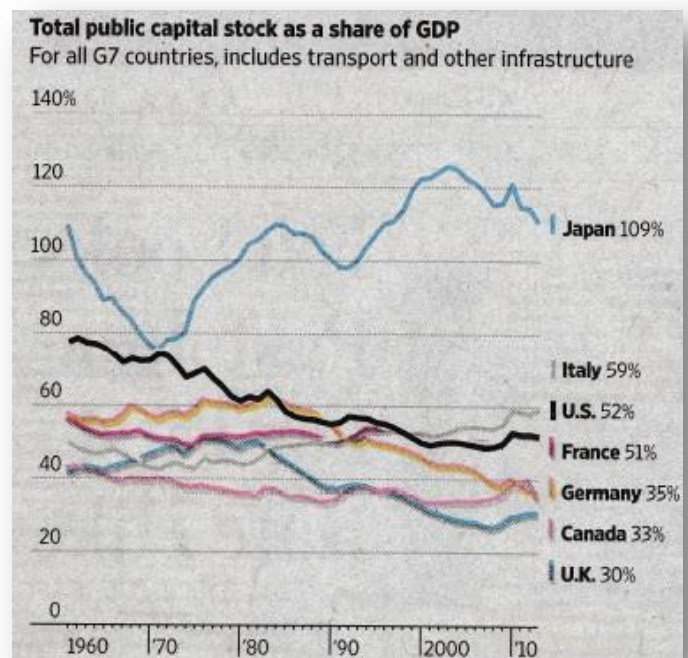


What is infrastructure?

Infrastructure facilities like bridges, roads, airports and railways are an essential component of economic growth and social development, accounting for roughly half of all fixed capital investment by governments.¹ Infrastructure is intended to have an enabling effect on future economic activity, serving as a catalyst for growth and paying for itself over time. Public investment in infrastructure occurs through the public procurement process. In short, public procurement is the acquisition of goods and services by a government entity using public funds.² The amounts involved in infrastructure spending can be eye-watering. Spending around the world on roads, railways, ports, sewers, telecoms and other infrastructure totals about \$2.5trn each year.³

While infrastructure is tremendously important for growth, countries often fail to build enough of it. States face a choice between consumption for today and investment for the future, and too often the future loses out. There is a benefit-cost mismatch in infrastructure, because the costs are immediate but the benefits are only apparent in the long run.⁴ As a result, politicians face an incentive misalignment that can only be corrected by external pressure from an informed public. The long-term benefits of new infrastructure can be thought of as positive externalities. In the same way that pollution imposes costs on society at large, infrastructure creates benefits. In both cases, the costs/benefits are external to the calculations of the companies doing the work.⁵

The G20 estimates that the global infrastructure backlog will reach \$15-20trn by 2030, and global infrastructure spending is said to face an \$800bn “gap”.⁶ Analysts estimate that developed countries spend on average 2.5% of their GDP on infrastructure, when about 3.5% is needed. The United States spends 1.7%.⁷ Government spending on infrastructure in both Europe and the United States is at a 20-year low. Ireland has cut its spending on infrastructure by 39% in the past decade, and Greece by an astounding 64%. Developed countries are investing relatively less in infrastructure, with dramatic cutbacks in the European Union, the United States, Russia and Mexico.⁸



Source: The Wall Street Journal, "Quality of Infrastructure," May 21, 2015

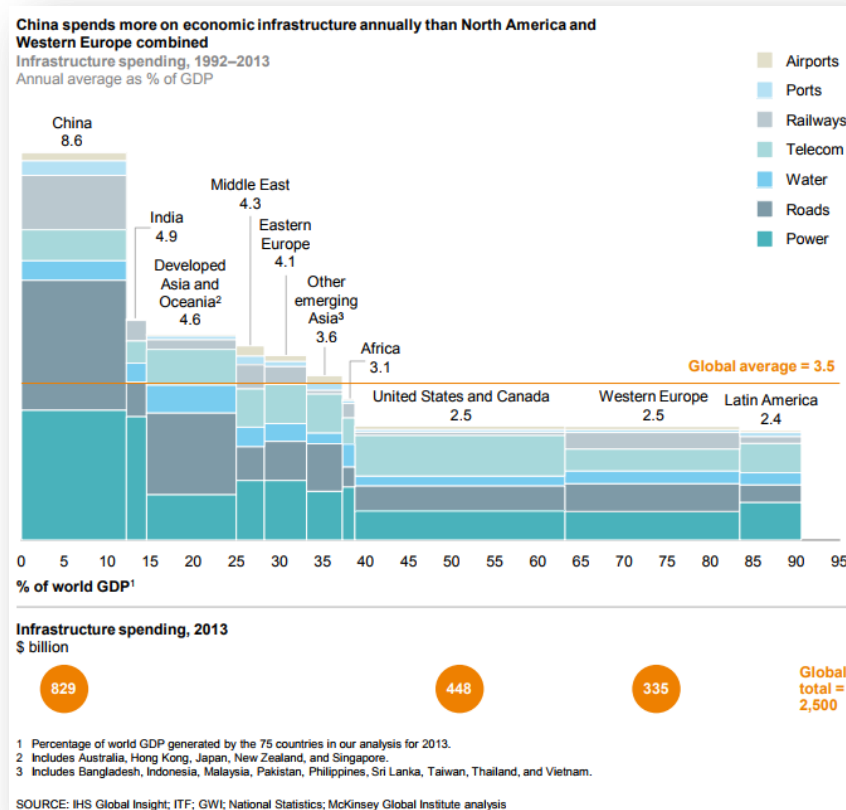
Increased infrastructure investment raises output in the short run by boosting demand and in the long run by raising the economy's productive capacity. An increase in spending of 1% of GDP raises the level of output by about 0.4% in the same year, and by 1.5% four years later. When done correctly, infrastructure investment more than pays for itself. However, these benefits depend on business-cycle timing, method of finance (debt, taxes, transfers), and public investment efficiency.⁹

Care must also be taken to distinguish between the employment produced by the construction phase, which exerts only a short-term stimulus, and the additional employment and productivity

enabled by the infrastructure itself.¹⁰ For those inclined to view infrastructure spending as a panacea, Japan provides a cautionary tale. Trillions in spending mainly provided employment on the projects themselves, rather than galvanizing additional economic activity.¹¹ There is actually good reason to doubt the efficacy of infrastructure as a countercyclical jobs program. For one thing, the long lag between conception and execution of projects calls into question their role as a fiscal instrument. Public works during the United States' New Deal, for example, did not significantly dent unemployment, though they did lay the groundwork for future prosperity.¹²

In the decade beginning in 2008, developed countries missed a historic opportunity to improve their infrastructure by locking in cheap interest rates and taking advantage of post-crisis spare capacity in the construction industry to drive down prices.¹³ However, there are still substantial benefits to building additional infrastructure, even in the developed world. An estimate by S&P indicates that increasing government investment by 1% of GDP would leave the US economy 1.7% bigger after three years, with equivalent bumps of 2.5% in Britain and 1.4% in the Euro zone.¹⁴ The IMF found that raising infrastructure investment by 1% results in a 1.5% increase in GDP four years later,¹⁵ and has called for additional public investment in order to lay the groundwork for future growth, particularly in advanced economies.

