7

Kazakhstan as Logistics Linchpin in the Belt and Road Initiative

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Geography as (Logistics) Destiny

Historically, five overland routes led out of northern and western China. The sixth, the Karakoram Highway leading into Pakistan and Afghanistan, is a modern, six-lane engineering marvel billed as the world's highest highway in elevation terms. The other five are traditional routes along which traders and armies have traveled for millennia. Three of these routes run through or touch modern Kazakhstan; two—the more important, historically impactful—run just north and south of the Tianshan mountain range, a range which Niu Ruji called the "pivotal line of converging Asian Civilizations" (Aubakirova, Umirzakov, & Aitenov, 2017; Christian, 2000; di Cosmo, 2004: 72, 82; Lattimore, 1953; Niu, 2015). Some have contrasted the southern route, which constituted the Silk Road(s), and the northern route, which constituted the Steppe Road, but

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these two routes were and remain tightly linked in terms of goods shipped and traded (Christian, 2000; di Cosmo, 2004; Frank, 1998: 120–22; Rossabi, 1990). Importantly, they are only integrated territorially within Kazakhstan's borders;[1] in fact, one of the key oil and natural gas pipelines is a modern manifestation of this integration of Silk and Steppe Roads (see Fig. 6.4 in Han & Ghobadian, 2020, this volume).

This chapter looks at the past and present in terms of logistics, reinforcing that reputed maxim of Mark Twain that "history does not repeat itself, but it sure does rhyme sometimes."[2] Kazakhstan's destiny is expected to rhyme with its past by providing major trading routes, but I predict it will become a modern logistics hub as well. These Silk and Steppe routes skirting the Tianshan range (literally Heaven Mountains) historically and in present day constitute main land trading routes into and out of China and East Asia, with the southern route traversing the desert in China's Xinjiang Province, and then westward through the Kyrgyz Republic and Uzbekistan into Iran. The northern route passes through the Junggar Pendi (Dzungar basin; see the Dzungar Gate in Fig. 7.1) in northern Xinjiang and into Kazakhstan, running north of the Western Tianshan at the mountains hugging the southeast corner of Kazakhstan. Professor Niu cites the seventh-century Buddhist Xuanzang who, dividing the "world into four parts: states dominated by elephants (India), by people (China), by horses (Mongolia and Central Asia), and by treasures (western Asia)," claimed all four parts could be seen by standing on top of Tianshan's peaks, and Xuanzang considered Tianshan to be the center of Asia (Niu, 2015: 6). Kazakhstan's southeastern border starts near the center of the Tianshan range; trading centers, oases, and the culture of the Silk Roads along both the Silk and Steppe Roads lie within Kazakhstan's present borders.

In the modern Silk Road development (sometimes called One Belt, One Road or Belt and Road Initiative), Kazakhstan will become a logistics linchpin. To understand why, to invest effectively and to minimize investment and operational risks, we must understand five critical elements: (1) the ancient and modern Silk and Steppe Roads' place in

[1] Kazakhstan is written in Cyrillic (Russian) as Казахстан and in Chinese (simplified) as 哈萨克斯坦.

[2] There is considerable debate about whether Mark Twain said this or if this was perhaps constructed from fragments of his writings and talks.

Fig. 7.1 The centrality of Kazakhstani logistics. (Source: Sternberg, Ahearn, & McConnell, 2017)

history; (2) Kazakhstan's role in this history; (3) how Kazakhstan's position between Russia and China provides great opportunities which the Kazakh government is attempting to maximize while minimizing threats and weaknesses; (4) the resulting relationship between China and Kazakhstan; and (5) why China's efforts to invest in maritime infrastructure facilities will likely run into many problems, which would push Chinese investment more toward land-based investment projects. The first four are given more weight in this chapter, in part because the fifth is partly based on the author's speculations (the fifth also does not involve Kazakhstani infrastructural and logistical development).

Total cost estimates for all planned, proposed and constructed projects under the Belt and Road Initiative (henceforth BRI) range between US $4 and US $8 trillion and span maritime- and land-based investments in Asia, Africa, Europe and beyond (Padilla, 2017; Selmier, 2018; Yu, 2017). Most of these projects fall under infrastructural investment, with a special focus on redevelopment or new construction of trade infrastructure; Kazakhstan's diverse projects, consisting of ports, railroads, roads

and airports, energy transmission and generation and information system backbones, demonstrate this (Higgins, 2018; Sternberg et al., 2017; Zhang & Belgibayev, 2014). While the BRI launched by China seems to be an enormous, global trade-changing *new* project, it is not new (see Ambalov & Heim, 2020, this volume). It will change global trade, again, as the old Silk Roads changed global trade but in a different way—by the stunning magnitude of goods transported. Quoting from Valerie Hansen's book (2012), Silk Road scholar Daniel Waugh (2012: 164) informs us:

> "*The Silk Road was one of the least traveled routes in human history and possibly not worth studying—if tonnage carried, traffic, or the number of travelers at any time were the sole measures of a given route's significance.*" *The qualifier here is crucial though, leading to the next sentence: "The Silk Road changed history."*

While modern logistics are now more complex, more contractually defined, risk-managed, financially driven and business operation-optimized, the old Silk Road was quite complex as well, with contracts, an extensive range of goods traded, use of complex financing projects and impressive risk management strategies. By looking at the history of the old Silk and Steppe Roads we can glean modern lessons in each operational area of business, capture some advantage over less-prepared business competitors and perhaps impress our Kazakh business partners.

