Influence and Infrastructure
The Strategic Stakes of Foreign Projects

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A Report of the CSIS RECONNECTING ASIA PROJECT
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Introduction

British prime minister Margaret Thatcher explained to a London audience in 1985, “You might have heard a lot lately about “infrastructure”—the new ‘in’ word. Some of you might even ask exactly what it is. You and I come by road or rail. But economists travel on infrastructure.”

That word is making a comeback. Around the world, and especially in Asia, countries are racing to build new railways, ports, pipelines, fiber-optic cables, and other infrastructure and to reap the benefits that come with greater connectivity. The Association of Southeast Asian Nations (ASEAN), China, Japan, South Korea, Turkey, Russia, and others have unveiled ambitious initiatives for regional connectivity. Countries with more connections to global flows of trade, finance, people, and data grow by up to 40 percent more than less-connected countries. Linking communities and powering businesses, infrastructure is often described as the backbone of economies.

But the stakes extend beyond economics, as recent developments show. China’s port investments in the Indian Ocean have set off alarms, and its attempt to extend a road near a disputed border with Bhutan led to a military standoff with India in 2017. Citing security concerns, Australia is bankrolling its own fiber-optic cable to Papua New Guinea and the Solomon Islands. South Korean president Moon Jae-in has proposed connecting to North Korea’s railway network as part of his strategy for regional peace and economic integration. Countless other examples, from proposals for new pipelines to changes in port management, underscore the strategic importance that infrastructure projects can carry.

Increasingly, foreign policy experts travel on infrastructure, but they lack a reliable map. The literature on the economic implications of infrastructure is robust, but it is relatively thin when considering strategic implications. There is research on related issues, especially foreign aid and finance as elements of economic statecraft. No one appreciates the strategic importance of infrastructure more than military logistics, for whom supply lines are a matter of life and death. But with a few important exceptions, little has been written about infrastructure as a foreign policy tool. Without a framework for thinking about the strategic aspects of foreign infrastructure, defined broadly to include projects pursued by actors outside their home markets, it is difficult to formulate policy for competing in today’s global infrastructure contest.

This report takes a small step toward filling that gap by illustrating how states use foreign infrastructure to advance strategic objectives. Specifically, it takes an initial look
at connectivity infrastructure in three sectors: transportation, energy, and information and communications technology (ICT).\textsuperscript{12} The report’s primary perspective is the foreign state pursuing infrastructure projects—as a financier, builder, owner, or operator—during peacetime. Host state conditions are noted primarily as they enable or constrain the foreign state’s objectives. With an eye toward illuminating current issues, this report draws from examples throughout history. While technology has changed, opening new avenues for influence and restricting others, there is plenty from the past that rhymes with today’s projects. Most strikingly, China is updating and exercising tactics used by Western powers during the nineteenth and twentieth centuries.

Influence is explored through three stages of the infrastructure project cycle, from the perspective of the foreign state, as Figure 1 summarizes below. Financing is the first and broadest avenue, providing the opportunity to extract diplomatic concessions, reward supporters, shape project plans, access resources, and gain operational control. The second stage, design and construction, provides an avenue for setting standards, transferring technology, and collecting intelligence. During the final stage, ownership and operation, which are considered together since the owner selects the operator, can be leveraged for deeper intelligence collection and to restrict or deny a competitor’s access. States can accrue more influence as their firms own and operate a broader network of infrastructure assets, becoming more resilient to disruptions and monopolizing critical skills and technologies. Network advantages can become even more valuable during conflicts, disaster response, and other contingencies. In practice, avenues for influence often overlap, with financing tied to construction and operation. This report notes those connections but considers each phase separately to highlight different mechanisms for exercising influence.

\textit{China is updating and exercising tactics used by Western powers during the nineteenth and twentieth centuries.}

\begin{figure}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
\textbf{Stage} & \textbf{Finance} & \textbf{Design & Construction} & \textbf{Ownership & Operation} \\
\hline
\textbf{Strategic Objectives} & Win political concessions & Set standards & Collect intelligence \\
\hline
Reward supporters & Transfer technology & Restrict access & \\
\hline
Set standards & Collect intelligence & Adapt to disruptions & \\
\hline
Access resources & & Monopolize skills & technologies & \\
\hline
Control operations & & & \\
\hline
\end{tabular}
\caption{Avenues of Influence}
\end{figure}

A few caveats are needed. First, most projects are not strategically important. For every Hambantota Port, a case that is examined in this report, there are scores of rural roads that serve their intended economic purposes. Understandably, they generate fewer headlines. Second, there are examples of infrastructure projects pursued primarily for their economic benefits that also confer strategic benefits. The political benefits of successful ownership and operation are examined briefly in this report but deserve further attention, especially the conditions that help translate commercial success into political success. Third,
illustrating how infrastructure can be used to advance non-economic objectives should not be confused with endorsing those methods. Indeed, gaining a better grasp of these mechanisms should help policymakers prevent, detect, and counter non-economic projects that are being pursued under the guise of supporting development.

By focusing on exceptional cases, this report aims to provoke a deeper discussion of the strategic implications of infrastructure, particularly among U.S. national security officials and scholars of international relations. In that spirit, a final section concludes with recommendations for further research. Among other related issues, there is a pressing need for work that helps conceptualize how outside influence could be minimized or countered in developing economies, where infrastructure demands greatly exceed the availability of financing options. With developing Asia alone requiring $26 trillion in additional infrastructure investment by 2030 to maintain growth momentum and adapt to climate change, these issues, and the strategic implications they carry, are likely to intensify in the coming years.
Finance

Infrastructure financing is the broadest avenue for exercising influence, which this section explores as it relates to three stages of a loan. The first and most important phase is the negotiation of terms, through which a lender can extract political concessions, shape project specifics, and set repayment terms. The second phase is the disbursement of funds, which allows a lender to reward supporters or withhold funding. The third phase is repayment, which can be leveraged if the recipient is overly indebted and unable to fulfill the initially agreed upon terms.