¹⁶



Investment in infrastructure requires regulatory clarity and predictability.¹⁷ To play a catalytic role in growth, the right infrastructure has to be built in the right places, at a reasonable cost. When these conditions are not met, infrastructure spending will simply transfer resources rather than encourage growth.

Infrastructure corruption

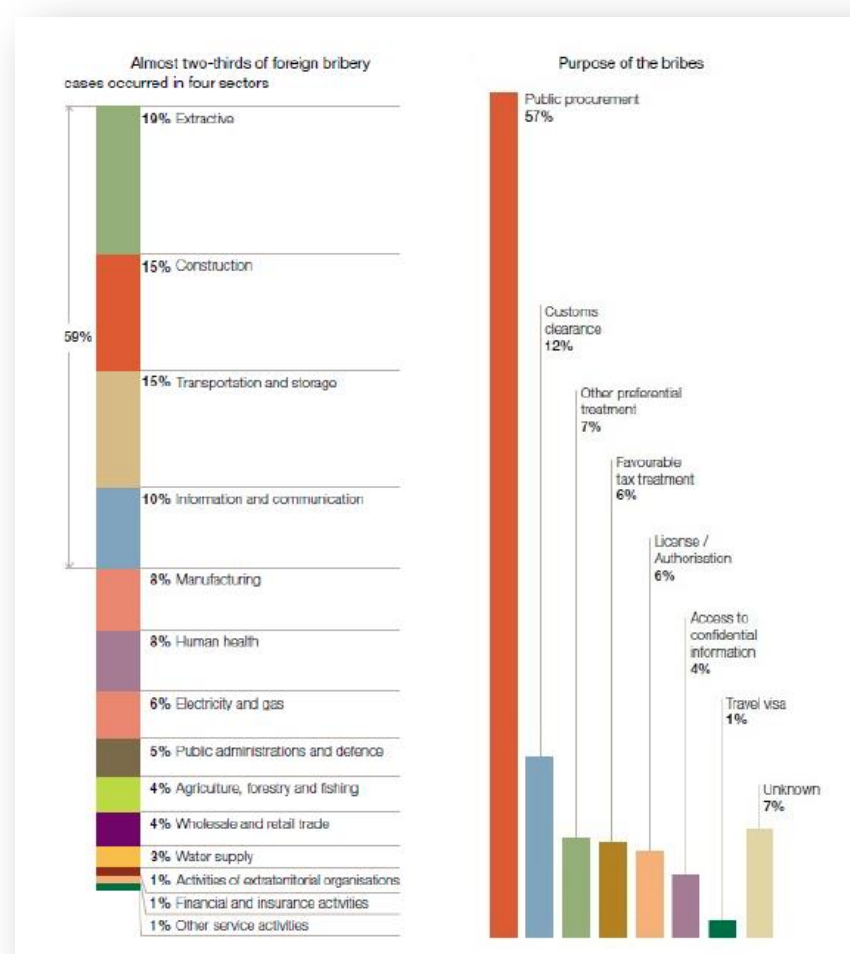
Infrastructure projects are particularly prone to corruption.¹⁸ Construction, along with mining and transportation, are the sectors of the global economy most prone to corrupt practices, and 57% of corruption convictions involve paying bribes to win public procurement contracts.¹⁹ Corruption in infrastructure is common because governments spend huge amounts of money on procurement and vest a great deal of discretion in their procurement officials. This major interface between the

public and private sectors is the intersection point of a number of distinct incentive structures, and imposes particularly complicated and contingent incentives on all parties.²⁰

Construction ranks as the most corrupt industry in global surveys of executives, and construction firms bribe government officials more often than other companies do. Construction firms typically spend about 7% of the contract value in bribes.²¹ Sophisticated international firms bidding on World Bank projects are said to offer bribes of 10-15% of the contract value, recovered via a markup on unit prices of procurement items.²² The ensuing misallocation of resources does great damage to the public interest. Road rehabilitation costs, for instance, have been shown to rise and fall in tandem with the number of corruption convictions per capita.²³

Examples abound. US states with high levels of corruption convictions spend on average \$1,300 more per capita. Recent rail projects in the United States have cost more than seven times the international average, and a recent project in New York featured hundreds of ghost workers on the state's payroll.²⁴ Spain recently indicted a number of former politicians for steering procurement contracts to favored firms, and Slovakia awarded a €120m public contract by posting it on a bulletin board.²⁵ Italy's infamous Mani Pulite and Tangentopoli scandals, where more than half the parliament was under investigation, might have been expected to force tough institutional changes to combat endemic corruption. Instead, according to the president of the national Anti-Corruption Authority, Italy "has not implemented mechanisms to combat the problem of corruption, but has favored its diffusion."²⁶ In the Netherlands, the public procurement process was rocked by a massive bid-rigging scandal in 2002, estimated to have robbed taxpayers of a billion euros every two years, affecting 3500 projects.²⁷ Even Canada is not immune—Quebec's government was forced in 2012 to establish a commission to investigate collusion in public contracts, revealing, among other things, a heretofore unknown "mafia tax" of 30%.²⁸

Across Africa, corruption affects approximately 70% of public procurement contracts, inflating costs by 20-30% and reducing the



Source: OECD 2014, OECD Foreign Bribery Report: An Analysis of the Crime of Bribery of Foreign Public Officials, OECD Publishing (2014).

quality of service delivery and public infrastructure.²⁹ The continent's infrastructure investment shortfall runs to nearly \$100bn per year.³⁰ Corrupt procurement practices have cost African countries an estimated \$20-30bn since independence.³¹ Nigeria's growth rate is less than half what its demographics and resources suggest it should be, owing to "endemic corruption that has led to so much public investment being squandered."³² In South Africa, the \$23m renovation of President Zuma's personal home was carried out by a single-bidder, and the 2010 World Cup involved more than 65 cases of bid-rigging totaling nearly \$2bn.³³

In Kenya, road expansion in any given year is concentrated in the home regions of the prime minister and the minister for public works. As a result, those regions without the right political connections have suffered real economic harm. Developing countries also use infrastructure funding for patronage more directly. Tanzania, for example, engaged contractors for dozens of major road projects just before the 2010 election, creating the expectation of substantial employment and using the resulting bribe revenue to finance the ruling party's election campaign. By 2015, most of the contracted projects had been cancelled.³⁴ A Nigerian NGO articulated the situation succinctly: "Our problem is greed, selfishness and pursuit of personal interest by the ruling, political and business class."³⁵

Elsewhere, rent-seeking among Bangladesh's bureaucrats has driven away significant foreign investment by making the investment environment unpredictable. As a consultant in the pharmaceutical sector put it, "If you're a criminal, it's good fishing. If you're not, your protection is minimal."³⁶ In Indonesia, 87% of contract winners are reportedly decided before the tender process has been completed.³⁷ In South Asia, 20-35% of all expenditure on water and sanitation is on corrupt payments, including expedition of new connections, attention to repair work, falsification of official invoices, and approval of illegal connections. In India, "leakage" due to illegal connections or underbilling accounts for 30% of all power generated, and 35% of all water. The practice of bribing officials to falsify meter readings is also widespread.³⁸ Similarly, 20-30% of all electricity in South Asia is being stolen, typically with the connivance of utility staff.³⁹ Guatemala jailed its entire presidential administration for embezzling from the customs authority.⁴⁰