Then, as now, Kazakhstan (or rather what became Kazakhstan) provided not only important logistics hubs on the Silk and Steppe routes but also energy resources which contributed to China's economic development and to its security. Starting perhaps 3000 years ago and continuing for 2000 years, the steppes provided horses which were essential to China's energy needs, to its transportation and to its capacity to defend borders and secure them. In the present, those energy resources are oil and natural gas. Modern horsepower is delivered through these modern energy sources.

Section "Geography as (Logistics) Destiny" sketches a selective history of the old Silk and Steppe Roads with an emphasis on Kazakh influences and China's historical relationship to this influence. We should note that some political actors along the Silk Roads were imperial, while some were

city-states which acted as entrepôts, and we must emphasize that modern Kazakhstan did not exist. The following section ("Kazakhstan Situated on Silk Roads and Steppe Roads") looks at the history of the area and the emergence of modern Kazakhstan along the New Silk Road/BRI, outlining the crucial role of Kazakhstan as transportation hub and energy producer and focusing on shipping costs, containerization, and capacity. Section "Shipping Costs, Containerization and Capacity" examines the four major issues facing Kazakhstan in her quest to become the logistics linchpin in the BRI: (1) small population in a very large country; (2) containerization development; (3) railroad gauge in the former Soviet Union countries is wider than the rest of the word; and (4) modern facilities must be developed. I introduce the logistic concept of the Four Rs (road, rail, runway and river/sea). Lastly, I touch upon international contention of the seas and how that may benefit Kazakhstan's unique position as the stable, land-based intermediary between East Asia and Europe.

Kazakhstan Situated on Silk Roads and Steppe Roads

In a sense, Kazakhstan has always been at the center of logistics. Horses for transport, first bred and trained for riding in Dereivka (present-day eastern Ukraine) beginning around 2000 BC, quickly spread westward across the steppe (di Cosmo, 2004) into what would become Kazakhstan. They were quickly adopted into steppe life; some scholars have called horses the "schooners of the steppe," as the vast waves of steppe grasslands resembled oceans. But the many easy paths which crossed those vast, similar-looking plains required the skills of a stargazer and necessitated specialized equipment to properly navigate.

Equestrian skills—and technologies involving reticulating bits, harnesses, saddles, and stirrups—were developed which allowed steppe-dwelling peoples to hunt, fight and literally live in the saddle. Various wheeled carts were also developed for specialized conveyances. Anthony and Vinogradov (1995) argue in an influential paper that the chariot was born on the steppe, spreading westward toward Egypt and the

Mediterranean and eastward into China. Ancient China fell in love with the horse not only for purposes of defense and transportation but, as time progressed, for the sheer beauty and power of the horse (di Cosmo, 2004; Liu, 2010). The area which was to become modern Kazakhstan was a key supplier into China, shipping horses and horse technology. Han Gu (32–92 CE), a Han Dynasty poet, historian and politician, rhapsodized both horses and the Tianshan region when he wrote, "A Heavenly Horse Soars across the Sky![3] (Hu, 2015). To fight against the nomads living in China's near-north and near-northwest more than 2500 years ago (Beng, 2014; di Cosmo, 2004; Wang, 2012), Chinese acquired these legendary "heavenly horses" of Central Asia by trading silk (of great use by light-traveling nomadic peoples on the cold, windy steppe). As the eminent historian Wang Gungwu wrote (2013: 10): "The only enemies of China who really were a threat and actually conquered China were the horsemen of the Steppe-Land. So, the Chinese built the Great Wall instead of a navy."

Why should a business investor want to understand the Chinese perspective toward the steppe, the Silk Roads old and new and Kazakhstan? First, China is the largest investor for Kazakhstan, inking nearly US $50 billion in contracts in 2015 (see Han & Ghobadian, 2020, this volume; Kambarov, 2015). In fact, China is Kazakhstan's most important partner in security (Contessi, 2015; Kembayev, 2018; Zhang & Belgibayev, 2014), energy projects (Heim, 2017; Hydrocarbons Technology, 2018; Kazakhstan-China Pipeline, LLC, 2018), infrastructural investment (Feng & Foy, 2017; Kenderdine, 2017; Uatkhanov, 2017) and finance and financial market development (Jenkins & Perzadayeva, 2018; Selmier, 2018; Voloshin, 2017). Second, China needs Kazakhstan for many reasons, and, realizing these reasons, Kazakh leaders seek to bind China and the Chinese industry to Kazakhstan while balancing Kazakh interests elsewhere. This idea is developed throughout the rest of the chapter, but let us sketch in here why this may lower political and investment risks in Kazakhstan for all investors. In Chinese leaders' viewpoints, Kazakhstan presents a stable, willing, resource-endowed, well-off, and welcoming business partner in the world where these five attributes rarely

[3] 天马行空, tian ma xing kong, author's translation.

exist for China (Aubakirova, et al., 2017; Kazakhstan 2050, 2016; Selmier, 2018). Diplomatically skilled Kazakhstan sits between China and Russia with critical border crossings to each while providing key pathways to Europe. China will seek to bolster this stable, neutral-but-friendly partner; Kazakhstan will continue to embrace this role, as discussed below (Contessi, 2015; Kirişci & Le Corre, 2015; Nixey, 2012).