Financiers exercise influence well before any funds are transferred. To attract foreign investment, recipient countries often make concessions before formal project negotiations are started. In recent years, for example, the prospect of Chinese infrastructure loans has helped persuade the Philippines and Cambodia to reevaluate military or diplomatic ties with the United States. Following actual investments, and the promise of additional funds, Greece, Hungary, and Poland have softened European Union’s statements on China’s human rights record and territorial claims. In practice, it is difficult to disentangle concessions made to attract investment in general versus those made to attract investment for specific projects. Prospective borrowers are always competing for the attention of foreign investors.

Several conditions impact a financer’s influence during project negotiations. The greater difficulty a recipient country faces in attracting investment, the greater influence a prospective financier wields. The size of the proposed investment matters as well. State lenders usually accumulate influence through a portfolio of projects rather than one-off investments. There are exceptions, however, particularly among smaller economies pursuing high-speed railways, large pipelines, and other big-ticket projects. Laos, for example, is building a high-speed railway with Chinese financing that is roughly half of its GDP. The speed of the investment and the recipient’s existing debt levels are two additional conditions that are considered later in this section.

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Bilateral financing models favor lenders. To be sure, multilateral lenders still wield influence over recipient countries, and they are not immune from their leading members
pursuing geopolitical objectives. But in multilateral deals, the influence of any single state is generally less than in bilateral projects deals. Indeed, one strategy for diluting a lender’s influence and minimizing negative impacts is partnering with that lender, turning bilateral deals into multilateral deals, and ensuring that multilateral deals are not concealing other motives. By this logic, states skeptical of the Chinese-led Asian Infrastructure Investment Bank (AIIB) have more influence over its decisions as participants than as outside critics. Yet for all the attention the AIIB has received, it has invested only $7.5 billion as of December 2018, while China’s Development Bank, a leading bilateral lender, has already invested $110 billion in countries participating in the BRI and promised to invest another $150 billion over five years. Given that imbalance, most of the dynamics explored in this section are done so with bilateral lenders in mind.

Guarantees and Conditions

Lending terms can set the stage for larger concessions than the recipient intended. The domestic analogy of loan-sharking illustrates the basic dynamics. Loan sharks lend at a high rate, on relatively short periods, and encourage renewals and refinancing. The goal is not for the borrower to repay the principle, but for the interest payments to continue, functioning like an annuity for the loan shark. But states are not individuals, of course, and they have several options available to deal with bad debts, including finding alternative creditors, offering public assets as payment, or defaulting.

During the nineteenth and early twentieth centuries, European powers frequently pressed for unrealistic lending guarantees. In India, Britain guaranteed 5 percent profits for its railway companies, with the Indian Treasury paying any deficit. In Turkey before World War I, Germany and France secured hefty guarantees from the Ottoman government for each kilometer of railway, extensive mining and construction concessions, and the right to import their own construction supplies and technical experts. Lenders argued these concessions were necessary, and when the parties sat down at the negotiating table, it was the lenders that had highly-trained accountants, lawyers, and other specialists on their side to help justify the guarantees.

The net effect on the host country could be disastrous, as Turkey’s experience highlights. In the early 1920s, a general manager of the National Bank of Turkey explained all the groups that profited from the loan and concession system at Turkey’s expense, noting: “the concessionaries . . . received in payment shares which they promptly converted into cash . . . the financial groups associated with the concessionaries made money . . . the railway contractors made money . . . the [debt] holders sporadically received interest.” As for Turkey itself, the manager noted, “the debt charges of an already more or less bankrupt country were increased.” This was the natural result of a system in which powerful foreign groups faced little effective oversight.

Modern international financing guidelines are intended to limit these risks for recipients, but not everyone subscribes to the same rules. The Organisation for Economic Co-operation and Development (OECD) prohibits its members from engaging in these types of activities. Specifically, OECD guidelines limit the use of tied aid (which requires that money being lent is spent in the lending country), regulate credit practices, impose maximum repayment terms, set minimum interest rates based on country
risk classification, and include social, environmental, and governance standards. Unintentionally, these guidelines provide an opening for countries not bound by them. Limiting repayment terms, for example, can discourage lenders from supporting riskier projects, which naturally require a higher rate of return. Lenders not bound by those guidelines have fewer competitors in riskier markets. The preferred solution is not to lower or remove these guidelines but to extend them to all major lenders, but that has proved difficult in practice.

Lenders can also shape project specifications in ways that advance their own interests. For example, if a lender pushes the recipient to expand the scope of a proposed project, it can increase the overall size of the required loan. Unsolicited proposals, in which a lender proposes a project rather than the recipient, are especially vulnerable to specification inflation. A lender might also have a strategic interest in ensuring that a certain standard is used for the project, as the section on design and construction explains in greater detail. Standard setting can happen from the top down, as required by a lender, or from the bottom up, as a consequence of contracting decisions.

Financing negotiations can impact contracting decisions as well. This can occur indirectly, as project specifications and rules for evaluating bids among contractors are decided. Lowest-cost estimates, for example, will favor proposals that promise to deliver a project cheaply, without regard to costs for operating and maintaining the project. Life-cycle estimates take a longer view and include those costs, favoring proposals that might cost more initially but require fewer additional expenditures after construction. Decisions to include or exclude environmental and social impact evaluations, and how those evaluations are carried out, can also tilt the playing field toward the financier’s preferred contractor.

