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CONNECTIVITY, CONNECTIVITY, CONNECTIVITY:

Has the China-Europe Freight Train Become a Winning Run?

By Xiangming Chen

In "China and Europe: Reconnecting across a New Silk Road" (Xiangming Chen and Julie Mardeusz '16, *The European Financial Review*, February/March 2015), we included a short section about the China-Europe Freight Train (CEFT). The CEFT was then in its fourth year of running, while the Belt and Road Initiative (BRI) was officially only two years old. A total of 815 freight trains ran between China and Europe in 2015. The pandemic year of 2020 saw 12,406 trains between China and Europe, with another surge during the first six months of 2021. What has changed over a few short years? This article addresses this question by examining the scope of the CEFT's connectivity and its impact on both ends of a transcontinental rail freight system across Eurasia.

Imagine a local resident in the ancient Silk Road city of Xi'an in northwestern China enjoying fresh Atlantic salmon from Norway in the summer. This is possible now, thanks to the China-Europe Freight Train (CEFT)¹, which began to ship salmon overland to China in 2020. Leaving Narvik, the northernmost cargo railway yard on the coast of the Norwegian Sea, a freight train carrying containers of salmon travels to Haparanda on Sweden's border with Finland, where the containers are switched to Finnish wagons. From Kouvola, Finland, the salmon cargo will cross into Russia and then follow the established rail cargo route via St Petersburg and Moscow into Kazakhstan and eastbound, to arrive in Xi'an in about 10 days.²

This freight connection from Arctic Norway to western China is only one line among a rapidly growing set of freight routes across Eurasia, the world's oldest and longest route of overland trade connections, which once relied on camels and horses, dating back to the ancient Silk Road or even earlier. Fast-forward to the turn of the 20th century, British scholar Halford Mackinder saw the landmass of Eurasia as the pivot of global history and influence on geopolitical dynamics, at the central location of the planet (Chen and Fazilov 2018). He also foresaw trains covering this super-continent some day, although direct China-Europe freight services did not exist up to as recently as 2008 (Hillman 2020). Over one short decade since 2011, the CEFT has grown from 17 trains from China to Europe in 2011 to 7,377 trains heading in both directions in just the first six months of 2021. Regarding Mackinder's foresight, it has taken a whole century for the CEFT routes to (re)connect the Eurasian landscape for greater cross-border trade.

CONNECTING AND GROWING THROUGH A TRIO OF EURASIAN DYADS

When the inaugural CEFT opened up a single route from the megacity of Chongqing in southwestern China to Duisburg, Germany in 2011, through Kazakhstan, Russia, Belarus and Poland, few would have imagined or envisioned an extensive transcontinental network of freight lines criss-crossing the vast Eurasia today. These routes had carried 41,008 trains between over 50 Chinese cities and 168 cities across 23

European and Asian countries by the middle of 2021.³ Miraculous as it is, the geographical band of the CEFT signals straight, long-distance freight connections between China at the eastern end and Europe at the western end of Eurasia. The actual scope of these freight routes, however, has extended more broadly in an untidy and complex

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pattern. It has veered off the traditional Eurasian land bridge via Central Asia and the Trans-Siberian Railway via Russia to include routes to and through Iran and Turkey. The CEFT has also created multi-modal and intermodal shipping routes that stretch its connectivity to East Asia and Southeast Asia. These extended freight connections have turned the CEFT into a trio of dyadic transport/logistics ties between China-Europe, Europe-Asia and China-Asia.

To assess the geographical and economic importance of freight lines between each of these three pairs, it is crucial to show the main contour of the CEFT network. Figure 1 displays the main CEFT corridors/channels, eastern, central and western. The eastern channel links cities in northeastern and eastern China to

FIGURE 1: THE CHINA-EUROPE FREIGHT TRAIN'S TRAVEL CORRIDORS/CHANNELS



Source: <https://www.winskyfreight.com/rail-freight-china-to-europe/>.

Russia via the border city of Manzhouli, north-west of Harbin. The central channel connects some northern Chinese cities to Russia via the border city of Erlianhot, northwest of Beijing in Inner Mongolia. Both channels meet in Russia and travel on the Trans-Siberian Railway until arriving in Moscow, where some trains would join the western corridor into Europe. The eastern and central channels align with the China-Mongolia-Russia corridor of the BRI. The western corridor brings freight trains from many of China's coastal and interior cities to Europe along the Eurasian Land Bridge from Lianyungang to Amsterdam, through the cities of Alashankou and Khorgos on the border with Kazakhstan. It parallels the BRI's new Eurasian Land Bridge corridor. The western corridor spins off from the south channel, also called the "middle corridor", which runs via Almaty along the BRI's China-Central Asia-West Asia corridor (Figure 1).

The western corridor has encompassed the largest number of specific routes and freight trains, as shown by the most recent evidence. In the first half of 2021, the western, central and eastern channels sent 3,810, 1,285 and 2,282

trains, which accounted for 51.6%, 17.4% and 30.9% of all CEFTs over that period, respectively. From a spatial matching perspective, the CEFT and the BRI have converged, with the former driving the latter to help keep trade flowing between China and Europe. In addition, these train runs and trade flows have covered main parts of Central and West Asia (see Figure 1). Not shown on this map are extended connections to East Asia and Southeast Asia, which suggests that other parts of Asia are now tied into the CEFT system.