Third, China's modern attempt at a modern global trading network is merely a repeat of past periods of "Pax Sinica." When China could—that is, when it was powerful, stable, and rich—it extended governance far to its West over these land-based trade routes. There is almost a clockwork nature to this pattern of power extension. Every seven centuries or so the Chinese government then in power, at the height of its power, worked its political and development magic on this trade network. During the mid-Han Dynasty (around the birth of Christ), the mid-Tang Dynasty in the early eighth century AD, the Yuan Dynasty in the fourteenth century and presently, we find a powerful China building infrastructure, establishing logistical and trading centers and seeking to govern and improve the existing trading system (for historical perspectives, see Frank, 1992; Hansen, 2012; Liu, 2010; Rossabi, 1990).

And hence, fourth, in marketing terms the Chinese have claimed "naming rights" on the Silk Road. Their effort was helped by nineteenth-century German geographer Ferdinand von Richthofen. He coined the term *die Seidenstrasse*—the Silk Road—because the Greeks and Romans valued silk highly and called China *Serica*, the land of silk (Hansen, 2012; Liu, 2010; Waugh, 2007, 2012), even though the roads also transported jade, horses, agricultural goods, art, ideas and people and slaves (Elverskog, 2010; Hansen, 2012; Liu, 2010). That a Chinese "brand name" was established is due in part to the European perspective of what goods were most important, but modern China has claimed ownership of the brand. But this claim is only partially true; over their 2500-year history, the trading routes were most completely and competently managed during two periods, and not by China, by the Abbasid Caliphate (roughly later eighth to later twelfth century AD) and the Mongol Empire (late thirteenth into mid-fourteenth century AD), when a "Pax Mongolica" (Elverskog, 2010: 162) created a continent-wide trading system which stretched across Asia into Europe:

> *through imposition of peace, religious tolerance and … an elite cohort of wide-ranging Muslim merchants by issuing them official certificates … backed by a powerful, well-administered [Mongol] state (Frank, 1998: 255–7) complete with an extensive system of postal stations. (Rossabi, 1990: 353) and the tolerance, even encouragement, of travel across Asia and from Europe* (quoted from Selmier, 2018: 262)

Central Asians above all are cognizant of these ebbs and flows of the Silk and Steppe Roads. Economic and political cycles help modern businesspeople to understand why the peoples of Central Asian countries have seen all of this before, and their histories remind Central Asians of when they were once rich and at the center of the world's trading system rather than on the periphery and presently re-emerging onto the world stage.

And while the Silk and Steppe Roads were interlinked over this history, trade through the steppe routes increased at the expense of the Silk Roads in the eighteenth century for three reasons: the powers and economic health of Iran/Persia, the key intermediary on the Silk Roads and the Ottoman Empire both began to decline (Esfahani & Pesaran, 2009; Keddie, 1972; Palmer, 1994). As they declined, the growing Russian economy pulled trade and travelers toward the north through the steppe routes (Christian, 2000; Frank, 1998; Rossabi, 1990). Competing with both Iran and the Ottoman Empire, Russia actively tried to weaken the southern trade routes while capturing more trade and riches from the northern steppe routes passing into Russia.

But Russia found it could not compete effectively with European economies and their colonization efforts in other parts of the world and so looked south toward Central Asia and west toward Siberia as Russia recovered from the Napoleonic Wars: "by the mid-19th century economic interests, a fear of falling behind Europe after the Crimean War disaster, and the search for more land catalyzed Russian conquest of Central Asia" (Selmier, 2018: 263). While Russia struggled to control Central Asia (Allworth, 1995; d'Encausse, 1995a; Saray, 1982), inward-looking China chafed under internal turmoil and barbarians encroaching from the eastern seas rather than the western steppes; Iran atrophied as the English effectively turned it into a colony. Trade along the Silk Roads and Steppe Roads nearly disappeared. Although Russia built some

railroad infrastructure, established large farming efforts, and developed some mining, aside from cotton exports, Central Asia under Russian control slid further into economic oblivion (d'Encausse, 1995a; Saray, 1982). The Soviet Union continued selected investment but found it difficult to achieve political stability, particularly in Uzbekistan, the most populous of the Central Asian countries. Then came World War II, and Central Asia underwent a period of extremely rapid industrial growth.

Correctly fearing that German troops would overrun the heavy industrial complexes in eastern Ukraine and southwestern Russia, 300 entire industrial plants and material processing units were disassembled, shipped then reassembled in southern Central Asia, particularly in Uzbekistan and Kazakhstan; this rapidly enlarged industrial base required equally rapid investment in railroads, mines and mineral processing facilities, more industrial plants and power plants (d'Encausse, 1995b; Matley, 1995). Plants were also shifted from areas around Moscow—in fact, from many plant sites west of the Urals—and moved east of the Urals and into Central Asia. World War II also brought a less-appreciated increase in human capital. Stalin's concern about loyalty led to forced inward migration by Russians, Ukrainians, Germans and Koreans who had settled in other parts of the Soviet Union, in the case of the Germans for centuries. These unwilling immigrants to Central Asia brought skills and, later, ties to their ancestral homelands (for instance, Korean firms and the Korean government are intensely interested in, and investing into, Kazakhstan).