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There are more direct approaches to influence contracting decisions. Through tied aid, a lender can make using its firms a precondition for the deal. China has been effective in using both direct and indirect means to favor Chinese construction firms along the Belt and Road. A CSIS analysis found that Chinese-funded infrastructure projects disproportionately favored Chinese contractors at the expense of local contractors. This can shift the project’s economic benefits toward the lender, benefitting foreign contractors and leaving the recipient country dependent upon the foreign lender’s capabilities and expertise. There are plenty of historical precedents for these tactics. According to one estimate, 40 percent of the capital raised for India’s colonial-era railways was spent in Britain. The strategic stakes of design and construction decisions are explored later in this report.

**Controlling Funds**

The second contract phase is the disbursement of funds, which a lender can expedite or delay. Research suggests that electorates reward incumbent governments for completing
projects in visible sectors, including basic infrastructure. Those incentives can provide leverage for a foreign lender, which could agree to expedite the funding for projects in key districts. Of course, these efforts are not always successful. For example, former Pakistani prime minister Nawaz Sharif announced a major effort to deliver power plants before his unsuccessful 2018 reelection bid, including 10,000 megawatts from Chinese-backed projects. Conversely, if a lender favors a new government, funding could be halted for existing projects or existing pledges for funding could be delayed.

Contracts are intended to limit uncertainty about disbursement, but in practice, many projects encounter difficulties that can lead to disputes. About 32 percent of joint construction ventures experience a dispute, according to the consulting firm Arcadis. The average dispute takes 14 months to resolve and costs nearly $43 million. Globally, the most common reason for construction disputes is failure to properly administer a contract. Next on the list are poorly drafted or incomplete claims, failure to comply with obligations, and errors or omissions in the contract, respectively. Legitimate or not, disputes can provide legal cover for a lender to halt the disbursement of funds for non-economic purposes.

How a lender handles corruption is another potential source of influence in the disbursement phase. Large infrastructure projects provide ample opportunities for skimming. One expert has identified 13 reasons why construction is prone to corruption, including the size of projects, government involvement, number of contractual links, project complexity, the concealment of work, and entrenched national interests, among other reasons. Exact estimates are difficult to obtain, given the nature of corruption, but one suggests the extractive sector, which includes oil and mining, is the most corrupt sector in the world. The same estimate suggests that construction and transportation are the second and third most corrupt sectors, respectively.

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In this murky environment, lenders have three basic options for dealing with corruption: counter, tolerate, or encourage. A lender might halt funding when evidence of corruption emerges to promote better governance in the host country, avoid legal and reputational risk, and minimize commercial losses, among other reasons. When evidence surfaced of corruption in Bangladesh’s largest development project, the Padma Bridge, the World Bank, Asian Development Bank (ADB), and other organizations placed conditions on continued funding, including putting officials on leave, appointing a special inquiry, and providing access to information from the investigation. When those conditions were not met, they withdrew funding.

Alternatively, a lender could allow funding to continue. If the project carries a high strategic value, for example, or if revealing corruption would jeopardize other objectives, the lender might express its concerns privately and refrain from taking public action. The
The U.S. special inspector general for Afghanistan reconstruction has faulted U.S. officials for making these tradeoffs early on during the war, writing, “Policymakers tended to believe that confronting the corruption problem—for instance, by taking a hard stand against corrupt acts by high-level officials—would impose unaffordable costs on the U.S. ability to achieve security and political goals.” Others have argued that these tradeoffs were necessary given the primacy of U.S. security goals and the reality of existing practices in Afghanistan, including patronage networks.

A lender could actively encourage corruption. For example, a lender looking to exercise additional political influence through the disbursement of funds could inflate project costs with the understanding that officials or other participants in the project would benefit. In extreme cases, the primary motivation for a project is funneling resources to favored individuals. In one recent example, as part of a broader corruption probe, Malaysia’s government is investigating missing payments for pipeline projects. Malaysia’s 2018 election, in which Mahathir Mohamad, the opposition candidate and now prime minister, made Chinese loans a major issue during the campaign, also highlights the risks of this approach. Even if these tactics yield short-term political concessions, they can also create long-term blowback, destabilizing institutions, eroding public trust, and damaging a lender’s reputation.

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Debt

The third and final contract phase is repayment. Repayment might simply entail a recipient country paying back its loans on schedule. Lenders can also structure loans around the delivery of commodities or other natural resources. Sometimes called the “Angola model” or “resource-financed infrastructure,” this approach can carry a higher debt burden for host countries, since interest often continues to accrue after project construction has been completed, at which point resource development activities begin. Only when the pledged resource revenue stream starts does the borrower start to effectively repay the loan. China has used this model extensively in Africa, but it is far from the first to do so. In ancient Greece, a foreign contractor was hired to drain a marsh and granted exclusive rights to develop and harvest the land for 10 years. Public-private partnerships are now used for a wide range of projects that generate revenue, from toll roads to airports, power infrastructure, and telecommunications assets. When projected revenues fall short, government funds are often required.