To get a more detailed picture of the freight connections between China-Europe, China-Asia and Europe-Asia in the tripartite CEFT system, Figure 2 organises the regions and cities that send and receive CEFTs through multiple international boundaries between China's coast and Europe's Atlantic coast. From east to west, corresponding to the rough geographical layout of a partial world map, zones 1 to 4 identify four connected regions with subregions that contain the departure, intermediate and arrival places for a variety of CEFT routes, and the general economic features and activities creating and sustaining these routes (see the bottom row of

Figure 2). While zone 1 includes three subzones of China's earlier and more opened and developed coastal cities, zone 2 refers to three interior and border regions that have become the most active and dominant drivers of CEFTs as late developers and beneficiaries of China's "Go West" campaign. Zone 3 consists of three parts of Asia, by land primarily and sea partially, that serve as transit zones or final or trans-shipped destinations. Zone 4 covers three regions further west, featuring Europe anchoring the other end of the CEFT system opposite zone 2. It also includes few West Asian cities, such as Istanbul, along the less-travelled south channel or middle corridor (see Figure 1), with North Africa (4C) much less connected to China by land.

While Figure 2 can reveal and mask numerous bilateral and trilateral freight routes between

China, Europe and Asia, I use it to highlight two examples that illustrate the ever-expanding and extending long lines across a diverse set of national and subnational areas, with elaborations in the last section. On 18 August 2020, a freight train carrying electronic products, consumer goods and PPEs left the Chinese city of Shenzhen (subzone 1C, which also refers to the Pearl River Delta) bordering Hong Kong for Duisburg (see photo, figure 3). It travelled through 27 other Chinese cities, including Chengdu (2C), exited at Alashankou (2A) on 23 August, passed through Kazakhstan (3A), and finally arrived in Duisburg (4A) 11 days later, after a journey of 13,438 kilometres.⁴ Sponsored by the China Merchants Group (CMG), headquartered in Hong Kong, and labelled "The Great Bay Express", this service sent 262 freight trains to Europe from China's top

FIGURE 2: THE CHINA-EUROPE FREIGHT TRAIN (CEFT)'S CONNECTED ROUTES ACROSS FOUR INTERNATIONAL REGIONAL ZONES

Zone 4	CEFT	Zone 3	CEFT	Zone 2	CEFT	Zone 1
4A Europe (Duisburg, Ghent, Madrid, Budapest)	↔	3A Central Asia (Almaty, Kazakhstan, Tashkent, Uzbekistan)	↔	2A North-West Region (Alashankou, Khorgos, Erlianhot, Manzhouli)	↔	1A Jing-Jing-Ji (Qingdao, Lianyungang) ↗ East Asia (Japan, South Korea)
4B West Asia (Istanbul, Tehran)	↘	3B South Asia (Afghanistan, Nepal)	↕	2B Central-West (Xi'an, Wuhan)	↘	1B Yangtze River Delta (Hefei, Xuzhou, Yiwu)
4C North Africa (Algeria, Tunisia)	↘	3C Southeast Asia (Singapore, Vietnam)	↕	2C Southwest Region (Chengdu, Chongqing)	↘	1C Great Bay Area (Guangzhou, Shenzhen, Dongguan, Huizhou)
CEFT	CEFT	CEFT	CEFT	CEFT	CEFT	
a. Overland to sea b. Luxury consumer products for China (expensive cars, wine) c. Large and growing consumer markets for Chinese products	↔	a. Overland to sea b. Many commodities c. Plentiful energy d. Key transport routes e. Limited manufacturing f. Growing consumer markets	↔	a. Land-locked to sea b. Many commodities c. Labour supply d. Growing manufacturing e. Smaller but growing consumer centers f. Logistic hubs	↔	a. Sea-facing and seafaring b. Weakening manufacturing c. Growing services d. Large consumer markets e. Innovation/upgrading f. Source of technology transfer

Source: Conceived by author.

FIGURE 3: THE FIRST “GREAT BAY EXPRESS” FREIGHT TRAIN FROM SHENZHEN ARRIVED IN DUISBURG ON SEPTEMBER 4, 2020



Source: China Merchants Group photo; accessed from <https://mp.weixin.qq.com/s/8BldmufNSlQGmV61QFPBcw>.

manufacturing region in 2020. This is the second-longest CEFT line, slightly shorter than the Yiwu-Madrid (1B-4A) route, covering roughly 13,500 kilometres (Chen 2018).

The second exemplary route returns a freight train from Europe (4A) through Kazakhstan (3A) to Chongqing (2C), which on 16 March 2018 sent the first train south to Hanoi, Vietnam (3C) via the Chinese border city of Pingxiang, Guangxi Province. This rail-rail route, which reduces transport costs by one-third over shipping by sea, also extends south to the Chinese port city of Beihai, Guangxi Province, from where the cargo can be shipped to Singapore (also 3C) via rail-sea intermodal shipping. The China-Southeast Asia extended segment of this long route roughly aligns with the China-Indochina Peninsular Corridor of the BRI.