The takeaways from this brief, selective history are the following: Kazakhstan is a richly endowed economy with strong industrial and extractive industry bases (as discussed throughout the book). With a diverse population and developed human capital, investment interest is strong, and this is enhanced by Kazakh citizens with ancestors from many other countries. Bordering the old Silk Roads with the old Steppe Roads running through it, its modern location could not be better situated for logistics. And interposed between Russia and China, significant land traffic simply has to pass through it. Russian political influences remained in Central Asia after the collapse of the Soviet Union in 1991 (Contessi, 2016; Nixey, 2012; Zhang & Belgibayev, 2014), and so Kazakhstan must finely balance its interests between China and Russia (Aubakirova et al., 2017; Contessi, 2015; Kembayev, 2018). Table 7.1 provides comparisons

Table 7.1 Demographic and economic comparison of China, Russia, and Kazakhstan

		China	Russia	Kazakhstan
Area (*1000 sq-km*)		9596	17,098	2724
Coastline (*km*)		14,500	37,653	0[a]
Selected demographic information				
Population (*mill*)		1379.3	142.3	18.6
Median age		37.4 years	39.6 years	30.6 years
Population growth rate		0.41%	−0.08%	1.04%
Urban population		57.9%	74.4%	53.2%
Calculated population density[b]		~144/km^2	~8.3/km^2	~6.8/km^2
Life expectancy at birth		75.7 years	71 years	71.1 years
Total fertility rate (*children born/ woman*)		1.6	1.61	2.25
Literacy (*total population*)		96.4%	99.7%	99.8%
Economic overview				
GDP (PPP, in USD trillions)		$23.1	$4.0	$0.47
GDP—real growth rate		6.8%	1.6%	3.3%
GDP—per capita (PPP)		$16,600	$27,900	$26,100
GDP by composition	**Agriculture**	8.2%	4.7%	4.8%
	Industry	39.5%	32.4%	34.4%
	Services	52.2%	62.3%	60.8%
GINI index		46.5 (2016)	41.2 (2015)	26.3 (2013)

Source: Authors' own processed data based on CIA Handbook (2017)

The original key for Table 7.1 read as follows: "Sources: From CIA Handbook, 2017. All figures are 2017 estimates unless noted

[a] Borders Aral Sea and Caspian Sea

[b] Author's calculation based on CIA figures

between these three counties, and here we note four important points: Kazakhstan has a younger and much smaller population than Russia or China, with roughly half living in cities. It is a highly educated, relatively high-earning, long-living population. Although Kazakhstan has no ocean coastline, there is 700 kilometers (roughly 470 miles) of coastline in the Caspian Sea which is being developed into an important transportation hub as discussed below. And Kazakhstan is geographically large and diverse, with an area more than a quarter the size of China, the United States or Brazil.

Shipping Costs, Containerization and Capacity

Far-flung European colonial establishment pulled attention from land to sea during the eighteenth and nineteenth centuries, and this shift naturally developed sea-going trade at the expense of land-based trading routes such as the Silk Roads and Steppe Roads. The goods which were transported also became increasingly heavy, fragile, and voluminous, pushing goods transport toward large ship holds rather than into smaller packs carried on camel or horse. Now, as then, shipping costs were increasingly driven by the number of times a good is handled (Crainic, Dell'Olmo, Ricciardi, & Sgalambro, 2015; Roso, Woxenius, & Lumsden, 2008; Vinokurov & Tsukarev, 2018). Land routes on the New Silk Road—the BRI—are still challenged by handling costs. But China's physical geography stimulates considerable land-based shipping. Production in the western provinces and their demands for energy sources must either be shipped to and from eastern seaboard ports, or sent and received from further west of these populous, fast-growing provinces. There are three international transport route options to and from China's west: southwest along the Karakoram Highway and through Pakistan; directly west along the rail over parts of the old Silk Roads skirting Kazakhstan's southern border and into Iran; and northwest through Khorgos and into Kazakhstan along the old Steppe Roads. Each route poses logistical, transport-economic, and political challenges.

Understanding these logistical, transport-economic, and political challenges helps firms to develop robust, resilient logistics networks. The middle route, toward China's crucial trading partner Iran, is under constvruction or being upgraded, providing a land route across the width of Asia (Erdbrink, 2017). Asghar Fakhrieh-Kashan, the urbane Deputy Minister for Roads and Urban Development, commented "if they (Chinese government and investors) want to save time and money, they will choose the shortest route. … There are also political advantages to Iran, compared to Russia" (Erdbrink, 2017). But both Russia and the United States are actively resisting this "shortest route" (Kim & Indeo, 2013; Nixey, 2012), and this resistance creates considerable political and operational risks for logistic chains.