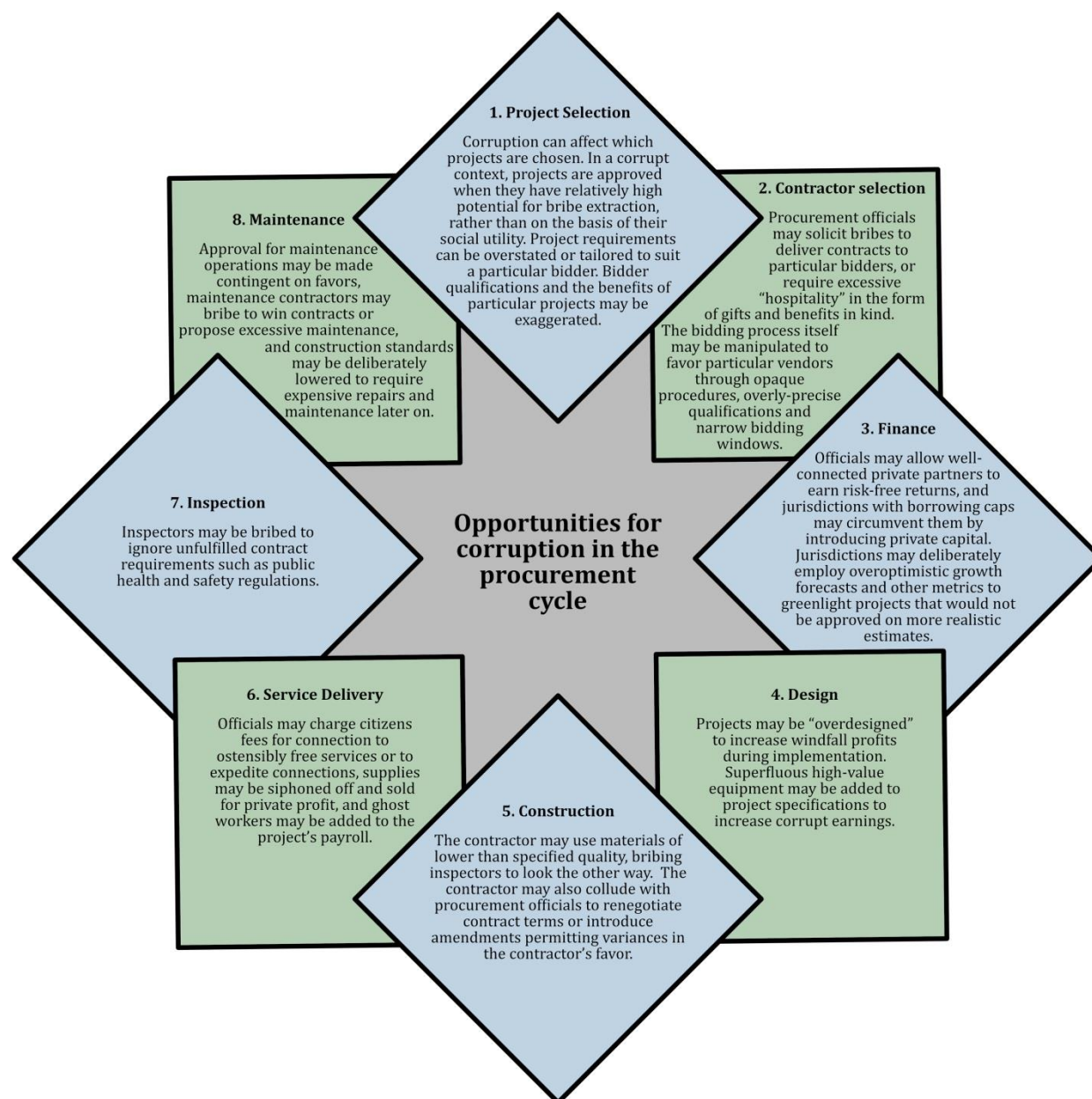
The highest rates of return on infrastructure investment are found in societies starting from a low base.⁴¹ Even here, however, cronyism can intervene. Pakistan, for example, possesses a great deal of modern infrastructure, but it has been allocated on the basis of patronage rather than public need. As a result, the hoped-for economic boom never arrived.⁴² In regions of Italy with greater perceived corruption, the efficiency of public contractors was markedly lower.⁴³ These examples, unfortunately, are far from isolated.

Mechanics

The incentive structure of the public procurement process can create incentives to overstate benefits and understate costs.⁴⁴ Common corrupt practices include bribery, bid rigging and invoice padding. Risk factors for corruption include large project size, unique parameters, a single buyer (government), and unaccountable politicians.⁴⁵ The harm done to the public interest is not always obvious, and coalitions to resist the harm typically fail to mobilize effectively. Perhaps as a result, more than 90% of the world's infrastructure projects are either late or over-budget.⁴⁶ Around the world, rail projects routinely run over-budget by 45%, bridges and tunnels by 34%, and roads by 20%. In short, "substantial cost escalation is the rule rather than the exception."⁴⁷

When government is the only client, corruption is more common.⁴⁸ This market structure, called a monopsony, is supposed to give the buyer the power to dictate the terms of trade, but the "buyer"

in this case is the public at large. When the agents of the buyer, government officials, dictate the terms of the transaction, they are behaving not as monopsonists but as self-interested agents with their own agenda. Unless they are embedded in an incentive structure promoting public-spirited behavior, they will be free to self-deal at the expense of the public interest.



Source: Author's rendering of data from GIACC 2008. "Examples of Corruption in Infrastructure," Global Infrastructure Anti-Corruption Centre May 2008, and Wells, Jill 2015. "Corruption in the construction of public infrastructure: Critical issues in project preparation." Chr. Michelsen Institute, U4 issue, no. 8 (March 2015).

There are four main phases to infrastructure projects: selection, finance, construction and service delivery. Government's role is concentrated in the first two stages, with actual construction typically conducted by contractors.⁴⁹ These phases comprise a number of different activities: specification, supplier selection, contracting, ordering, expediting and evaluation.⁵⁰ Corruption can affect each of these stages.⁵¹

For example, in the planning phase, government must determine what to buy and how much it is willing to spend. Both of these decisions are susceptible to principal-agent problems. In the solicitation phase, the government issues a request for proposals, and both solicitation and evaluation of these bids provide ample opportunity to exclude undesirable bidders or frame the proposal criteria in such a way as to force a particular result, favoring the interests of the procurement official rather than the public at large. Finally, the contract award phase can be manipulated by firms offering unrealistically low prices in the expectation of a later contract adjustment outside the scrutiny of the procurement process, or contractors can substitute lower-quality staff or materials once receiving the award. Procurement officials may also award a final contract bearing scant resemblance to the criteria outlined in the bidding process.⁵²

There is a strong relationship between the length of a project's implementation phase and cost escalation. Larger projects have larger percentage cost-escalations. Type of ownership is less important in cost escalation than the type of project accountability. State-owned enterprises are particularly unaccountable, and as a result see some of the highest rises in costs.⁵³