These two exemplary routes reveal the crucial intermediary role of key CEFT hubs in central and western

China (2B and 2C) in linking a number of China's coastal export-oriented centres (zone 1) to a large number of cities in Central Asia and Europe (3A and 4A). The spatial pattern within China is logically consistent with China's goal of shifting development priority and opportunities

The CEFT has created a geographically and functionally favourable opportunity for such northwestern and southwestern cities as Xi'an and Chengdu to catch up in development by prioritising transport logistics.

from the coastal to the interior regions, especially the western region. The CEFT has created a geographically and functionally favourable opportunity for such northwestern and southwestern cities as Xi'an and Chengdu to catch up in development by prioritising transport logistics. This has further benefited these major interior cities by allowing them to

shift from “going east” to attract cargo from export-heavy coastal cities to “going west” by sending exports to Europe by the CEFT more cost-effectively.

Figure 2 also points to the critical role of four small Chinese border cities, Alashankou and Khorgos (Xinjiang)

and Erlianhot and Manzhouli (Inner Mongolia), as exit/entry points that have turned a few marginally located places into important gateways (2A) of the CEFT network. With the smallest population of the four at less than 30,000, Alashankou (Alataw

Pass or Dzungarian Gate), on the border with Kazakhstan, led all four cities in processing 19,841 freight trains up to 23 May 2021 since seeing the very first train from Chongqing to Duisburg in 2011. Alashankou now links 22 CEFT lines from a variety of cities across China to many cities

spread across 13 European and Central Asian countries. In the first half of 2021, 3,033 trains carrying 288,300 TEUs (twenty-foot equivalent unit) containers passed through Alashankou, representing 41.1% more trains and 48.6% more freight over the same period in 2020.⁵ The CEFT has turned Alashankou and the other three small border cities of China into new international logistics hubs.

As the number and extent of these CEFT routes have multiplied, they have expanded the number of departure, intermediate and arrival points across the four zones and thus accelerated the growth of CEFTs. While there were only 17 trips in 2011, the launch of the BRI in 2013 saw 80 trips, which rose to 308 in 2014. The number of trains jumped to 6,363 in 2018, almost equalling the total number of trips for the previous seven years. While the COVID-19 outbreak in China at the beginning of 2020 slowed the CEFT's strong growth through 2019, the quick suppression of the virus halted the temporary slowdown and accelerated growth through 2020. By year-end, the 12,406 CEFT trips were 6.3 times those of 2016 and exceeded the record 2019 by 51%. The end of 2020 saw the cumulative number of CEFT trips reach 33,600, which had carried almost three million TEUs of traded goods, worth \$160 billion.⁶ This accelerated growth occurred at some

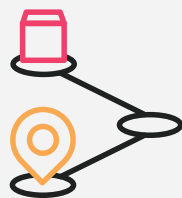
expense in terms of reduced air and sea shipping during the pandemic. During January-June 2021, 7,377 CEFTs carried 707,000 TEUs, increases of 43% and 52% over the same period in 2020.⁷

As the CEFT has grown, it has run more balanced directionally. Prior to 2014, every train ran from China to Europe. But the return or back-haul trips began to grow in 2016 and accounted for roughly one-third of all trips. Of the 3,673 trips in 2017, 1,225 (33.4%) trains went from Europe to China (Jakóbowski et al. 2018). In 2018, the 2,690 eastbound trains

equalled 73% of the 3,670 westbound trains (Tjia 2020). To put it differently, the Europe-to-China trains accounted for 42% of all trips. By another metric, while 94% of the westbound trains were fully loaded in 2018, 71% of the eastbound trains carried a full load of containers. In 2019, eastbound CEFT trains rose to 45% of the total in both directions.⁸ This indicated an effective end of the "one-way street" before 2014. Moreover, this more balanced pattern has fostered extensions beyond the China-Europe and China-Central Asia connections, as indicated by the second example above.

The CEFT's wide connectivity and rapid growth has impacted the relative positions and roles of the cities involved in relation to the spatial dynamics of production and consumption across Eurasia. While some small and marginally located cities like Alashankou have become specialised in border-clearing logistics, other second-tier or medium-sized cities have risen or revived to shape or redirect the geographical configuration and intersection of manufacturing supply chains and consumer goods flows within and across Europe and China, with important local consequences. I illustrate this cross-boundary impact of the CEFT using the ancient Chinese city of Xi'an and the historic river port of Duisburg, from their respective

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locations and in long-distance connection to some other cities across Eurasia (Figure 2).