Pakistan and Kazakhstan provide a powerful comparison, as Pakistan offers direct seaport access at Gwadar on the Indian Ocean while Kazakhstan offers access to Europe, through either the Caspian or through Russia, after passage through the Khorgos Dryport or Dostyk, both on Kazakh's eastern border (see Fig. 7.2). The China-Pakistan Economic Corridor (CPEC) links Xinjiang's Kashgar with Pakistan's deep-water port of Gwadar over the Karakoram Highway and through a massive rail/road/LNG pipeline/data backbone running down the spine of Pakistan to Gwadar. In energy transportation terms, Kazakhstan and Pakistan are each important to western China's energy needs: the Kazakhstan-China Oil Pipeline, a 50:50 joint venture between China National Petroleum Corporation (CNPC) and KazMunayGas, the Kazakh national oil company, pumped 12.2 million tons of oil from fields near Atasu to CNPC's complex in Alashankou, Xinjiang, in 2017 (Hydrocarbons Technology. (2018)., LLC, 2018. Also see Ambalov & Heim, 2020, this volume, for more details). In October 2017, Kazakhstan also began shipping natural gas from western Kazakh gas fields through another LNG pipeline. When the CPEC is completed, LNG could be pumped, and electricity wheeled into western China. But the Pakistani project is fraught with issues of

Fig. 7.2 Major transport routes through Kazakhstan. (Source: JEX Corporation (Japan Eurasia Express), 2018)

high debt, high-risk, massive engineering requirements in heavily populated areas and considerable local resistance. Selmier (2018: 270) sums up:

> *If Pakistan's prospects for the Initiative [BRI] from a Chinese perspective are potentially problematic, complex and complicated by Islamic economic considerations, Kazakhstan's prospects are simpler, secular and conditioned by pragmatic foreign policy.*

Kazakhstan's foreign relations has been following a "balancing" strategy through a well-engineered portfolio of foreign policy tactics (Contessi, 2015, 2016), and China has become the key partner in Kazakhstan's efforts. While Chinese investment into Kazakhstan and other Central Asian countries has increased Russian concerns about growing Chinese influence (Kirişci & Le Corre, 2015; Nixey, 2012; Tang, 2000), both Kazakhstan and China have tried to alleviate Russian concerns (Aubakirova et al., 2017; Kembayev, 2018; Makarov & Sokolova, 2016). We can see why both China and Russia are intensely interested in Kazakhstan merely by glancing at the borders shown in maps in Figs. 6.4 and 7.1. At 4254 mi (6846 kms), Russia and Kazakhstan share a border matched only by the Canadian-US border in rough length; the Sino-Kazakh border is over 1100 mi (1783 km) long.[4]

The map in Fig. 7.2 shows a rough tracing of Kazakh logistics by sketching Kazakhstan's major road/rail lines with key Kazakh cities and international border crossings. Scanning the map from east to west, we see the two key entry points between Kazakhstan and China at Dostyk (through the Dzungar Gate, with Baktu Port on the Chinese side) and Altynkol Station (where the Chinese side, Khorgos, has been developed into the largest dryport in the world). The more important northern entry points into Russia pass through Nur-Sultan (former Astana), the Kazakh capital, and then onto Pavlodar (Novosibirsk-bound), Petropavlovsk (east to Omsk, west toward Chelyabinsk) and Kustenay/Rudny (northeastward toward Orenburg and then onto Samara). Toward the south, a short spur crosses the border to Tashkent, Central Asia's

[4] Kazakh Ambassador to China Shakhrat Nuryshev notes their "common border do not separate our nations, but bring them closer together. … [W]e managed to create an exemplary model of interstate relations" (quote in Sabayeva, 2015).

largest city (2.4 million) in Uzbekistan, Central Asia's largest country (33 million).[5] Western exit points enter Russia near Orai (formerly Uralsk) heading toward large Volga-based cities such as Samara, Saratov and Volgograd and Caspian ports at Aqtau/Aktau (and possibly Atyrau/Aktyrau, both discussed in more detail below).

Four Major Issues in Becoming a Logistics Linchpin

From a physical geography perspective, Kazakhstan simply could not be better placed to gain advantages and capitalize on opportunities in logistics along the New Silk Road, and BRI investments bear out this fortuitous location. But there are at least four major issues in Kazakhstan's quest to become the logistics linchpin in the BRI. Each could be partially or completely addressed through investment and development and understanding each helps us to more accurately estimate risks and more effectively target investment. In increasing order of the capacity of investment to deal with these bottlenecks, the four are as follows: (1) Kazakhstan has a small population in a very large country; (2) containerization in all its manifestations is underdeveloped; (3) the railroad gauge in Kazakhstan (and throughout the former Soviet Union countries) is wider than in China and Europe; and (4) facilities for transportation, handling, processing, administration and financing are still underdeveloped. Each bottleneck increases transportation costs, inherently makes logistic chains more complex and pushes transshipment toward other networks. Let us look at each in turn.

The issue for Kazakhstan which is least easy to solve or address is that Kazakhstan has a small population spread across a very large area. The very nature of this vast steppe-situated country results in sparse population. For instance, the US CIA's comparative map shown in Fig. 7.3 superimposes Kazakhstan over what the CIA considers comparable parts

[5] Kabul and Urumqi are larger in population terms, but I have used Central Asia as a modern term in this chapter to denote the five former Soviet Union countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

Fig. 7.3 Kazakhstan superimposed over "representative" United States. (Source: CIA Handbook 2017)

of the United States, the Great Plains and part of the Midwest. But the population of three metropolitan areas subsumed within the American sampled area—Chicago, St. Louis, and Dallas-Ft. Worth—adds up to Kazakhstan's entire population. Returning to Table 7.1, we can see that the population densities depict this as well. China's population density is roughly 144 people per square kilometer, while sparsely populated Russia with its vast Siberian spaces west of the Urals is roughly 8.3 people per square kilometer (for comparative purposes, the United States is roughly 33 people per square kilometer). Kazakhstan is one of world's less-densely populated countries at roughly 6.8 people per square kilometer.