Estimates for public infrastructure corruption range as high as 30% of the value of the project.⁵⁴ Features that make a project relatively more vulnerable to corruption include size, uniqueness, accountability, complexity (including a high number of contractual links) irregularity, opacity of the finished product, entrenched interests, cultures of secrecy, absence of a trade organization and a lack of due diligence by financing bodies.⁵⁵ Common forms of corruption involve bribery to win contracts, cartel formation, bid falsification, tender front-loading, skimping on materials, and foregoing retention payments. The standards by which these actions are seen as corrupt or not are set within the industry, and not cued by society at large.⁵⁶ In other words, most corruption is the result of firms adopting informal industry norms, and many participants would prefer to compete honestly.⁵⁷

In corrupt project contexts, large construction projects like dams and stadiums are often prioritized over health and education projects and maintenance spending to increase opportunities for bribe extraction. As a result, infrastructure deteriorates more quickly.⁵⁸ As two African economists put it, "bribery often results in the selection and execution of projects that are uneconomic or unnecessary, thereby preventing investments...that economically....would be much more desirable."⁵⁹ These unnecessarily large projects, often dubbed "white elephants" serve as a constant reminder of elite corruption and lower citizens' trust in government.⁶⁰ Countries with insecure property rights often feature high public investment with little impact on growth, which is a "reflection of the enhanced rent-seeking incentives of governments in environments where property rights are more insecure."⁶¹

When corporations bid on international contracts, they tend to bid relatively more often in countries that closely match their home corruption environment. Those from relatively more corrupt countries are better able to cope with the uncertainty of the formal regulatory system by soliciting champions in government and working through informal channels.⁶² In this way, a corrupt procurement environment can drive out international expertise.

Discouragingly, while many countries have improved their project implementation process through procurement reforms, very few developing countries have been able to materially improve the process of project appraisal, design and selection.⁶³ This problem could be addressed by outsourcing appraisals to private consulting companies with the expertise to ask the right questions about starry-eyed proposals, but such outsourcing would also create new corruption risks. In addition, much of the bad decision-making is deliberate, not misinformed: many

governments view public investment spending as “a vehicle for distributing rents for political purposes.”⁶⁴ In Cameroon, for example, civil servants refer to the state as “the warehouse,” meaning a place from which resources can be requisitioned to benefit their families and friends.⁶⁵

The basic case for government involvement in infrastructure is that the market fails to provide certain essential goods and services at the proper scale, particularly those with opaque investment horizons.⁶⁶ However, this genuine need for policy intervention can be abused for private benefits. Problems that can arise include logrolling, pork-barrel spending, rent-seeking, misallocation of subsidies, collusion, regulatory arbitrage and regulatory capture. In essence, there are agency problems between electorates and their politicians, between politicians and their civil servants, and between procurement officers and the contractors they hire. As one researcher put it, “it is difficult to make the link between sector performance and policy choices transparent enough for democratic mechanisms to be effective in this area.”⁶⁷ Terms like “accountability” fail to convey the tangle of incentives involved, and the second- and third- order reactions of participants within the system to any change imposed from the outside.⁶⁸

The United Nations has called infrastructure corruption a “major threat” to its Agenda 2030. Increased transparency and accountability is “a sine qua non for a successful outcome of the 2030 development agenda.”⁶⁹ After reviewing the impact of corruption in infrastructure provision, this chapter will turn to an evaluation of preventive strategies.

Impact

The major damage caused by corruption in infrastructure is not the narrow financial loss of bribe payments, but rather the economic cost of skewed spending priorities. In other words, the major impact is “on what is built where, not how much is paid to build or connect it.”⁷⁰ The true cost of a bribe is the ensuing economic distortion rather than the bribe itself, and as a result bribes that influence the pre-project appraisal process may be relatively more harmful because they divert investment towards projects with lower returns, and towards new construction at the expense of high-impact maintenance.⁷¹ As one scholar put it, “Bribes that are paid in order to win contracts for well-selected projects that are subsequently well-constructed are less damaging than corruption which skews spending priorities or lowers construction standards.”⁷²

Infrastructure spending tends to be measurably *higher* in countries with bad governance and few checks and balances, and highest of all in countries without competitive elections. This “extra” public investment is unproductive, and is intended to deliver rents to government officials and their cronies. It also crowds out an even greater amount of private investment, reducing economic growth.⁷³ Unaccountable governments use public investment as a vehicle for rent-seeking, and efforts to increase public investment without first improving governance are unlikely to succeed. For example, in Turkmenistan, amid crumbling roads and intermittent electricity, authorities constructed a gleaming international airport with the capacity to receive 25 times its current annual traffic. This distortion is the result of a deeply-seated incentive structure, and not susceptible to quick fixes. In short, public investment improves the quality of infrastructure only when the quality of governance is high.⁷⁴

Weak governments unable to control their agents experience very high levels of corruption. Actors in the development sector have often been shocked by the demand of locals for unnecessarily advanced state-of-the-art equipment, but such demands are rational in an environment where the value of the transaction is determined by the proportion that can be embezzled. The social costs of

this misdirection of resources vastly exceed bribe revenues, introducing tremendous inefficiency and entrenching poverty.⁷⁵

Corruption leads to the delivery of superfluous infrastructure with low social benefits and poor economic returns at high cost, negatively affecting projects by delaying delivery, increasing cost, lowering quality and limiting access.⁷⁶ Corruption and mismanagement have also been repeatedly linked to poor-quality construction, which can reduce infrastructure lifespans by more than 50%. An experiment in Indonesia found that each dollar skimmed from road projects inflicts \$3.41 of harm in the form of reduced quality and lifespan.⁷⁷ In addition, corruption adds uncertainty to private investment returns and creates an atmosphere of mistrust among contractors.⁷⁸

In total, corruption can add up to 40-50% to initial infrastructure project estimates.⁷⁹ Such high losses can swamp initial gains from improving infrastructure, resulting in a rational but suboptimal equilibrium.⁸⁰ In developed countries, the extra costs imposed by corruption mean that infrastructure gets built inefficiently and at great cost. In the developing world, corruption overwhelms potential benefits to such an extent that much vital infrastructure *never gets built at all*. The choice of low-quality projects at high prices with significant time and cost overruns and inadequate maintenance negatively impacts both economic growth and poverty alleviation. In addition, skewed incentives during project preparation can facilitate corruption during implementation.⁸¹

As already mentioned, the construction sector features significantly higher-than-average corruption around the world. Contributing factors include the uniqueness of construction projects, the complexity of transaction chains, the multiplicity of permits and approvals required, and the sheer scale of infrastructure costs.⁸² Perhaps as a result, banks are increasingly reluctant to finance infrastructure projects.⁸³ Traditional methods of infrastructure funding involve the issuance of bonds spreading the cost of the investment over a 20 or 30 year timeframe, shifting some of the burden to future generations, who will also reap the benefits.⁸⁴ These types of intergenerational agreements are jeopardized by the trust-eroding effects of corruption. In addition, corruption's effects on human capital are stark, as citizens respond rationally by investing in their networks rather than their skills.⁸⁵