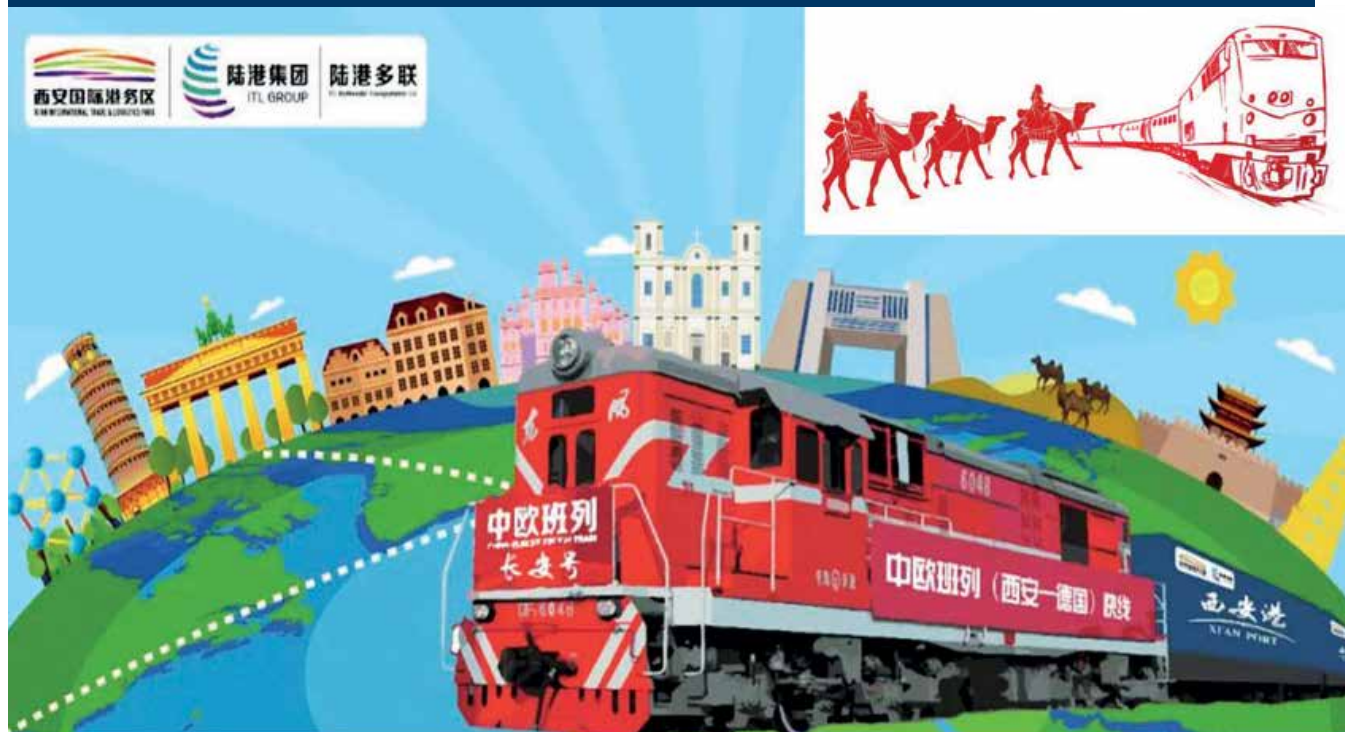
REDIRECTING PRODUCTION AND CONSUMPTION: XI'AN

The eastern starting point of the ancient Silk Road, Xi'an in Shaanxi Province, has been a prominent historical, cultural and economic centre in China for over two millennia. It served as the capital for 13 dynasties. While much better known for the Terracotta Soldiers than its economic prowess, Xi'an became one of the earliest cities in the world during the Han dynasty (206 BC–220 AD) and Tang dynasty (618–907 AD), the early and peak periods of the Silk Road. Fast-forward to the contemporary era, Xi'an fell behind its historic peers, such as Hangzhou and Nanjing in the coastal region, and lagged further behind coastal powerhouses like Shanghai and Shenzhen. Shenzhen benefited particularly from being the major destination for people and

companies that had left inland cities like Xi'an in the 1980s. Xi'an has regained some of its lost fortune since around 2000, after China's "Go West" policy and later the BRI. This favourable turn for Xi'an, and other central and western cities, positioned them well to use the CEFT as a logistics strategy for catch-up development.

Xi'an's logistics strategy began with the construction of the Xi'an International Trade and Logistics Park (ITLP) in 2008. The ITLP comprised three integrated zonal functions: 1) the Xi'an Comprehensive Bonded Zone; 2) the Xi'an rail container centre; and 3) the Xi'an inland road port. In 2009, the ITLP established and financed the Xi'an International Inland Port Investment & Development Group (ITL Group) as the ITLP's operating arm. The ITL Group launched the first train to Almaty, Kazakhstan in 2013. From the outset, Xi'an idealised its CEFT with a reimagination of its ancient Silk Road position by invoking the metaphor of the "Iron Silk Road". The Xi'an government named its CEFT after the old city name of "Chang'an (Forever Peace) Express", which was used for the

FIGURE 4: THE CHINA-EUROPE FREIGHT TRAIN "CHANG'AN EXPRESS" (XI'AN): THE CORPORATE IMAGE AND LOGO



Source: The China-Europe Freight Train "Chang'an Express" WeChat platform; accessed from https://mp.weixin.qq.com/s/ie84R92W5hns3s4p_VJ0YA.

capital of several Chinese dynasties until it was renamed Xi'an (Western Peace) in 1369. The "Chang'an Express" also uses a fitting logo of three Bactrian camels walking next to a speeding train (see image, figure 4). Riding on the "Chang'an Express", Xi'an rose to be a top-tier CEFT city in a few short years. In 2020, 3,670 CEFTs left and returned to Xi'an, ahead of Chengdu (2,800) and Chongqing (2,177) as the second- and third-ranked cities (Figure 2), accounting for almost one-third of China's total number of CEFTs.⁹