Debt is another source of leverage. When borrowers are unable to repay, lenders have an opportunity to ask for financial concessions, bargain for equity in a project, or extract non-financial concessions as part of the renegotiations. In 2017, for example, when Sri Lanka was unable to repay China, the countries agreed to a debt-for-equity deal that reduced Sir Lanka’s debt by $1.12 billion and gave China a controlling stake in Hambantota Port and a 99-year lease for operating it. When these transactions are done amidst financial distress, and without full transparency, they understandably...
trigger concerns about sovereignty. Sri Lanka’s leaders never intended to borrow money for a port that would be owned and operated by a foreign country, but each loan was too tempting to turn down.44

Sri Lanka’s experience illustrates how a lender can exercise influence during the repayment stage even when it is not a country’s leading lender. When it agreed to a debt-for-equity deal, China only held roughly 10 percent of Sri Lanka’s foreign debt stock. In comparison, the World Bank held 11 percent, Japan held 12 percent, and the Asian Development Bank held 14 percent.45 The largest share of Sri Lanka’s foreign debt is bond issuances and term loans.46 Despite not being the leading creditor, China’s influence stemmed from two factors. First, Sri Lanka’s overall debt levels were unsustainable, and secondly, it was looking for relief. China contributed significantly to that problem because of the speed at which it lent. In 2008, China only held 2 percent of Sri Lanka’s debt. But between then and 2017, the beginning of its renegotiations over Hambantota port, it lent $8 billion,47 raising its overall stake as other lenders were calling for caution.48 The lesson is that the scale of lending matters but so does speed.

Critically, China was also willing to accept a form of payment that other lenders were not. For example, the ADB has three major financing guidelines: it seldom takes an equity stake larger than 25 percent of total share capital, it will seldom be the largest single investor in an enterprise, and it will not assume responsibility for managing an enterprise. In the case of Hambantota port, a Chinese state-owned firm took an 80 percent share, becoming the largest investor, and assumed responsibility for managing the enterprise.49 Equity and management responsibilities are not without risks, of course, but they provide flexibility for negotiations. A lender’s influence increases when it can accept a wider range of terms.

The risks that infrastructure lending poses for borrowers are not new, as Britain’s lending to Egypt highlights. Between 1862 and 1875, Egypt’s external debt increased 23-fold, as it borrowed heavily for infrastructure projects, including the Suez Canal.50 During this period, European banks were issuing loans to the Egyptian government at effective rates ranging from 7 to 10 percent.51 By 1868, Egypt’s debt had become unsustainable, but its government continued to borrow, and in 1873, it took out the largest loan in its history. Two years later, it was forced to sell its 45 percent stake in the Suez Canal to Britain.

Ultimately, Egypt’s infrastructure binge came at the expense of its sovereignty. When Egypt went bankrupt in 1876, its creditors moved to take control of its governing functions. A commission was established to service Egypt’s debt, and its members were nominated by Austria, Britain, France, and Italy. Representatives from Britain and France were put in charge of the government’s revenue and expenditures. International administrators oversaw Egypt’s railway and port commission. As one scholar summarizes, “The political consequence of all these new regulations was . . . [a] government by an executive council whose leading members were foreigners.”52

The economist Thomas Schelling once observed that burglars steal what we have, while loan sharks sell what we want.53 But for global projects, those lines are easily blurred. When foreign powers offer infrastructure loans, they sell what developing countries want.
When those loans cannot be repaid, foreign powers can “steal” what developing countries have: taking control of assets and either directly benefitting from their operations or using unrepayable loans to influence the host government’s actions.

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Design and Construction

States designing and building infrastructure beyond their borders can advance their strategic interests in at least three ways: standard setting, technology transfer, and intelligence collection. Although private firms are typically the most important actors in this phase, they can independently help set standards and develop expertise that bring broader benefits to the countries where they are headquartered. State-owned enterprises can do the same, and their closer relationships with government agencies provide an even wider window for intelligence activities.

Standards

Standard setting can be tied to financing, as noted earlier, but it can also occur during project design and construction. Even decisions about who manages a project can impact what standards are used and where supplies are sourced. For example, a major section of the Baghdad Railway, financed by Germany and built through Turkey, relied almost entirely on German suppliers. By 1914, German suppliers had provided the rolling stock, approximately 200 steam locomotives and 3,500 freight or passenger cars. German dominance of the material used was not only due to its financing of the project, but also because the construction was overseen by a manager who graduated from an engineering school in Saxony. The manager was using the supplies he was trained to use.

Standards determine whether the host country’s infrastructure is compatible with the foreign state’s infrastructure, enabling or restricting access. For example, China and Russia use different railway gauges, creating a dilemma for Mongolia, which sits between them and has a mining industry that relies on railway transport. As Mongolia seeks to strike a balance between its two larger neighbors, debates over which gauge to use have
touched broader security concerns. Mongolian president Khaltmaagiin Battulga, who previously served as transportation minister, made this a signature issue during the 2016 election, saying, "Tanks can easily penetrate Mongolia in no time if we build a railway with a [narrower] gauge track, the same used in China." While the threat was naturally overstated for political effect, and Battulga has softened his criticism of China since taking office, it highlights how decisions about standards can be political as much as technical.

For economic and strategic reasons, the European Union is funding a new railway, Rail Baltica, to connect Poland and three Baltic states. The Baltic states—Estonia, Latvia, and Lithuania—were once part of the Soviet Union, and despite joining the European Union in 2004, their railways are compatible with Russia’s network and not the European Union’s. This requires rail cargo to be swapped at the Lithuanian-Polish border. A seamless connection is expected to reduce commercial shipment times and has also been explicitly tied to military mobility. The Baltic states are also members of NATO, which supports construction of the railway to increase its ability to move troops and personnel. Russian state media have tried to cast down on the project’s economic merits, suggesting that NATO will be the only beneficiary. The challenge that Rail Baltica is addressing underscores the long shadow that infrastructure decisions cast. Once adopted, standards are often difficult to change, even if a more practical or advanced technology becomes available.