Continuing with map 4's comparison, we can employ Thill and Lim's (2010) examination of continental US' intermodal linkages in which they determine regional access variation to export via US ports. Taking into account the ports situated along the Great Lakes and St. Lawrence

waterway, we might loosely suggest that the United States is surrounded by ports with access to the sea as Kazakhstan is isolated from seaports. Thill and Lim's maps show us the considerable advantages of a highly developed intermodal system providing export opportunities, while the Great Plains and Northern Rocky Mountain regions rank more lowly on access to seaports (see Thill & Lim, 2010), extensive construction of inland container ports and development of container terminals along Lake Superior, Michigan, and on eastward through the St. Lawrence waterway improve access considerably (ibid.).[6]

The United States has highly developed logistics systems and transportation networks. Importantly, it is five times as densely populated as Kazakhstan. To examine logistics difficulties in similarly sparsely populated areas with highly developed transportation networks, we can look to Scandinavia. For instance, Solvang and Hakam (2010) analyze the challenges of developing sustainable logistics networks in an area of Norway even more sparsely populated than Kazakhstan (4.3 people per square kilometer). They note three important generic differences between how densely and sparsely populated areas influence logistics networks: (1) denser populations allow "the network to take the advantages of both economy-of-scale and economy-of-scope"; (2) shorter distances in denser populations enable "mass-customized logistics service(s) with diverse focuses"; and (3) "sparsely populated area(s are) usually situated in a peripheral region of a country" (Solvang & Hakam, 2010). For Kazakhstan, the first point may be much more important than the last two, as the point of this chapter is to sketch out how Kazakhstan may act primarily as a transit zone for transshipments between China and Russia/Europe/Mediterranean rather than describe complex delivery networks for domestic consumers (as Solvang & Hakam analyze). So, population density may not matter as much as container facilities. Also, intermodal transportation may be relatively less important in comparison to more complex intermodal networks as train transport is what matters across Kazakhstan. Even in a highly developed transportation network such as

[6] Because this chapter is meant as a thematic survey, I have purposefully removed the econometric studies used in logistics and transportation analysis. Readers are invited, and encouraged, to look at the cited studies.

Scandinavia, many OD pairs (Origin-of-good to Destination-of-good) are served by a single mode (Rich, Kveiborg, & Hansen, 2011).

However, wherever a shift toward "seamlessness" in transportation is to be engineered (Capineri & Leinbach, 2006) it will require "the emergence of a system of inland intermodal transfer terminals" at key points (Thill & Lim, 2010: 532) and the infrastructural backbone which underpins this. Thill and Lim (2010) analyzed the *internal* US transportation network capacity to improve export-oriented trade, but their analysis applies to Kazakhstan as nearly all trade is export-oriented.

In a sense, then, Kazakhstan as a transit country is not as damaged by perceived intermodal weaknesses, nor is its logistics systems analyzed effectively by OD models as a very limited number of intermodal transfer terminals are required. The map in Fig. 7.4—a view of Kazakhstan from space—gives a sense of the vast steppe which a transportation system must cross. Yet there are relatively few transfer points required (as the map in Fig. 7.2 shows). But whether the unimodal or intermodal transfer is required, transportation will only be successful through standardization, and standardization for non-bulk goods requires *containerization* (Capineri & Leinbach, 2006; Levinson, 2016).

In the words of Vinokurov and Tsukarev (2018: 93), the BRI will be the "story of the container." The United States has a highly developed

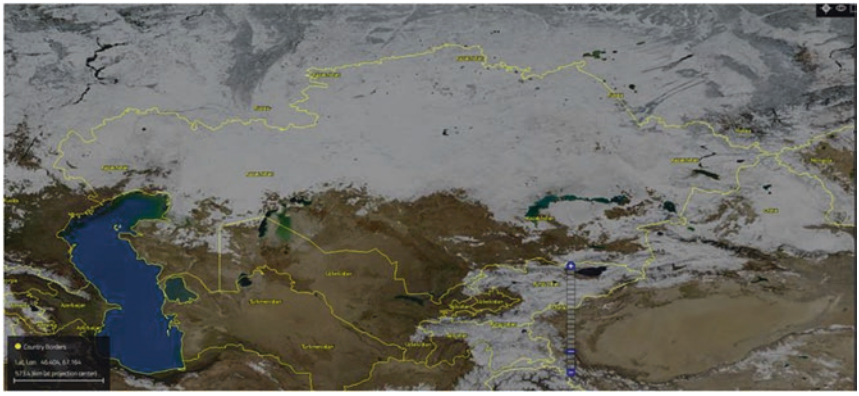

Fig. 7.4 Kazakhstan from space. (Source: Image courtesy of the Earth Science and Remote Sensing Unit, NASA Johnson Space Center)

transportation system for containerization, but containerization is still quite low in Central Asia (Makarov & Sokolova, 2016; Vinokurov & Tsukarev, 2018; Xinhua, 2017). Comparing Russia's 100 rail stations capable of modern container handling (admittedly, with some less modern than others) with less than ten presently in Kazakhstan, Vinokurov and Tsukarev (2018) comment that:

> *there is not a single facility, either in Kazakhstan or at any station on the border between [Dostyk in] Kazakhstan and Russia, that offers full-scale container services, including train marshalling, redirection, shipment storage and customs clearance.*

Containerization involves not only Chinese shipping containers across the border at Dostyk or Khorgos, but the "full-scale" facilities needed to add logistics value within Kazakhstan, optimally directing each container toward its destination. China's development effort at Baktu (dry)port across the border from Dostyk demonstrates a strong Chinese commitment to Kazakh logistics (Liu, Fang, & Ren, 2016). But even by late 2017, the amount of railroad carriage through Kazakhstan was still quite small: "when the current throughput capacities of the various China-to-Europe landbridge rail routes are combined, the total doesn't exceed that of four mega container ships that presently serve China's trade with Europe" (Tsuruoka, 2018, quoting logistics expert Doug Procak).