Xi'an has reconfigured some transnational flows of trade and production through its newly established logistics role. In September 2019, the ITL Group dispatched the first "LG block train", which carried exclusive liquid-crystal display (LCD) panels and electrodes to the factory owned by the large Korean manufacturer located in the Polish city of Sławków. Instead of around 40 days by sea, these containerised parts on a dedicated freight train arrived at the destination in 10-12 days. Since 2019, LG has already sent over 1,000 TEUs of parts to its factory in Sławków on the "Chang'an Express", after shipping them from Korea to the Chinese port city of Qingdao and then to Xi'an for

Europe.¹⁰ Via this logistical path from 1A->2B->2A->3A->4A (see Figure 2), which saves time and cost for LG, Xi'an has effectively redirected a global supply chain from East Asia via western China to central Europe.

Xi'an's other logistical effect on production is more direct, as its transnational freight connectivity has lured more manufacturing companies to (re)locate locally in order to ship products and parts to European markets more quickly and cheaply. In 2018, the founder of Siying, an electronics manufacturing company in Shenzhen, originally from Xi'an, moved his entire factory back to his home town after realising that he could ship products to Central Asia faster (from around 40 to around 15 days) to lower costs and thus expand production. Since relocation, this company has reduced the cycle of its order placement and supply chain coordination from around 90 to 30-40 days, almost tripled its output, hired more local workers, and expanded its markets from Kazakhstan and Kyrgyzstan to France and Germany. This relocation of manufacturing production and faster shipping has involved a spatial movement of 1C->2B->2A->3A->4A (Figure 2).

FIGURE 5: VOLVO XC90 SUVs AND V40 HATCHBACKS ARRIVED AT XI'AN PORT FROM GHENT, BELGIUM ON JUNE 13, 2018



Source: China Daily photo;
accessed from <https://www.chinadaily.com.cn/a/201806/15/WS5b2387b9a310010f8f59d39f.html>.



FIGURE 6: A FREIGHT TRAIN LOADED WITH XC 60 SUVs ARRIVED IN GHENT, BELGIUM FROM XI'AN ON JULY 4, 2019

Source: *China Daily* photo; accessed from http://www.chinadaily.com.cn/a/201907/08/WS5d22d625a3105895c2e7c40f_2.html.

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Along with its impact on production, the "Chang'an Express" has strengthened Xi'an's role in connecting and redistributing consumption across European and Chinese cities. For example, Volvo has benefited greatly from running a new regular train between Xi'an and Ghent, Belgium. In June 2018, a CEFT train departed from Ghent and arrived at Xi'an Vehicle Port with 160 European-made Volvo XC90 SUVs and V40 hatchbacks, after 16 days (see photo, figure 5). These more expensive models sell very well in China, the world's largest market for Volvo cars. In 2019, a "Chang'an Express" train loaded with 160 XC60 SUVs arrived in Ghent, Belgium after an 18-day journey. Made at Volvo's plant in Chengdu, China, the XC60 were sold in 25 European countries, including France and

Germany.¹¹ During the first three months of 2020, when China was seeing off the pandemic, 27 trains from Xi'an carried 3,377 XC60s (averaging 125 cars per block train) to the European markets through a fast and secure system from truck to train, without exposing the new cars to potential virus contamination (see photo, figure 6).¹² While involving Central Asia only as the pass-through space, this bidirectional transportation and consumption of Volvo cars flows through zones 1-4 (Figure 2).

From its geometrical central location in China, Xi'an has channelled imported consumer goods within and beyond China. In 2020, more than 20 provinces, with uneven access to overland exports, used the "Chang'an Express" to export and import their goods by means of consolidation and redistribution via Xi'an. More than half of the imported goods for Shaanxi province passed through Xi'an, which also moved over 70% of these goods to the rest of China.¹³ The "Chang'an Express" has brought such popular European imports as Dutch dairy products, French cosmetics, Georgian red wine, Italian clothing and Norwegian salmon to Chinese consumers. As China has become an even bigger consumer, whose share of global consumption rose from 9% during 2000-5 to 23% during 2013-18 (McKinsey & Company 2021), Chinese consumers have been buying more imported consumer goods, especially luxury