Corruption diverts managerial effort away from supervision of the productive process, and more corruption is strongly associated with more inefficient firms, requiring more inputs to achieve a given level of output. Public ownership, high inflation, and lack of law and order play a separate, smaller role, and state-owned enterprises are substantially less efficient than private firms.⁸⁶ High perceived general levels of corruption are associated with lower spending on operations and maintenance and lower-quality infrastructure.⁸⁷ In an international comparison of road resurfacing costs, the average Corruption Perceptions Index score of countries with below-average costs was 3.6, compared to a score of 2.4 in countries with above-average costs.⁸⁸

The most vulnerable are disproportionately impacted by corruption in infrastructure provision. Small businesses are unlikely to have the capacity to deal with predatory regulations or capricious nonpayments, not to mention the bribes required to participate in the public procurement process.⁸⁹ Similarly, corruption in infrastructure disproportionately impacts the poor by requiring payments for nominally free infrastructure services, and exacerbates social inequality by reducing investment.⁹⁰ Corrupt procurement environments deprive local businesses of the spur of foreign competition and inhibit local technology uptake.⁹¹

When health and safety codes can be circumvented with the right bribes, the costs are borne by the most vulnerable. Despite robust safety regulations, a 2001 earthquake in India caused half a million houses to collapse and a similar 1999 quake in Turkey killed thousands living in substandard housing. 83% of all deaths from earthquakes in the past three decades have occurred in high-corruption states with poor construction standards.⁹²

Emerging economies will need \$22trn of investments in infrastructure over the next decade. Transparency International has warned that up to one third of this investment could be lost to corruption, and analysis suggests that another third could be wasted through inefficiency and mismanagement.⁹³ The World Economic Forum's conclusions are stark: “unless we rapidly improve the efficiency of infrastructure investments, our efforts to meet the great global challenges of our era are less likely to succeed.”⁹⁴

Remedies

What can be done? In one view, boondoggles and pork-barrel spending are “transaction costs of democracy.”⁹⁵ However, like other transaction costs, they can be reduced. Measures that have had an impact on corruption in infrastructure include competitive selection, merit-based pay, streamlining of procurement rules, reform of auditing standards, and increased transparency.⁹⁶ The adoption of international best practices, including improved project selection, delivery and management of existing assets could produce savings of 40%.⁹⁷

Best practices include independent, professional procurement officials, frequent rotation of those officials, performance ratings and public surveys, a concentration of decision nodes into technical and economic expertise, clarification of procurement rules, enforceable time limits on the procurement process, explanations to unsuccessful bidders, independent evaluation, particularly of exceptional cases, increased access to information, blacklisting of corrupt bidders, electronic procurement where feasible, self-policing trade associations, and an increased focus on product rather than process.⁹⁸

Phases of procurement where a great deal of discretion is exercised by officials ought to be subject to independent review. These phases include needs assessment, definition of technical specifications, and contract execution. In addition, rules can be made both more intelligible and more effective by standardizing procurement procedures and enacting sanctions as parliamentary laws rather than mere procurement rules. Cases of corruption should be *prima facie* grounds for piercing the corporate veil and attaching individual liability to top executives on a strict liability basis.⁹⁹

Monitoring the quality of delivered projects is difficult but essential, since treating projects as commodities allows unscrupulous bidders to undercut honest contractors, driving them out of the market in a manner reminiscent of Gresham's law.¹⁰⁰

Transparency International recommends the adoption of accreditation procedures for independent project assessors to monitor contract pre-qualification, tender and execution, the creation of a corruption reporting service to circulate common schemes and share information, the publication of a blacklist of companies that have participated in corrupt activities, and a robust investigation and prosecution unit empowered to impose serious penalties.¹⁰¹

Officials do not exercise their discretion in a vacuum, and the context within which they make their choices is a powerful determinant of behavior. Coping with a corrupt project context might involve acknowledging the risk of white elephants by breaking megaprojects into small projects with standardized specifications and established costs and benefits.¹⁰² Changes to the contract after the tendering process has closed ought to receive additional scrutiny.¹⁰³ Formal accountability systems like independent quality control and interjurisdictional authorities would improve governance and prevent additional corruption.¹⁰⁴

Younger officials, with no professional affiliations, less organizational loyalty and low job satisfaction are more likely to engage in corrupt practices.¹⁰⁵ As a result, it makes sense to act through existing professional associations, requiring them to police their members in the first instance. So-called “integrity pacts” among suppliers seek to break the prisoner’s dilemma by establishing intrusive monitoring and sanctions. Integrity pacts have been implemented in Argentina, Colombia, India, Indonesia and Italy, with mixed success. Other approaches that have shown promise are the VfM (value-for-money) approach, allowing for the consideration of quality in procurement. Similarly, “merit points” provide for additional weighting of qualitative dimensions during the procurement process. The “principle-based” approach, popular with the World Bank, involves reinforcing ethical behavior through training.¹⁰⁶ Sanctions for violations are also essential – according to the OECD, only 2 out of 427 cases of foreign bribery resulted in debarment of the contractor concerned.¹⁰⁷

The Global Infrastructure Anti-Corruption Center (GIACC) has promulgated twelve Project Anti-Corruption System (PACS) Standards detailing best practices for the management of public construction contracts. Foremost among these are independent assessment of projects, transparency, pre-contract disclosure of corruption risks, strict gifts policies, compliance ombudsmen, effective enforcement and explicit anticorruption commitments by the project owner and funders, specifying exact remedies in case of breach.¹⁰⁸ Similarly, the Sustainable Infrastructure Foundation’s new International Infrastructure Support System is an online project preparation platform, providing resources to inculcate a consistent and systematic approach to early-stage project development.¹⁰⁹

What are the common themes on this laundry list of ideas? The public interest often lacks robust advocacy because self-dealing takes place in secrecy. Transparency empowers ordinary citizens to see when their interests are being affected, and to organize accordingly. Fundamentally, the goal must be to create an incentive structure that discourages participants from adopting informal practices.¹¹⁰ All the remedies for misaligned incentive structures that emerged earlier in this analysis – collegiality, rotation, sortition – apply equally well in the case of infrastructure.

Public-private partnerships

Since tax and use revenue are the ultimate sources of money for infrastructure, it ought not to make much difference whether the financing is private or public.¹¹¹ One idea is to outsource both the risk and the profits to an outside firm, matching public need with private capital and circumventing the conflicts of interest and principal-agent problems already identified, making corruption less likely. Private provision of services was linked to greater efficiency in a sample of African water utilities, and reduced the number and amount of bribes paid to utilities.¹¹²

Public-private partnerships (PPPs) are becoming more common, accounting for 5-10% of total global infrastructure investment.¹¹³ A large proportion of the world’s major toll roads and airports are operated by PPPs.¹¹⁴ There is increased appetite for private ownership of infrastructure assets:

Blackstone Group LP has recently kicked off a \$40bn infrastructure fund, and similar ventures have been initiated by Global Infrastructure Partners and Saudi Arabia's sovereign wealth fund.¹¹⁵