Thill and Lim (2010: 532) note: "The success of intermodalism requires a more tightly integrated process of transportation and logistics, so that modal networks are interconnected through minimal seams at transfer terminals." But ***different railroad gauge*** increase transportation costs (Silin, Kapustina, Trevisan, & Drevalev, 2018; Vinokurov & Tsukarev, 2018; Wu, 2017). Tsarist Russia, fearing that European trains could carry European invaders directly into Russia, established a wider-gauge standard for trains in the Soviet Union (1.520 meters in Russia versus the international standards, 1.435 m). This legacy is problematic in that goods must either be transferred onto cars running over the wider gauges or specialized cars which can change gauges must be used (Makarov & Sokolova, 2016; Tsuruoka, 2018; Wu, 2017). The present, costly, solution is to off-load containers at the Sino-Kazakh border and then reload

onto trains running on the wider gauges (and reverse this process when containers exit the wide tracks of the former Soviet Union railway systems). This is part of the reason the China-to-Europe landbridge rail costs are roughly ten times what maritime shipping might be (Tsuruoka, 2018; see also Wu, 2017). As Kenderdine (2017) notes, there is no *present* alternative to gauge-changing:

> *The Mongolia-Russia-Belarus route is also long, and also involves Russia. The same is true of the Kazakhstan-Russia-Belarus route. The Kyrgyz route passes through five jurisdictions and requires two rail gauge changes: one from China to Kyrgyzstan, and another from Turkmenistan to Iran.*

But a purely cost-benefit analysis which ignores politics would misunderstand the importance of the China-to-Europe landbridge. Makarov and Sokolova (2016) correctly point to China's motivation coming from the "need to diversify export risks in the face of deteriorating military and political conditions in the sea rather than by perceived commercial benefits" (see also Padilla, 2017; Silin et al., 2018; Wang, 2013). Kazakhstan is well-situated here as an intermediary; assuaging China's worries about safe passage, calming the steppe "waters" between China and Russia and developing a transportation and energy infrastructure which bolsters each economy (Aubakirova, et al., 2017; Kembayev, 2018; Selmier, 2018).

Issues 2 and 3 (*containerization* and *different railroad gauge*) provide part of the impetus behind an alternative route through Kazakhstan which does not continue transit through Russia. The requirement for massive investment in Kazakh transport infrastructure gives more options to Kazakh policy planners as legacy infrastructure need not be quite so important. The difference in railroad gauges make the former Soviet Union into a "wide-gauge island" as noted above, requiring a change not only at the Chinese border but when the wide gauge encounters an international gauge railroad in the West (Europe, Iran, elsewhere). The option of a route across the Caspian, with Kazakh railheads terminating at a Caspian ferry port at Aqtau (and possibly Aktyrau), is being pursued (Kenderdine, 2017; Makarov & Sokolova, 2016; Silin et al., 2018). Presently two container ferries are carrying cargo onto Baku, from which trains run westward through Azerbaijan toward Georgia and Turkey.

Makarov and Sokolova (2016) estimate transportation facilities investment of some US $8 billion is required to bring this plan to full fruition on the Kazakh Caspian coast.

In January 2017, the first train finished an 18-day journey over the China-to-Europe landbridge from Yiwu, China, to London, carrying 24 containers (Wu, 2017). Both train and the tiny cargo were symbolic, bringing up broader questions about needs for *transportation*, *handling*, *processing*, *administration and financing facilities* which are still underdeveloped. The best-known facility under development is the Khorgos Gateway project; this, the largest dryport in the world, has been developed on the Chinese side of the border (Feng & Foy, 2017; Higgins, 2018). Chinese leaders have suggested Shenzhen as a model, but this is an incomplete analogy. Shenzhen developed as a manufacturing hub first, then as a financial and logistics center. Khorgos is perhaps better seen as a throughput hub where containers are shifted from one gauge to another, export processing and information management may be accomplished here and routing along to Central Asia and the Caspian route achieved. Ongoing discussions of converting some Kazakh rail lines to the international standard width continue (Silin et al., 2018).

The Khorgos Gateway is an international port which has the potential for high-volume customs clearance as well as transportation, handling, and data administration of transshipments. Khorgos breaks the mold where a dryport has been as near a seaport:

> *as inland freight terminal directly connected to one or more seaports with high-capacity transport means, where customers can drop and pick up their standardized units as if directly at a seaport* (Crainic et al., 2015: 518; see also Roso et al., 2008)

But this is not to say that Khorgos is not connected to a seaport; Khorgos is linked to Lianyungang some 4200 kilometers away, with COSCO Shipping handling the logistics of Kazakh goods transported to that port (Sabayeva, 2015; Uatkhanov, 2017) while Dubai World handles portions of Khorgos Dryport operations.