Decisions about standards can impact security interests even if they are not strategically-motivated. Popular legend holds that Tsarist Russia chose a different gauge to defend against invasion. In truth, it is more likely that the decision was initially made for efficiency and safety reasons. As more track was constructed, the cost of switching to standard gauge became more prohibitive. That path-dependency became an asset during World War II, when German engineers occasionally struggled to convert the Russian railways to the standard gauge that was compatible with German trains. Similar operational complications arose during the U.S. Civil War, when there were 23 different railway gauges in use across the United States. Many of today’s choices about standards, such as which 5G technology to adopt, have implications well beyond the immediate technology at hand, impacting a wider array of related technologies and shaping what might be thought of as a broader “ecosystem.” As a result, switching costs becoming higher and higher.

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Of course, the importance of standards for enabling or restricting access are not limited to railways. Standards for electricity grids can enable or complicate regional power trading agreements. Oil and natural gas vary widely in quality and composition, creating the need for common standards to promote interchangeability. The United States, China, European Union, and Russia all have different global navigation systems and interests in expanding these systems to other countries. China has made expanding its BeiDou navigation system a
priority for countries participating in the Belt and Road. As the third section of this report will consider, owning and operating these systems confers strategic advantages.

Technology Transfer

States can exercise influence through transferring technology and related expertise. As one scholar observes, technology is “not only artifacts but also the body of skills, knowledge, and practice that make them work.” For example, an agreement to build a nuclear power plant typically comes with a package of long-term contracts to operate, maintain, and even refuel the plant. These agreements can also include regulatory consulting, which allows a foreign state to help shape the laws governing strategic sectors, as Russia has done for Turkey’s nuclear power sector. After the plant is operational, suppliers can threaten to raise the price of fuel or close the reactor. This leverage may decline over time, as the host country trains more technical specialists.

The impact of new technology depends on the supplier’s willingness to encourage local development. As the historian Daniel Headrick has argued, there is a difference between technology transfer and technology diffusion. The latter requires education and training, which foreign states may attempt to monopolize. During 1850-1940, European powers restricted technical education opportunities and discouraged non-European entrepreneurs, contributing to underdevelopment in colonial territories. For example, the French-backed Suez Company, which Egypt granted a concession for developing the Suez Canal in 1854, made little effort to develop a local workforce. As one scholar writes, “Investments were made in physical, but not human, capital,” such that, “the concession did not serve the national economy, but, on the contrary, favored European capital, widening the gap between the economic structures of rich and poor countries.” Restricting access protects the foreign state’s technological edge and prolongs the host’s dependence on foreign support.

Conversely, technology diffusion has been pursued to strengthen partners and signal solidarity. In 2008, the U.S.-India nuclear deal carried commercial incentives for both sides, but its advocates also touted the exchange as strengthening the U.S.-India strategic relationship. In 2017, Japanese prime minister Shinzo Abe visited Indian prime minister Narendra Modi’s home state to lay the foundation stone for a high-speed railway. The 500-kilometer bullet train using Japanese financing and technology will link Mumbai and the industrial city of Ahmedabad. Modi called Japan “a true friend” and the train a “symbol of new India.” Abe agreed, saying, “The project symbolizes India-Japan friendship.” The project includes a training institute for developing India’s operation and maintenance services for the railway, underscoring Japan’s commitment to local capacity building.
Intelligence

Finally, states can use the design and construction phase to collect intelligence. Designers and contractors have access to detailed information, which can become valuable during contingencies. For example, Soviet intelligence agents produced highly-detailed maps that included not only a bridge’s basic location and dimensions, but also its height above water, the construction material used, its weight limit, and other details. Advances in satellite technology have increased the amount of information that can be gathered remotely, and other technology has allowed plans to be copied more easily, but specialized information available to contractors is still valuable. Foreign contractors can also collect intelligence unrelated to the project they are using for cover. Although not unique to connectivity infrastructure, this challenge is growing as more sensors and other technology is embedded into physical infrastructure.

Detailed information about a project might provide insights into an adversary’s intentions and capabilities. During the Cold War, the United States and the Soviet Union invested heavily in intelligence activities to determine each other’s nuclear strike capabilities. One avenue was recruiting technical experts and construction workers involved in nuclear infrastructure development. To limit the risk of foreign intelligence, the Soviet Union relied heavily on prison labor, preferring workers with at least five-year sentences and sending them to remote regions when they finished. Given that most infrastructure is dual-use, it can be difficult to determine a project’s primary purpose and whether non-commercial enhancements are being made. In some cases, technical information might reveal design choices that favor military or commercial activities.

This knowledge can be used to improve operation of foreign systems or to impede an enemy. Operating foreign infrastructure is challenging. A study of U.S. army railway operations from the Civil War to Afghanistan and Iraq concluded, “In all cases there have been delays and difficulties due to cultural, language, and equipment differences.” Even during the U.S. Army’s second deployment to Kosovo, in 2000, engineers had to examine bridges on site and discovered that some would not reliably hold the loads they planned to move. Detailed information can also be used to destroy or disable infrastructure. Bridges, railway hubs, and power stations are often early targets in conflicts. Cyber capabilities now make it possible to disable, disrupt, and even destroy aspects of physical infrastructure without kinetic force.

Another method for intelligence collection during the design and construction phase is planting surveillance technology. After spending $23 million to build an embassy in the Soviet Union during the 1970s and 1980s, the United States spent more than twice that trying to neutralize listening devices, including some that were so deeply planted that they could not be removed from the building’s structure. A U.S. Senate committee in 1987 called it “the most massive and skillfully executed bugging operation in history.” Ultimately, the building was scrapped and a new one was built that finally opened in 2000. It is now more common for states to insist on importing their own construction workers and materials when building embassies. Although embassies are not connectivity infrastructure, these basic challenges apply to other types of large projects near valuable sources of information.
Bridges, railway hubs, and power stations are often early targets in conflicts.

