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Central Asia: Technology & Modernisation
In the context of China's Silk Road Economic Belt Initiative

While China's Silk Road Economic Belt [SREB] initiative can be described as 'win-win'[1], the consequences for technology and the costs to 'Belt' countries are not well understood because they entail many short-term intangibles and long-term uncertainties. In this paper we will deal with four dimensions: the Chinese context, strategic considerations, short term priorities, and the means employed. We start with the context generally and use the case of high speed railways to illustrate these themes. These include lock-in outcomes that go beyond financial dependency and possible detrimental alliance effects. We focus on those aspects of the SREB that touch upon technology considerations within the broader context of China's trade, foreign affairs, and macroeconomic policies.

Context

Since the late 1990s China has been engaged in a concerted and highly successful process of 'catch-up' in many aspects of their economy and society, and in particular in science and technology. Externally signaled by joining the World Trade Organization in 2001, the Chinese economy was able to build upon a base of strong collaborations with European and U.S. high technology joint ventures and the slow accretion of science and technology expertise. Most notably the returns on massive investment in technological education and its consequent dissemination of skilled workers into industry has brought many of China's economic sectors close by, and even to, the head of the worldwide state of the art. These sectors include those using advanced manufacturing processes, construction, digital services and transportation infrastructure. The initial goal for many

commercial participants was to move from competing as exporters of lower-cost goods to satisfying the increasingly valuable domestic market. This was met, for the most part, with remarkable success, to the point where immediate demand was reached and the domestic market could not quickly absorb all potential supply. Although the domestic market will probably continue to grow for the next twenty years, China is currently experiencing overcapacity in a number of sectors such as steel, construction, and many kinds of consumer-goods. This is a consequence of one feature of catching up in that a high proportion of legacy plant is obsolete and so most replacement is done using state of the art technologies. This means that in many areas highly efficient designs are employed that are often able both to improve output and minimise inputs of energy, materials and manpower. China is efficient in producing many of the goods that constitute components of SREB projects, and the impetus to develop new markets within the Belt countries is strongly felt.

Strategy

When, in the 1970s, Japan approached a state of prosperity with rising salaries and increased social expectations, it turned to strategies of planning to move out of low-end production in areas such as consumer durables and of shipbuilding. Over a carefully managed transition period, Japanese shipbuilding was moved to South Korea and some low-wage processes were distributed to that country and elsewhere, such as Thailand and Taiwan.[2] This move was part of the broader strategy to move to lucrative work in technological innovation, higher value-added production, and investments in quality infrastructure. The Japanese society and economy benefited greatly from this transition despite the subsequent long years of slow growth and stagnation and, while it would be wrong to regard China as closely emulating this process, it has absorbed many important lessons. These lessons include: 1) the importance of moving out of low-value production in a carefully managed manner; 2) procedures for disseminating higher-value added processes; 3) finding means to deal with short-term overcapacity. This is the context in which we see private as well as state owned enterprises move to establish production facilities in lower wage countries, first in countries such as Vietnam and the Philippines, later along Belt countries such as Uzbekistan and Pakistan. While much attention is being paid to the Silk Road Economic Belt initiative as a strategy to secure access to raw materials for China's domestic economy and as an efficient export infrastructure, we can emphasise the additional strategic dimension of creating opportunities for long-term

dominance in those features that are associated with China's move into becoming a high technology, high wage, high value-added economy.

The strategy is built upon five 'cooperation priorities'[3], referred to as the 'Five Ways (五通)', each of which might be regarded as a necessary component of any large-scale development scheme, but embodied in the SREB becomes a wholistic approach that helps to explain the position of technology throughout the initiative.

The SREB Five Ways (五通)
• Policy coordination (政策溝通)
• Facilities connectivity (設施聯通)
• Unimpeded trade (貿易暢通)
• Financial integration (資金融通)
• People-to-people bonds (民心相通)

The first two of these, 'policy coordination' and 'facilities connectivity' hold meaning both at the highest level, indicating cooperation in policy making to facilitate major projects, financing and planning, but they also hold implications about the coordination of lower-level policies associated with assessing procedures and practices, many of which are associated with agreeing technical standards. 'Facilities connectivity' is at the heart of the infrastructure policies and has been the motive for pushing for integrated standards and interconnectivity.

Short term priorities

The initial activities of the SREB have set the pace for such coordination. They have focused on infrastructure projects especially with regard to transportation and thus the focus on railways and ports. These have been accompanied by more coordination in the production of two kinds of production facilities, assembly plants such as those recently built in Pakistan by Haier, and privately developed industrial parks catering for both local and foreign, especially Chinese companies, in various countries.

The means employed

While the details are important, more important currently are the mechanisms by which they are to be delivered. The primary mechanism are those associated with finance and trade agreements. For this the Asia Infrastructure Investment Bank [AIIB] and the Silk Road Fund are fundamental. Their investment decisions are very largely based on long-term risk assessments, often at the expense of normal calculations of return on investment, and two of the key criteria are the background trade agreements and the willingness of partners to coordinate through technical standards and promote connectivity.