Logistics of the New Silk Road/BRI will necessitate developing the "four critical forms of distribution: runway, road, rail and river/sea" (Cox,

2009: 150). Including the Caspian Sea ferry route, Kazakhstan will offer all Four Rs, but not at the same place. This lack of co-locational transportation options may lessen, but will not remove, the logistic benefits Kazakhstan has to offer. But investors and others seeking to establish logistics hubs in Kazakhstan will need to understand the steppes and nature of Kazakh feelings about distance. Perhaps Australians and Russians come closest to this sense that a few hours' drive may be considered nearby. In this regard, at or near Khorgos (near in Kazakh terms), three of Cox's "Four Rs" transport systems may come together in a Kazakh co-locational sense: road, rail and runway.

Looking again at Shenzhen's gradual integration into the developing Pearl River Delta region, it began as a low-cost production center with design, marketing, management, transportation, and financial servicing tied to Hong Kong. Travel times between the two required sometimes three hours or more as roads, customs, immigration, and other facilities were underdeveloped and cumbersome. In comparison, present driving times for the 300 kilometers from Khorgos to Almaty require a bit more than four hours, but this could be shortened with higher speed railway and highway development. Almaty is the logical place for logistics HQs as it is the largest city, largest airport and has well-developed banking and business services. Khorgos in combination with Almaty offers the possibility of a massive freeport:

> *In some cases, the free port can become the main driver of national economic development, as the case of Dubai illustrates by combining port, airport and real estate development and creating a free port in a relatively closed regional context.* (Lavissière & Rodrigue, 2017: 6)

Modern freeports are usually seen as seaports, but being a seaport is not a necessary condition. However, developed finance and business services are required (Lavissière & Rodrigue, 2017) to develop synergies through interlinkages between logistics and finance (Kasarda, 2015; O'Connor, 2010; Selmier, 2017). The Almaty-Khorgos linkage would provide the package of transport, logistics and finance which Shenzhen and Hong Kong achieved in the earlier decades of Shenzhen's development and which continues today.

A hub airport is also a key part of a dynamic modern freeport such as seen in Dubai and Istanbul (Kasarda, 2015; Selmier, 2017). Both Kazakhstan and China may benefit from investing in a hub airport at Almaty (or perhaps Nur-Sultan). Almaty and Nur-Sultan combine the advantages of optimal location between Europe and East and Southeast Asia, sound diplomatic relationships between Kazakhstan and China and Russia, well-developed business services and land transport options and the possibility for robust financial markets (many business travelers either work in finance or travel to negotiate financial contracts). To gain a sense of air travel logistics and the centrality of Almaty, Table 7.1 above gives a rough estimate of flying times between important East Asian, Gulf and European destinations with present flights now available through Almaty. It is important to note that jet fuel, landing fees and operational costs are relatively high at present in Kazakhstan but that addressing these higher costs is a focus of Kazakh government officials.

Although Almaty may be a more logical choice for a logistics hub given proximity, financial and business services and a larger airport, the Kazakh government has been attempting to pull more business functions toward the capital of Nur-Sultan. The Astana International Financial Centre (AIFC) officially opened on January 1, 2018. The AIFC provides additional inducements to the development of a wide-footprint Kazakh freeport, including financial operations under British legal standards (nearest alternatives would be Singapore, Hong Kong, offshore operations in UAE and Europe), the Shanghai Stock Exchange as a key strategic partner (holding a 25% ownership share) and trading platform technology provided by NASDAQ (Jenkins & Perzadayeva, 2018; Norton Rose Fulbright, 2018; Voloshin, 2017). To create the logistics and business services of a freeport would necessitate tight coordination between Khorgos, Almaty and Nur-Sultan, which is quite conceivable.

Silk Road Logistics and Politics

> *The Silk Roads were originally defined by Richthofen narrowly and since have become such a ubiquitous term that one wonders what it really means. Obscurity can help a concept as well as hurt it, and so the Chinese (and Americans and others) have adopted it for their own meanings.* (Selmier, 2018: 271)

Politics and governance have always been a key determining factor on land-based Silk Roads ancient and modern and on the maritime routes which have become associated with the modern concepts surrounding the Silk Roads. China's efforts to develop a "string of pearls" of maritime logistics centers (and possible naval bases) have garnered considerable controversy from perspectives involving strategy (Beng, interviewing Wang, 2014: 170–71; Padilla, 2017), incurrence of debt (Hurley, Morris & Portelance, 2018; Lloyd & Partners, 2017) and cultural conflict (Kirişci & Le Corre, 2015; Selmier, 2018). On the one hand, Tony Padilla (2017) has suggested Americans still revere Admiral Mahan's thought—Mahan, the naval strategist whom Teddy Roosevelt followed to build the modern American Navy—that "the destiny of the world will be decided in these (Indian Ocean) waters." On the other hand, China is emerging as an anxious seapower (Wang, 2013) which has caused fears that it seeks to encircle the Indian Ocean.

Logistics experts will factor in this maritime political turbidity to their calculations, realizing that contention on the seas and oceans will increase risks while land-based transport, even if more expensive, may provide a more tranquil setting. And China will also consider this calculus. Even if land transport is more expensive, Chinese firms and the Chinese government will invest in land transport and logistics to hedge bets and provide other transportation routes, thereby lowering transportation costs and underpinning an emerging transportation infrastructure. Kazakhstan, as an island of relative calm in more turbid terrestrial times, will benefit.

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