As technology changes, so do the opportunities for surveillance during the design and construction phase. In January 2018, for example, reports surfaced that servers in the African Union Headquarters in Addis Adaba, Ethiopia were secretly transferring confidential data to Shanghai every night. The building had been operational for five years before the breach was made public, and officials reportedly kept the discovery secret for a year, perhaps to limit diplomatic fallout. The African Union issued a statement denying that China bugged the building, but replaced the building’s computer system and took additional security precautions. While the details of the case are officially disputed, no one denies that China funded, designed, and built the headquarters, or that a diplomatic facility would be a prime target for intelligence gathering.

While embassies are obvious targets, other infrastructure projects provide surveillance opportunities as well. German, Swedish, and U.S. officials have warned that Nord Stream 2, a proposed gas pipeline from Russia to Europe across the Baltic Sea, could be outfitted with Russian surveillance devices. “When we look at the ability of governments and companies to use infrastructure deployments as a means to convey devices and technologies that can listen and follow and monitor, that is a concern with regard to this particular undersea pipeline project in the Baltic Sea,” Sandra Oudkirk, the U.S. deputy assistant secretary of state for energy diplomacy, said in May 2018. Infrastructure projects, therefore, are not just single function and dual-use, meaning they can perform the same function for commercial or military purposes. They can be multifunction, providing a platform for primary and ulterior functions.

ICT infrastructure is a natural target for intelligence collection. Specialized knowledge of how communications systems are designed makes it easier to surreptitiously access them. More active involvement in the design of these systems can allow states to construct “backdoors” that allow them to bypass normal security protocols. These risks can arise during both software and hardware design and development, creating challenges for supply-chain management of the components that go into infrastructure projects. Reflecting these concerns, in August 2018, Australia banned Chinese state-affiliated firms Huawei and ZTE Corporation from its 5G mobile network. Far from being limited to ICT projects, this increased scrutiny is likely to impact more infrastructure types in the future.

In the coming years, the Internet of Things and related developments that incorporate more sophisticated sensing technology into highways, electric grids, and other...
connectivity infrastructure could boost productivity but also create new security challenges. These technologies can be leveraged to increase the security of infrastructure projects during their design and construction, but new systems also create new risks. As one computer security expert said in 2000, “The future of digital systems is complexity, and complexity is the worst enemy of security.” Of course, many projects do not offer surveillance rewards commensurate with the investment and risk required for intelligence collection. But functionally, “smart” infrastructure is surveillance infrastructure. Whether it is an asset or threat hinges on what is being collected and who is watching.
Ownership and Operation

States can leverage ownership and operation of individual projects as well as larger sets of related projects. Individual projects can aid intelligence activities and limit a competitor’s access to strategically important territory. States accrue more influence as they own and control a broader network of infrastructure assets. These “network advantages” can include reputational benefits, resilience to disruptions, and dominance of strategically-relevant skills and knowledge. Owning or operating a network also carry risks, including vulnerabilities to personnel and assets in dangerous areas as well as reputational damage if operations are not perceived to benefit local communities. This section considers each of these in turn.

Intelligence

Intelligence operations can benefit from the access that ownership and operational control provides. There is a long history of countries using commercial ports for intelligence operations, whether to gain information or conceal the movement of goods or people. In the early 1850s, roughly a decade after Canton (modern Guangzhou) was established as one of five Chinese treaty ports, British officials were operating an intelligence network from there using local agents.85 As a declassified U.S. government intelligence review summarizes, "It is common knowledge that intelligence services use seamen of their own or friendly countries’ merchant fleets to make clandestine port observations in denied areas."86 Ownership and operational control is not essential for these methods, but it does make avoiding detection easier.

A foreign state’s ability to use these tactics hinges on the counter-intelligence and governance capabilities of the host state. Many states have policies that prohibit foreign companies from owning or operating critical infrastructure. In less critical cases, they rely on domestic security personnel and procedures to limit security risks. Of course, port security challenges are not new. Aware that merchants could gather useful intelligence, the Carthaginians limited Roman traders’ movements and mandated that sales occur with a government official present.87 Countries hosting foreign-owned and operated ports still use their own border security and customs agents.

Signals intelligence is another concern in recent debates about foreign ownership. When a Chinese firm acquired Australia’s Port Darwin in 2015, for example, some observers worried it would become a foreign listening post. As one analyst explained, “Even if communications could not be decoded, this information could be logged so that in a
future conflict a foreign power could register that emissions were from a particular type of communications system aboard a particular ship. By referring to a computer library, an enemy would know that ship was in the area and to some extent what it was capable of. The proximity of a port to major shipping lanes, military installations, or other high-value targets could increase its utility for signals intelligence.

Aware that merchants could gather useful intelligence, the Carthaginians limited Roman traders’ movements and mandated that sales occur with a government official present.

Access Denial and Ownership Risks

States can acquire an infrastructure asset to deny a competitor from possessing it. This zero-sum approach can be economically disastrous for the host county because the primary motive is not to make the asset commercially successful but to take it off the table. In 1900, Russia obtained rights from Turkey to construct all railways bordering the Black Sea, with the exception of those already granted to Germany. But Russia directed its resources toward developing its own domestic system rather than Turkey’s. The rights in Turkey were obtained first and foremost to prevent Germany from gaining further access to strategically important territory. A more recent example is India’s interest in operating Sri Lanka’s Mattala Airport. The project, financed and built by China, no longer receives commercial flights and is often called the world’s emptiest airport. But the airport is 11 miles away from Hambantota Port, which is Chinese owned and operated, and the Indian government is not eager for China to operate the airport as well.