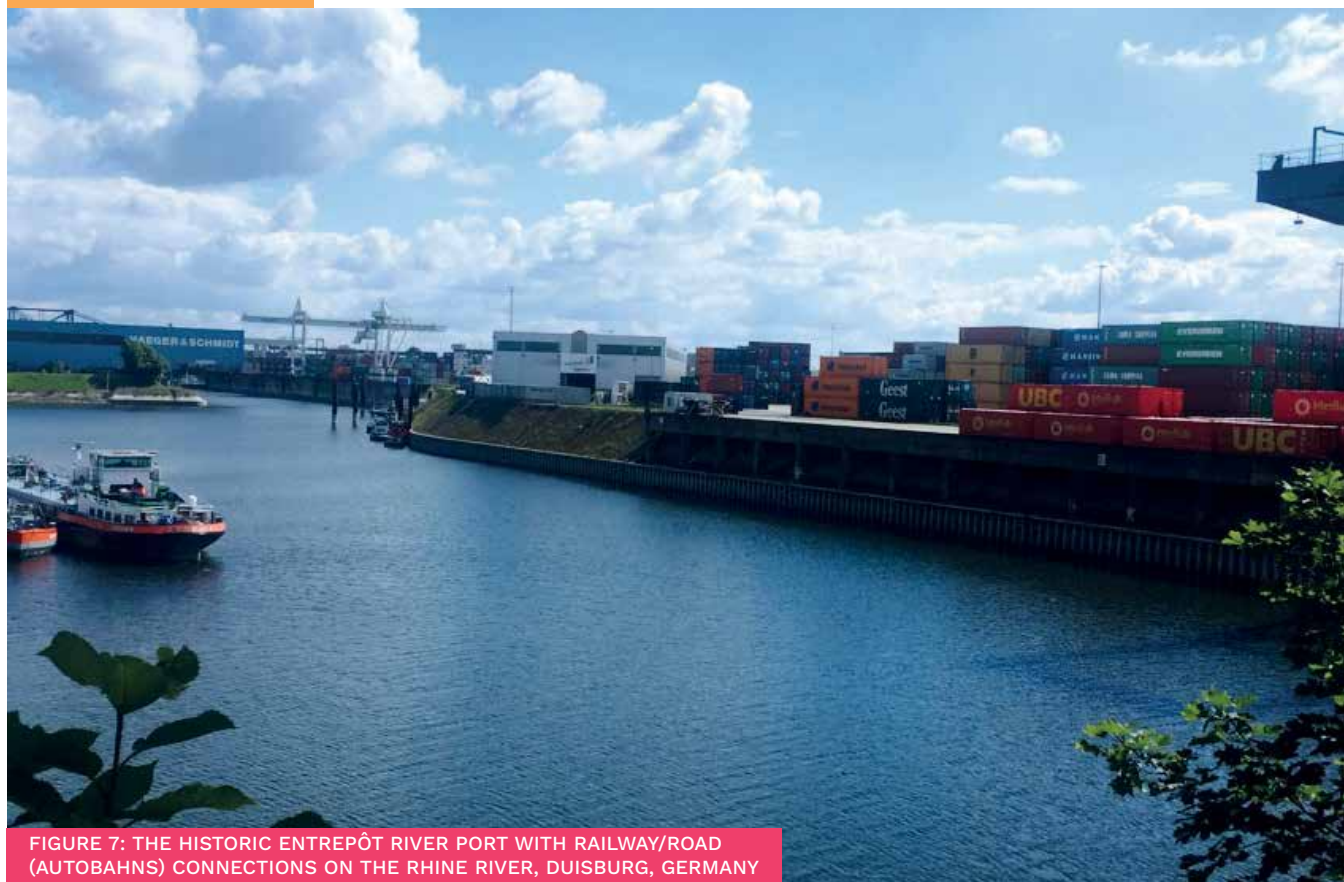


FIGURE 7: THE HISTORIC ENTREPÔT RIVER PORT WITH RAILWAY/ROAD (AUTOBAHNS) CONNECTIONS ON THE RHINE RIVER, DUISBURG, GERMANY

Source: Taken by author in July, 2016.

European brands, with over half of this spending from second- or lower-tier interior cities, led by cities like Xi'an.¹⁴ This bodes well for Xi'an to continue its role in stimulating local consumption and spreading national consumption of global imports carried by its "Chang'an Express".

RENEWING URBAN DEVELOPMENT: DUISBURG

While Xi'an is a good example of reviving itself through building up the ITLP and operating the "Chang'an Express", I turn to Duisburg as a more compelling case where a deindustrialised city has renewed itself as Europe's most important logistics hub for the CEFT.

As the world's largest inland port, at the intersection of the Rhine and Ruhr rivers in central Germany, Duisburg has a strategic locational advantage in receiving freight trains from China and trans-shipping their cargo to other parts of Europe by river, highway and rail. A river port for over three centuries (since 1716) and once a dominant coal-mining and steel-making centre

in Germany's industrial heartland of the Ruhr region, Duisburg has lost much of its manufacturing base since the 1960s with a weak economy and high unemployment, which stood at 11% compared with the average unemployment of 3% across Germany.¹⁵ In 1982, Duisburg became a sister city to the Chinese city of Wuhan, although it had not done very much with China before 2011. Wuhan is similar to Duisburg economically, as a steel-making centre on the Yangtze River and also a CEFT hub today, similar to Xi'an (see Figures 1 and 2). The 1980s also saw Duisburg build up its inland port facilities. In 1993, Duisburg combined the harbours of Duisburg and Ruhrort and created the modern logistics hub of Duisport, although it continued to suffer from a broader decline due to industrial restructuring in the Ruhr region and Germany as a whole. This suppressed Duisburg's build-up and greater logistics capacities, leading to two decades of "relative stagnation" until 2011,¹⁶ when it began to receive a growing number of CEFTs from China.

Duisburg now receives four out of five trains every day from China as their first European stop, averaging about 35-40 arrivals each week.