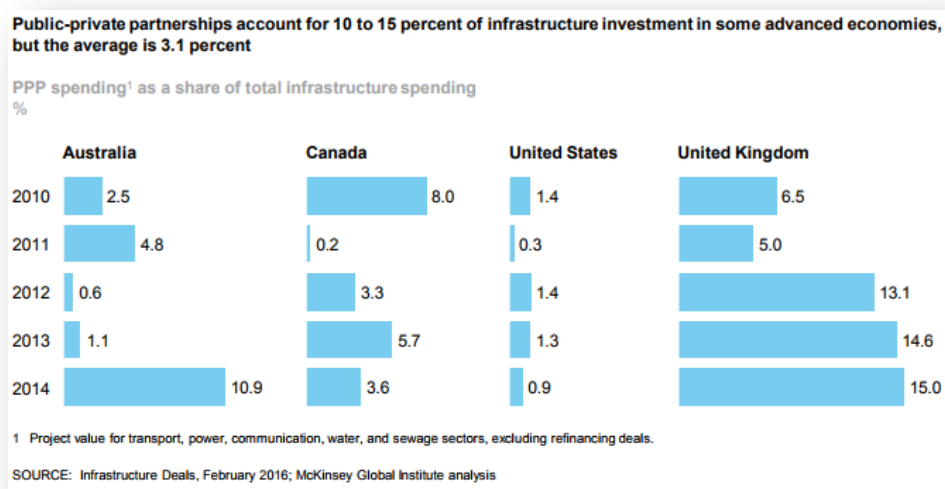
Public-private partnerships seem like an intuitive fit for infrastructure. The long-term investment horizons and predictable yields are precisely what pension funds and other asset managers are looking for, particularly at a time of low government bond yields. However, PPPs have often been turned to in an effort to circumvent fiscal rules that cap local government borrowing, indicating that the projects concerned are likely marginal, since they failed to attract scarce capital on their own merits.¹¹⁶ PPPs can accelerate the availability of financing by, for example, circumventing states' constitutional or statutory limits on borrowing, but do not make additional financing available.¹¹⁷

On projects without the possibility of a direct revenue stream, the scope for private profit is greatly reduced.¹¹⁸ However, guaranteeing private companies a share of future tax revenue in exchange for project finance “would simply be government borrowing through the back door – with much less

transparency, and hence greater opportunities for giveaways to favored interests.”¹¹⁹ To encourage additional private investment, governments should help insure against risk unrelated to the project's viability – political risk, currency fluctuation, and so on. The World Bank has endorsed this approach.¹²⁰ Australia has pioneered a new public-private partnership model by lending more during the early stages of a project, where risk is more opaque, and privatizing the projects as they become operational.¹²¹

In some areas, private involvement has pushed public service providers to improve. In education, for instance, the pressure exerted by charter schools has been shown to improve the performance of nearby public schools.¹²² Studies show that PPPs encourage a relatively more transparent bidding process.¹²³ Private companies have also proved better at keeping costs down in construction. London's Crossrail project, built by private contractors but publicly-owned, is a model of this approach.¹²⁴ Infrastructure where competition is viable, pricing is market-based and the investment horizon is relatively short is suitable for a public-private partnership.¹²⁵

However, there are limits to the types of projects for which PPPs are appropriate. Tolls, for instance, only make sense on certain kinds of infrastructure in certain situations.¹²⁶ Outsourcing core government functions is usually a bad idea -- the IRS, for example, spent \$20m on private debt collectors in 2017 but took in only \$6.7m in back taxes while violating important constitutional rights.¹²⁷ PPPs are often burdened by unanticipated costs, which frequently turn into perpetual



government subsidies. Ex-post renegotiations are often opaque and seldom serve the public interest.

Public-private partnerships work best for already-existing infrastructure, because the risks of a new, “greenfield” project often cannot be accurately priced, particularly in the case of unique or large projects. Public capital tends to flood into infrastructure during bubble periods, like railroads in the 1840s or fiber-optic cable in the late 1990s, but even when particular projects are highly profitable, sectoral returns are often disappointing.¹²⁸ Of 14 privately-financed road projects completed in the US since 1995, for instance, three went bankrupt and one required a public buyout—a 29% failure rate.¹²⁹

There are also environmental limits to the suitability of PPPs. In the absence of genuine competition, for instance, private partners will reap windfall profit margins. In addition, competition and independent regulatory agencies are crucial.¹³⁰ However, overall it seems that public-private partnerships significantly improve the management of construction risk as long as threshold conditions are met.¹³¹ These include modernizing procurement practices to elicit competition and disrupt incumbents, imposing international accounting practices, and broadening the ethical responsibilities attaching to public-private partnerships (for example, by applying the Ecuador Principles).¹³² Fundamentally, the risk inherent in a project ought to be borne by the party most able to manage it.¹³³ Introducing private competition where feasible should be a cornerstone of infrastructure provision.¹³⁴

Decentralization

Decentralization of infrastructure provision requires an informed electorate capable of factoring information about the quality of public goods into their voting decisions. In developing countries, the absence of crucial information and credible political competitors lead to the underprovision of services to those without power and political connections. Reforms to improve the information environment might include independent evaluation of the quality of public goods and the efficiency of the resources used to provide them. In well-functioning democracies, these functions are fulfilled by a free press and political parties, but civil society organizations can fill in the gaps in developing countries.¹³⁵

Decentralization can break up the monopolistic structure of infrastructure provision, but only where the local levels of government have sufficient expertise and capacity to do the job properly.

¹³⁶

Studies indicate that countries with decentralized road maintenance have better roads.¹³⁷

Centralized provision leads to more “unauthorized leakages” of public funds through inefficiency, waste and corruption. However, decentralization of infrastructure provision more generally is only desirable if there is strong accountability, an educated and empowered citizenry, and no elite capture of critical institutions.¹³⁸

Large-scale infrastructure projects frequently cross jurisdictional lines, and require a level of regional planning that the political system is often unable to provide. In addition, a state's political subdivisions rarely correspond to the underlying patterns of commerce, and inter-state and even transnational infrastructure projects will require effective trans-jurisdictional institutions. For example, the cities on the United States Gulf Coast are part of a tightly-integrated economic zone facilitating exports. However, as parts of five separate states the Gulf Coast cities are discouraged

from effective political and institutional integration, resulting in redundant port facilities and incompatible regulation.

For these reasons, many experts have proposed turning over major infrastructure decisions to an infrastructure bank, which would be empowered to ignore state lines and other jurisdictional boundaries when allocating projects.¹³⁹ An infrastructure bank's technical staff would factor out regional or political considerations, focusing on a proposal's economic merits.¹⁴⁰ An infrastructure bank would make decisions about which types of projects to fund and how much to leverage the federal funds involved, and would make it easier to compare the benefits and costs of projects in a competitive selection process.¹⁴¹

E-procurement

In developing countries, transparency in procurement can require the creation of a safe bidding environment to prevent intimidation.¹⁴² E-procurement and e-customs are an obvious mechanism to disintermediate corrupt officials. E-procurement can cut the price of contracts by 12%, as well as prevent “tender-snatching,” or the use of paid thugs to seize competitors’ bids.¹⁴³ Bangladesh, Ghana, India, Kenya and Indonesia have implemented e-procurement to great success, improving competition and quality.¹⁴⁴

In Indonesia, the current government's shift to online procurement has saved billions, thereby depriving “bribe-hungry bureaucrats of chances to extort backhanders.” It has also cleaned house at a number of state-owned firms, particularly in construction and resource extraction. The offshore trading arm of the state oil company had hitherto been “controlled and plundered by Indonesia’s “oil-and-gas mafia,” and the head of the oil and gas regulatory agency was recently convicted and jailed for accepting bribes. These measures have been important components of the president's charm offensive in search of foreign investment.¹⁴⁵