Ownership also comes with risks, especially in contested territory or areas of intense geopolitical competition. Attempting to balance outside powers, host nations might calculate that it is preferable to have two or more foreign competitors own or operate projects rather than become overly dependent upon any single state. Before World War I, the sultan of the Ottoman Empire sought to draw Germany into his territory to offset the threat posed by other powers. With an economic stake, he reasoned, Germany would be more likely to intervene on the Ottoman Empire’s behalf. A modern example is Djibouti, which now hosts military bases for the United States, France, Japan, and China, along with foreign infrastructure projects in the same vicinity. Saudi Arabia and other states have expressed interest in building bases there, and the government has been happy to court
them. As Djibouti’s foreign minister said, “we are trying to keep the balance to see where their interest lies.”

Ownership also brings security challenges. In recent years, for example, Chinese workers in Pakistan have come under attack while working on projects related to the China-Pakistan Economic Corridor (CPEC). The foreign state has three basic options, all of which depend on the host state’s preferences. It can help bolster the security capacity of the host state by providing equipment, training, and funding, it can fund private security forces, or it can send its own security forces. Another challenge is deciding whether to protect the asset during a conflict. If the asset cannot be protected effectively, or is of relatively little value, a foreign owner looking to cut its losses will have to overcome political pressure to defend the asset. The host country’s insurance can become the foreign owner’s liability.

**Network Advantages**

As a state assumes ownership and operational control of additional projects, it can gain two types of broad network advantages, one political and one logistical, both of which come with risks. A foreign state can secure political advantages if it successfully demonstrates the appeal of its way of conducting business. Theoretically, the benefits might extend beyond local goodwill and have a broader positive impact on the foreign state’s reputation. In exceptional cases, it could even convey that an economic model is preferable to alternative approaches being offered by competing states. In Africa, China’s special economic zones have been motivated in part by the desire to demonstrate the advantages of China’s approach to development. While attractive in theory, these positive demonstration effects are difficult to achieve in practice.

The reputational effects of infrastructure projects are not necessarily determined by their commercial performance. There is no guarantee that commercially successful projects translate into goodwill. Sometimes commercial success is at odds with a host country’s political environment. Since China assumed control of Greece’s Piraeus Port, for example, throughput has increased significantly. But reports also suggest the Chinese firm has cut workers’ wages and fired others, creating local resentment. If China were primarily interested in generating political goodwill from the project, it might be moved to strike more generous deals with local labor groups. Over the longer-term, unless the foreign state is willing to provide endless subsidies, commercial success becomes essential for the project to continue operating.

*There is no guarantee that commercially successful projects translate into goodwill.*

Projects of limited or uncertain commercial value can still produce political benefits, at least in the short term. For example, China has been willing to heavily subsidize new China-Europe railway services, which have captured headlines despite their uncertain commercial future. When a train from Yiwu, China, arrived in London in January 2017, *The Telegraph* called it “a new chapter in the history of the centuries-old trading route,” and *The Guardian* said it...
“heralds the dawn of a new commercial era.” In the past two years, historic firsts have been celebrated for trains arriving in France, Latvia, and Finland, among other countries. Even countries that have been reluctant to endorse China’s BRI have embraced these new routes.

The reputational impacts of failing projects are clearer. At Sri Lanka’s struggling Hambantota Port, layoffs and unkept promises for job creation have sparked protests that have occasionally turned violent. To be sure, these challenges are not unique to foreign infrastructure projects. Large infrastructure projects, foreign and domestic-owned, are prone to delays, disputes, and disappointments even after they are completed. But foreign operators are easier political targets, especially for opposition candidates seeking office. Skepticism and opposition to Chinese projects has figured in recent elections in Malaysia, Pakistan, and the Maldives. For states looking to improve their reputations, owning and operating foreign infrastructure projects is a risky pursuit.

The second type of network advantage is logistical: contingency readiness. States owning and operating global infrastructure networks can enjoy greater mobility (in the case of transportation infrastructure), resilience to disruptions, and dominance of dual-use skills and knowledge. These advantages are accumulated during peacetime, often through private enterprises, and become even more valuable during conflict. It is beyond the scope of this report, which focuses on peacetime activities, to fully examine each of these dimensions. Instead, they are introduced briefly to illustrate the broader implications of foreign ownership and operation.

Transportation infrastructure is critical to military mobility. As one expert summarizes, “Global mobility consists of the sea and aerial ports, lines of communications, and sustainment hubs that provide the global reach, speed, and capacity to move forces to the point of need, move sustainment in support of operations, move forces to other operational areas, and return forces to their home stations upon mission completion.” Of course, a state’s ability to operate foreign infrastructure assets during a conflict will depend on relations with the host country, which may side with an enemy or decide to remain neutral. Ownership of foreign infrastructure is not necessary nor is it sufficient to guarantee access, which also hinges on partnerships and alliances.

Resilience to disruptions is another benefit of extensive ownership, which can provide a buffer against shocks and facilitate recovery. States that are dependent upon single sources for energy, transportation, or internet connectivity are more vulnerable to coercion. Russia’s history of cutting natural gas exports to Europe, China’s closure of its border with Mongolia in 2017, and the 2017 blockage of Qatar are all recent examples of connectivity-based coercion. As noted earlier, connectivity infrastructure projects are typically among the first targets in a conflict. In 2014, Russian-backed separatists moved to destroy bridges in eastern Ukraine, block railways, and cut phone and internet lines.
States with a more diverse set of connections, including redundant connections, can reduce these risks. Similarly, states controlling key nodes and significant network shares have more leverage to coerce others.