This large freight cargo flow into Duisburg has produced an agglomerated effect through the expanded and clustered activities in customs clearance, bonded warehousing, loading and other areas of intermodal trans-shipping at and from the river and rail terminals (see photo, figure 7). Duisport's CEO noted that its employment has grown from 19,000 to 50,000.¹⁷ This has also created new opportunities for more Chinese companies, numbering over 100, to set up shop in Duisburg, which in turn contributes further to the local economy. It is estimated that the combination of the CEFT cargo and other Chinese investment account for about 15% of Duisburg's employment. The infusion of Chinese goods, capital and personnel has turned Duisburg from a traditional river port for local trade into a more expansive continental logistics centre capable of diffusing economic influence across Central and Eastern Europe through the multimodal distribution of cargo flows.¹⁸

Besides the measurable economic impact in Duisburg, the city's growing ties with China through and beyond the CEFT have brought about other positive local changes. About 2,000 Chinese students currently study at the University of Duisburg-Essen. Max Planck High School in Duisburg has become a leader in teaching Chinese. "The trend is clear: we must work together with China," said principal Gabriele Rügen. To that end, she decided that as of 2020, students at her school would be able to start learning Chinese from their seventh year, alongside French and English. This educational initiative can help Germans better understand China and be prepared to deal with this global economic power with a long reach.¹⁹ On 14 April 2020, the first train for Europe from Wuhan arrived in Duisburg with large amounts of PPE, which reinforced the long-standing, long-distance sister-city relationship between the two cities. Now known as Germany's "China City", Duisburg has not only largely revived its eroded economy by becoming Europe's central CEFT hub, but also created a broader foundation for more sustainable development and prosperity through logistical multipliers.

FROM CONNECTIVITY TO SUSTAINABILITY

Looking out from Xi'an and Duisburg as main CEFT hubs, the CEFT's ever-expanding trans-border spaces (Figure 2) appear to be geographically confined and finite due to a variety of economic, spatial and market conditions, such as basic demand and passable topography, etc. The actual scope and edge of the CEFT's connectivity, however, have been pushed further out toward unfamiliar territories and through more complicated intermodal extensions. This alerts us to consider where the most recent CEFT routes may lead and the additional actors and places involved.

As the world's largest inland port, at the intersection of the Rhine and Ruhr rivers in central Germany, Duisburg has a strategic locational advantage in receiving freight trains from China and trans-shipping their cargo to other parts of Europe by river, highway and rail.

On 24 July 2020, a freight train left Xi'an, travelling north via Erlianhot into Mongolia, through Russia and Minsk, Belarus, and then ran south past the town of Mostyska near the Ukrainian-Polish border, before arriving in Kiev. This became possible through cooperation between the Polish logistics company PCC and the Ukrainian company Global Ocean Link. They took advantage of the CEFT's rapid expansion and Ukraine as the EU's largest trading partner, with their bilateral trade having grown 10-15% during 2014-19.²⁰ On 28 June 2021, the first-ever freight train travelled from Xi'an through Kazakhstan, Russia, Poland and Germany, before arriving in



Paris after 18 days. From Paris, some cargo was transported to the port of Marseilles, and then shipped to Algeria, Morocco and Tunis by sea (2B->2A->3A->4A->4C). This is faster than going through Duisburg and then to either Hamburg by water or any of the Mediterranean ports by truck for shipping to North Africa, reaching the edge of the CEFT's conventional boundaries (Figure 2) via intermodal trans-shipment.

In November 2019, a "Chang'an Express" train left Xi'an, went through Kazakhstan and Baku, Azerbaijan across the Caspian Sea, passed the Georgian capital of Tbilisi and then the Turkish capital of Ankara, through the Marmaray tunnel below the Bosphorus Strait in Istanbul, and eventually arrived in Prague. It marked a rare land-sea-land intermodal run along the CEFT's south channel or middle corridor (see Figure 1). This new line gained more use in early 2021, when the inaugural return train from Istanbul arrived in Xi'an after 15 days and thus launched the bidirectional Xi'an-Istanbul

service (2B->2A->3A->4B). Back in August 2016, Jiangsu Qingeng Industrial Co. and companies from Afghanistan jointly launched a freight train from the city of Nantong (Jiangsu Province), near Shanghai, to Afghanistan. The trip took 15 days to complete and passed through Alashankou, Kazakhstan and Uzbekistan before arriving at the land border port of Hairatan (Mazar-i-Sharif) in northern Afghanistan.²¹ A freight train returned along the same route in 2019 (see photo, figure 8). A rare China-Asia freight connection (1B->2A->3A->3B), this difficult route to a risky destination heralds a potential new opportunity for China to engage with Afghanistan economically and logistically with the departure of the United States military.

As the CEFT connects more cities over wider geographies and longer distances, it has involved more diverse and competing players, most of which are local municipal governments, their subordinate entities and private logistics firms (see above), as well as their partnerships.

FIGURE 8: A TRAIN LOADED WITH AFGHAN GOODS HEADS TO NANTONG, CHINA IN SEPTEMBER, 2019



The ITL Group worked with DHL in November 2019 to launch the “German Express” from Xi’an to Hamburg and Neuss, another logistics hub on the Rhine river, like Duisburg. The ITL Group has also cooperated with Deutsche Bahn (DB) in using the “German Express” to add a service to Vilnius, Lithuania. In March 2019, the ITL Group got Nippon Express, a top global logistics firm from Japan, to lure its clients like Olympus and Honda to use the “Chang’an Express” for shipping their exports from Xi’an to Europe (1A->2B->2A->3A->4A, Figure 2). This goes along with Xi’an’s greater role in adding air and sea extensions, which accounted for 40% of the “Chang’an Express’s” new business during the initial peak of the pandemic in early 2020.