Regulatory simplification

When considered in its political context, voters are frequently offered a false choice between inefficient infrastructure spending and reckless, poorly targeted parsimony. The costs themselves are the primary issue—why are they so high?¹⁴⁶ One answer is that the proliferation of regulations and veto points has resulted in unaccountable government.¹⁴⁷ More funding is necessary, but not sufficient, and regulatory reform is needed.¹⁴⁸ High regulatory burdens do not seem to be improving outcomes, implying scope for streamlining.¹⁴⁹ Collusion among bidders can result from poorly-designed procurement rules.¹⁵⁰ In an international survey, only 15% of firms thought current procurement rules did a good job of deterring corruption.¹⁵¹ Low effective regulatory burdens have been shown to correlate with lower levels of corruption.¹⁵²

Practical measures that can improve the effectiveness of infrastructure spending include streamlining the permitting process, requiring that projects use life cycle cost analysis to develop a funding plan that lasts for the full service life of the asset, and instituting incentives for maintenance investment by state and local governments and private investors.¹⁵³ As an example of simplification, tolls, fuel taxes and vehicle ownership fees could be rolled into a single road tax, charged per mile, and calibrated to the vehicle's weight and emissions.¹⁵⁴ In cases where core government functions have been permeated by official corruption, “one solution is to clarify and streamline the necessary laws in ways that reduce official discretion.”¹⁵⁵ Simplifying regulations leaves fewer loopholes to be exploited, and a consequently smaller margin for corruption.

To fix the infrastructure approval process, permitting decisions should be consolidated within a simplified framework, empowering political leaders to balance the demands of various regulators with the public purpose of the project. The resulting framework should preempt state laws for interstate projects. This approach has been adopted in Germany and Canada, and is under consideration in Australia.¹⁵⁶ Public comment should be solicited throughout the planning process, but should not be an attempt to “build the record” for subsequent litigation. It should take the form of a good-faith public discussion to inform politically accountable choices. The crushing burden of environmental review should be relaxed, to be completed within a year and measured in hundreds of pages, not tens of thousands. Since much of the superfluous detail is included out of fear of litigation, statutes should be passed requiring prompt filing of all claims challenging a project. Legislation ordering that environmental impact be measured against the overall benefit of the project would also limit the current practice of “flyspecking,” or examining proposals in minute detail in search of pretexts to deny approval.¹⁵⁷

Transparency

Mobilizing effective coalitions to defend the public interest requires transparency. When procurement decisions are made in secret, officials have a greater incentive to self-deal. Publication of all government contracts, including modifications and amendments, would provide significant transparency as well as opening up a large stock of public intellectual capital, helping to spread best practices and reducing the cost of building.¹⁵⁸

Transparency imposes self-regulation: mandatory disclosure of toxic releases by firms in the United States was linked to greater emissions-reduction efforts by the firms concerned, for example.¹⁵⁹ Publication of all government contracts, including modifications and amendments, would provide significant transparency as well as opening up a large stock of public intellectual capital, helping to spread best practices and reducing the cost of building.¹⁶⁰ Freedom of information acts and citizen report cards, if properly drafted, can empower citizens to exercise oversight and demand investigation.¹⁶¹

When planning a new high-speed train network over the past two decades, Italy permitted the procurement process to occur in secret, and allowed pre-selection of the main contractors without an open tender. As a result, the project suffered massive delays and cost overruns. On average, the program was 179% overbudget, and the Italian example has become a textbook case of corrupt project context. Deviation from procurement rules and best practices became tolerated, and this tolerance for deviation normalized yet further deviation from best practices.¹⁶²

World Bank projects in countries with the most transparency generate returns 8-22% higher than other countries. Giving citizens “voice” promotes accountability and reduces corruption.¹⁶³ This approach has been piloted in Bangladesh, the Philippines and Indonesia, where committees of locals have been deputized to keep an eye on local infrastructure construction. These interventions produced savings of 21-25% and increased the asset lifespan by 400%.¹⁶⁴ The Construction Sector Transparency Model (CoST) is a useful model for improving transparency and oversight.¹⁶⁵

However, transparency and oversight are limited to contexts where stakeholders can actually observe problems, and are dependent on functional literacy and political efficacy among the beneficiary population. Transparency and oversight are also costly. In one Indonesian project, establishing capacity-building and oversight mechanisms cost 13% of the project budget. In some cases, these costs may outweigh concomitant benefits.¹⁶⁶ Freedom of information laws are often

cumbersome and costly to fully exploit, deterring the transparency benefits that the laws were enacted to provide.¹⁶⁷

Case Study: The BRICS

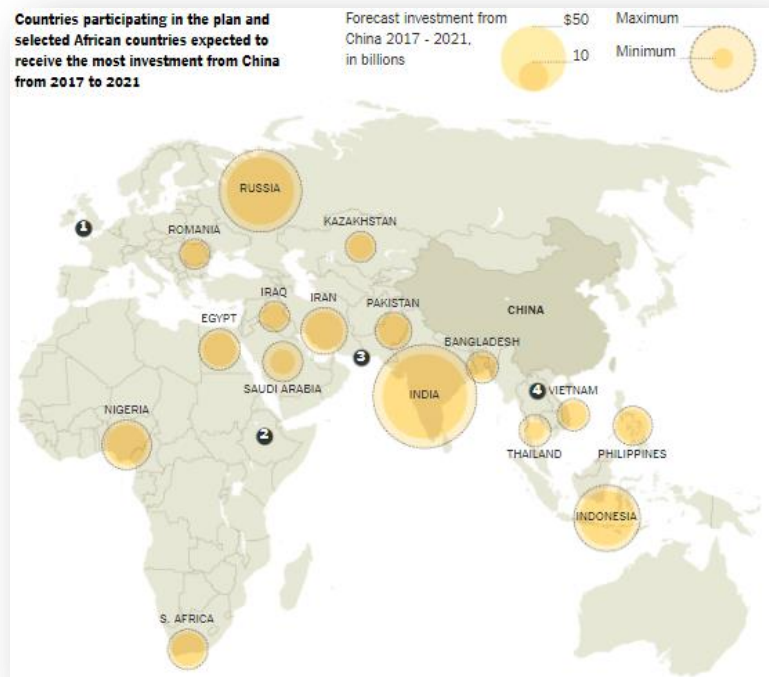
The so-called BRICS--Brazil, Russia, India, China and South Africa—have all suffered significant corruption in public procurement, dampening growth rates and sparking scandals.¹⁶⁸ In Brazil, the four biggest construction companies colluded with the state oil company to overcharge and false-invoice their way to \$3bn in corrupt gains, bribing more than 200 politicians across 18 parties along the way. Public procurement had been conducted behind closed doors, limiting public oversight. Bid requirements were crafted to deliver the contracts to preselected contractors, and much of the money found its way into the campaign accounts of many top politicians, including the current and former presidents.¹⁶⁹