Before World War I, the British government invested heavily in a system of telegraph cables, establishing itself as the dominant owner of cables globally. It also developed a smaller system of cables, known as the “All Red” routes, which touched only Britain and its possessions. As the network grew, the British treasury opposed some of these projects on economic grounds. But it was largely outmaneuvered by the British army, navy, and other defense organizations, which “developed a virtual fetish” for the routes, as the historian Paul Kennedy writes. Some of these investments had little or no commercial value, but during WWI they allowed Britain to maintain continuous communications with its territories while monitoring and disrupting enemy communications.

Extensive ownership of physical assets can also enable dominance of the skills and knowledge required to operate them. Indeed, Britain’s advantages in the global telegraph system stemmed not only from owning and operating physical infrastructure but also the abilities of its companies and the services they provided. Britain’s largest telegraph company manufactured two-thirds of the cables used during the nineteenth century and almost half thereafter. In 1896, there were 30 cable-laying ships in the world, and 24 were British-owned. Monopolizing the expertise to lay cables meant that Britain’s rivals struggled to repair damaged cables. On August 5, 1914, a day after declaring war on Germany, Britain cut Germany’s direct telegraph cables to the world outside Europe. These cables remained disabled for the duration of the war, leaving Germany with one indirect cable route that ran through London and allowing British
intelligence to intercept its messages. As its state-owned firms build a growing share of the world’s undersea fiber-optic cables, China could enjoy similar advantages in the future.

Britain’s advantages in the global telegraph system stemmed not only from owning and operating physical infrastructure but also the abilities of its companies and the services they provided.
Conclusion

This report has highlighted how states can use foreign infrastructure projects to advance non-economic objectives. Infrastructure projects directly impact traditional foreign policy issues, including diplomacy, intelligence, and military operations. Some of these impacts are intuitive, while others require a more detailed understanding of how infrastructure projects are conceived, financed, built, and operated. As part of their knowledge of the broader U.S. foreign economic policy toolkit, U.S. foreign policy experts should become familiar with the opportunities and challenges that infrastructure projects present.

Many of the avenues for influence explored are not new. Without access to highly-privileged information, including private discussions among governments, judgements about the motives behind recent foreign infrastructure projects are largely speculative. But history is filled with examples of states using foreign infrastructure to access territory, harvest resources, shape government policy, dominate technology, and undercut their competitors. To be sure, not every project is strategically valuable, even those that appear to lack commercial viability. But with the world now embarking on the greatest infrastructure push in history, it would be a mistake to ignore the strategic implications of today’s projects and their broader networks.

Above all, money matters. Finance is the broadest avenue for influence and sets the terms not only for repayment but often for what follows in the construction and operation phases. Without a willingness to finance foreign projects, a state forfeits its seat at the table for the most important phase of negotiations. In theory, it can participate in later phases, but in practice, its companies are less likely to participate in those projects, as contractors or operators. The global need for infrastructure far outstrips the financing ability of any single country. Countries with few resources, or limited political will, for foreign infrastructure spending will need to find financial force-multipliers, through partners and allies, and private-sector investors.

*Without a willingness to finance foreign projects, a state forfeits its seat at the table for the most important phase of negotiations.*
This report also identifies several areas for further research. The war-time contingencies that were introduced in the final section deserve further attention and would benefit from collaboration between infrastructure experts and military strategists. Emerging technologies will open new avenues for influence and restrict others, warranting further attention from scholars and policymakers. Finally, having focused primarily on the perspective of the foreign state, an equally (if not more) important perspective to consider is the host state. Examining each of the same phases—financing, design and construction, and ownership and operation—from the host’s perspective could shed light on decisionmaking processes and help inform options for preventing and countering malign foreign influence.
About the Author

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Prior to joining CSIS, he served as a policy adviser at the Office of the U.S. Trade Representative, where he directed the research and writing process for essays, speeches, and other materials explaining U.S. trade and investment policy. At USTR, he contributed to the 2015 U.S. National Security Strategy, the President’s Trade Agenda, and numerous Congressional testimonies. He has also worked as a researcher at the Belfer Center for Science and International Affairs, the Council on Foreign Relations, and in Kyrgyzstan as a Fulbright scholar. He is a graduate of the Harvard Kennedy School, where he was a Presidential Scholar, and Brown University, where he was elected to Phi Beta Kappa and received the Garrison Prize for best thesis in international relations.
Endnotes


11. “Foreign infrastructure” is a general term intended to cover projects with involvement by foreign governments or non-government actors headquartered outside the country where the project resides.


14. This is a simplification of the loan cycle, which can be broken into more stages. For example, the World Bank describes nine stages, from preparation to final maturity, in its official handbook: http://siteresources.worldbank.org/LOANS/Resources/Disbursement09.pdf.


22. Drezner, “Bad Debts.”


25. Ibid., 370.


27. James Kyenge, “Chinese Contractors Grab Lion’s Share of Silk Road Projects,” Financial Times, January 24, 2018, https://www.ft.com/content/76b1be0c-0113-11e8-9650-9c0ad2d7c5b5.

28. Headrick, The Tools of Empire, 188.


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48. In 2014, for example, the IMF noted: “low tax revenue mobilization remains a concern—particularly given a relatively high debt level and the ongoing shift from concessional to more expensive loans on commercial terms,” IMF Press Release No. 14/270, https://www.imf.org/en/News/Articles/2015/09/14/01/49/pr14270.


52. Ibid.


54. In addition to offering attractive financing, states can tip the scales in favor of their own standards by subsidizing their companies at home.


70. Ibid.


study-of-intelligence/csi-publications/csi-studies/studies/vol48no2/article01.html.
78. Ibid.
99. Ibid.