From the European end, for example, the ÖBB Rail Cargo Group (RCG), a leading rail logistics company in Austria, entered the CEFT market in 2017, when it operated only 62 trains with a transport capacity of 3,000 TEUs. Due to stronger demand, RCG transported 35,000 TEUs between Europe and Asia in both 2018 and 2019. In 2020, it set a new record of over 700 trains with around 70,000 TEUs.²³ As one of the EU’s only four landlocked countries, Austria stands to benefit from a stronger connection to the CEFT driven by RCG and its strong focus on creating and connecting the Eurasian freight routes through Russia.

Through the growing participation via both competition and collaboration between private and public logistics companies from Europe, China and East Asia, the CEFT has introduced more market efficiency into this vast cross-border logistics system. The CEFT-led initiatives by cities like Xi’an and Duisburg have driven the larger number of freight lines from below. To sustain the CEFT for the long run, the private sector and local government need to interface with the national governments and even supranational agencies of China, Europe and Asia more broadly. In July 2020, the most top-heavy national

The CEFT’s expansion and sustainability will benefit from being the critical middle option of long-distance freight transport that is faster than sea and cheaper than air.

government of China issued a plan to consolidate the CEFT hub functions in five major cities, Xi’an, Chengdu, Chongqing, Urumqi, and Zhengzhou (Henan Province), which accounted for 63% of all CEFTs in the first half of 2021. This was a corrective measure to reduce the inefficiency

cause by over-competition and duplication among many cities. It reflects the national government’s effort to catch up with local authorities and actors in developing and operating the CEFT by introducing a national vision and form of support. This is further


exemplified by the national government’s requirement that subnational governments’ subsidies, including by Xi’an, for CEFT cargo trains should not exceed 50% of domestic railway costs and be reduced by 10% a year compared to the 50% level in 2018, with the prospect that all subsidies will be phased out by 2022.²⁴

From the more collective and fragmented European end, the EU’s two-decade-old Trans-European Transport Network (TEN-T), which includes hundreds of air, rail, road and port projects to strengthen the cohesion, interconnection and interoperability of the trans-European transport network by 2030, appears to dovetail with the CEFT and the BRI. In reality, however, the TEN-T and the CEFT have not formally “met” through any direct dialogue and cooperation. In another complication, it is unclear how the CEFT will interact with the EU’s “Connecting Europe and Asia – Building blocks for an EU” strategy, introduced in September 2018. A new challenge to coordinate with the CEFT comes from the most recent EU initiative – “Globally Connected Europe” – which seems designed to counter the BRI, and by extension the CEFT, by coordinating and promoting investments in infrastructure projects to link Europe with the world from 2022. At the national level, however, Germany has more of its cities involved with the CEFT than any other EU member state, also evidenced by its discharging the second-largest



number of TEUs from East Asia, including by sea, behind only Britain before it left the EU. It isn't just coincidence that the departing German Chancellor Merkel has consistently taken the most pro-China stance among the major EU members, and also relative to the United States.

Finally, the CEFT faces a greater challenge in raising its share of carrying the China-EU trade cargo, especially against the dominant sea shipping. In 2018, the CEFT accounted for only 2.3% of China's exports to Europe and 3.1% of China's imports from Europe, while about 90% of China-Europe trade by weight and 60% by value went by sea (Tjia 2020). Aided by a shift of maritime cargo to overland rail shipping due to the pandemic, the share in Europe's total imports from China by train rose from <1% in 2011 to 4% in 2020. The EU-China trade volume on rail more than doubled, with annual growth of 26.9% from 2016 to 2020.²⁵ Yet the 1,135,000 TEUs carried by the CEFTs in 2020 only equalled 2.6% of all the TEUs handled by Shanghai Port,²⁶ which is not surprising given the structural cost and scale advantages of sea shipping.

As trade continues to grow between China and the EU, as each other's largest and second-largest trading partners respectively, the CEFT is poised to grow with it. This looks more promising as the CEFT consolidates its recently launched routes into round trips and to regular schedules, such as the new Xi'an-Istanbul line and a new Xi'an-Budapest line via Ukraine. It will help translate the CEFT-related dots and lines on the Eurasian transport map into a more formal and resilient network carrying a steadily growing share of the China-Europe and China-Central Asia trade cargo. The CEFT's expansion and sustainability will benefit from being the critical middle option of long-distance freight transport that is faster than sea and cheaper than air. This bodes well for the CEFT to run not only more connected across Eurasia but also more sustainably into the future. 

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"Through skillfully executed case studies of China's growing nexuses with Europe, Asia and Africa, The Belt and Road Initiative as epochal regionalisation offers a timely look into how the BRI is reshaping globalisation, urbanisation and development via new cross-regional logistics connectivity, infrastructure-led city-building and special zone-induced industrialisation from China's borderlands to far-flung places."

– Liu Zhigao, Associate Research Fellow, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences

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ENDNOTES

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