision based on big data and AI application** (e.g., smart networks and line planning, business forecasting, site selection planning, scheduling, route optimization)

Information sharing increases efficiency

- **One window for data delivery:** establish an interconnected ecosystem and uniformly-recognized data network involving all the participants (rail operators, freight forwarders, ports and terminals, customs authorities, etc.) to promote information sharing, reduce duplicated paperwork, increase bill of lading standardization and increase efficiency

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