In practice this has entailed jointly developing international standards, such as those shown in agricultural standards demonstration zones targeting the ASEAN markets as a way of promoting its agricultural standards and management experience. The Standardization Administration of China (SAC) signed the standardization cooperation agreements with the standardization agencies of Mongolia, Kazakhstan, Singapore, Tajikistan, Armenia in 2015 as the foundation for the extended coordination of Silk Road standards alignment. In 2016 the China-UK Standardization Cooperation Commission Meeting in Chengdu set the agenda of implementing the Agreement on Standards Mutual Recognition between the SAC and the British Standards Institute (BSI). One of the first extensive tests of this coordination of trade and standards, backed by Chinese-initiated financing, has been the railway system.

Case: Railway system development within the SREB

When The first China-to-Britain freight train arrived on 18 Jan. 2017, having traversed a 7,456 mile journey from Yiwu to London in 18 days, it illustrated the efficacy of technology projects within SREB. That trip took place in around half the time required for sea transport and was the consequence of negotiated passage through Kazakhstan, Russia, Belarus, Poland, Germany, Belgium and France. While the first train contained only £4 million worth of clothes and other goods in 34 containers, it demonstrated the potential of the use of rail to transport goods throughout the whole of the route.

Behind this trip lies a story of domestic Chinese rail infrastructure growth on a massive scale. In total, China's high-speed railway network measured over 22,000 km in 2017 and

constituted about 60 per cent of the world's total. While most of that infrastructure is only indirectly related to the SREB elements, some elements that provide high speed rail lines to the China's western border were prioritized because of their significance as links to Central Asia. The final 401 km high speed rail line between Baoji in Shaanxi province and Lanzhou in Gansu province opened on July 9, allowing links with the existing line from eastern China to Xi'an and Baoji (open in late 2013) and the 1,776 km route from Lanzhou to Urumqi (opened in 2014). The high speed line extension frees capacity to enable more freight to be carried on the conventional line to the western border and on through Central Asia. The rapid growth of the Chinese domestic high speed rail system is itself a consequence of the coordinated effects of imported railway technology, concerted efforts to accelerate the domestic technology capabilities, and highly focused policies at national and local levels to ensure unfettered infrastructure build-out. Initially technologies from Siemens (Germany), Bombardier (Canada), Alstom (France) and Kawasaki (Japan) dominated Chinese high speed rail production. Subsequently, standards migrated to Chinese forms, centred on railways[4] that travel on newly built dedicated rights-of-way either at speeds up to 250 km/h ('D series') or up to 350 ('G series). These Chinese standards promoted by domestic producers have been strongly promoted by Premier Li Keqiang, who is sometimes referred to as 'the high speed rail salesman'.

This development has been accompanied by new standards established by Chinese manufacturers and supported by the state in technologies including details of electrical units, braking systems and related areas of engineering. A major advantage to adopting such standards is that it reduces maintenance costs and provides a stable platform upon which further innovation can take place domestically. It also provides domestic producers marketing advantages and forces foreign suppliers to comply with Chinese standards if they wish to sell to the rail system. By applying these standards throughout the whole route, it offers the opportunity for Chinese developers to export to the transited countries. There are cases where the Chinese standards are not only different from but significantly incompatible with Japanese and European standards.

While the benefits of the rail system are clear in terms of relatively low cost, high construction speed and advanced technical capabilities through a vertically integrated organizational structure, there are concomitant disadvantages. Most of the high value

added processes associated with design, consulting, financing and especially standards setting are held by Chinese participants while the low value provision of basic building materials and lower-skilled labor are provided by SREB partners.

Conclusion

The momentum associated with the Silk Road Economic Belt, especially felt in Central Asia, is associated not only with trade treaties, cooperation agreements and financing contracts but arguably more importantly through the coordination of technological systems. The key to such coordination is in the adoption of standards that lock in participants to a single set of procedures, design principles and practices. Who determines, for example, the railway gauge, the dimensions of tunnels and train stations, the load capacity of railway cars and other such criteria controls not only the sourcing of materials and designs, but also the long term future of such systems. While international coordination of all such systems are evidently beneficial, at least in the medium-term, as is evident in the interoperability of mobile telephone services, the agenda setting strategies are uniquely central to the SREB initiative and extend throughout the program, well beyond engineering specifications.

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- [4] A definition of HSR (International Union of Railways, UIC)

- A combination of three elements – infrastructure, rolling stock and operations – that meet the criteria of the EU standards (EU directive 96/48 appendix 1 (1996))
    - Infrastructure: built or upgraded specially for high-speed travel; a new system with a dedicated right-of-way … the speed capacity equal to or greater than 250 km/h, whereas an upgraded one with the speed capacity of 200 km/h
    - Rolling stock: designed to support safe, uninterrupted travel at a speed of at least 250 km/h on a dedicated right-of-way…
    - Operation: requiring compatibility of infrastructure and rolling stock to meet performance level, safety, quality of service at the above speed capacities (signaling and communication systems increasingly important)