In Russia, the Sochi Olympics was a corruption windfall, with inflated public construction contracts going for more than twice the projected cost. Called by some “the greatest financial boondoggle in the history of the Games,” the 2014 Winter Olympics in Sochi was supposed to cost \$12bn, against the \$7bn cost of the 2010 Vancouver Olympics. Sochi actually cost Russian taxpayers more than \$50bn, and was “controlled largely by businesspeople and companies close to [Vladimir] Putin.” Then-Prime Minister Putin's judo partner was able to pick up over \$7bn in Olympic-related construction contracts, and other members of the inner circle received even more. President Medvedev's ski instructor likewise raked in a cool \$2.5bn, and an infamous ski jump ended up costing the Russian state \$245 million to build. Estimates of total losses exceeded \$30bn, and the cost of fraud in Russia's construction industry is slated to reach \$1.5trn annually by 2025.¹⁷⁰ Corruption and insecure property rights are strangling Russia's infrastructure. Unmet infrastructure needs are estimated at \$1trn, over 75% of Russia's GDP.¹⁷¹

In India, half of all road projects suffer huge project duration increases and cost overruns, and a fifth of completed roads are immediately rated unsatisfactory.¹⁷² The Indian army's Border Roads Organization is a bastion of patronage, and only 36% of its projects slated to be completed by 2012 were actually completed by 2016.¹⁷³ While the Modi government recently launched a large-scale infrastructure drive, spending \$11bn in 2015 and pledging to devote 11% of government spending to infrastructure every year,¹⁷⁴ the ten-year infrastructure investment plans have been beset by corruption scandals. A tunnel contract in Jammu and Kashmir was allegedly steered by a national MP to a favored contractor, provoking allegations of “crony capitalism,” and prominent witnesses in corruption cases have disappeared under suspicious circumstances.¹⁷⁵ Public-private partnerships in India endured numerous failures, and bad infrastructure deals make up 10% of India's non-performing loans.¹⁷⁶

China's infrastructure boom involved a close nexus between the state and a small network of often untraceable developers, and was abetted by its unaccountable government's ability to evict those in the way of its projects. More than 100,000 protests at evictions by the state are recorded every year.¹⁷⁷ Corruption allegations surfaced after the devastating Sichuan earthquake of 2008, where shoddy construction appears to have played a significant role in the scale of the damage.¹⁷⁸ Eight bridges have collapsed since 2011 because of faulty construction and substandard materials. According to a scholar at the Chinese Academy of Governance, bid-rigging is the norm and there are no checks or balances in the procurement process.¹⁷⁹

China routinely deploys large-scale infrastructure projects to “direct the flow of global trade to its advantage.”¹⁸⁰ Across Asia, the unmet infrastructure need has been estimated at \$1.7trn per year. The Chinese infrastructure initiative “One Belt, One Road” has promised more than \$1trn in infrastructure spending across 60 countries. By providing the physical infrastructure to catalyze additional economic activity, China hopes to set the rules of trade for the century ahead. While many of the related projects will lose money, they make long-term sense for China both for diplomatic reasons and for their impact on future growth. In effect, “One Belt, One Road” is an updated, grander version of the Marshall Plan, without the military obligations. Projects to-date have been dogged by corruption and protests over the importation of Chinese workers.¹⁸¹ European and American construction companies and banks are deeply involved in One Belt One Road projects, and Chinese companies have used the credibility of their Western partners to help close deals and raise finance.¹⁸²



Source: “Behind China’s \$1 Trillion Plan to Shake Up the Economic Order,” *The New York Times*, 13 May 2017.

Two large Chinese-backed infrastructure projects in the Philippines were cancelled over corruption concerns. Perhaps as a result, China is now explicitly promising “corruption-free” projects as part of One Belt One Road.¹⁸³ In addition, Chinese-funded projects in Angola and Cambodia have been accused of favoring the commercial interests of China over those of the host country.¹⁸⁴ According to *The Economist*, Chinese-financed development plans can be “opaque, careless of environmental concerns and shot through with dodgy political dealings.”¹⁸⁵

A common theme among the BRICS is huge increases in procurement budgets without concomitant investment in transparent and well-regulated processes. It is interesting to contrast the reaction in democratic Brazil and South Africa, where these revelations have toppled regional and national governments, with China’s “selective witch hunt” for corrupt officials and Russian officials’ attacks on those who revealed the corruption. The BRICS’ New Development Bank was established to sidestep the heavy checks and balances imposed by the World Bank and other infrastructure lenders, but without a well-regulated, transparent process for evaluating and implementing projects the corruption these countries have seen at home will simply be taken on the road.¹⁸⁶

Authoritarian governments favor wasteful construction spending because of the short term boost it can give the economy and the ease with which funds can be passed to favored cronies. Such “populist clientelism” promotes wasteful infrastructure spending, and has played a major role in (for example) Turkey’s economic boom. One wonders about its role in China’s recent economic expansion. But such “sugar highs” do not last, because parceling out money to cronies creates an arbitrary investment environment, causing honest firms to exit the market. Economists have found

that authoritarian governments are more likely to overinvest in low-quality new construction while skimping on maintenance, and to invest relatively little in education. By overinvesting in redundant physical capital and underinvesting in human capital, authoritarian governments shrink the horizons of their future prosperity.¹⁸⁷

Case Study: The United States

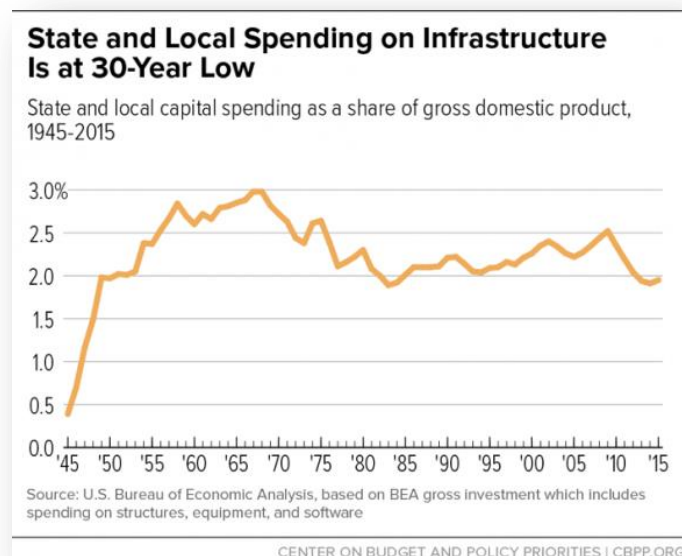
American history is a testament to the power of infrastructure to transform a continent. Massive projects like the Hoover Dam, Los Angeles Aqueduct and the Interstate Highway System had a transformative effect,¹⁸⁸ and they were constructed quickly and efficiently. The Empire State Building was built in 410 days, and the Pentagon was completed in 16 months, during wartime.¹⁸⁹ The Hoover Dam and Golden Gate Bridge were completed under budget and years ahead of schedule.¹⁹⁰

Today, after adjusting for depreciation, the US makes no net investment in infrastructure, despite its popularity across the political spectrum.¹⁹¹ Capital spending by states dropped from 3% of GDP in the 1960s to less than 2% in 2015.¹⁹² Much U.S. infrastructure is decades past its intended life span. The Department of Transportation reports an infrastructure backlog of \$926bn. More than 1 in 10 of the country's 608,000 bridges are structurally deficient,¹⁹³ and 40% are older than their design lifespan.¹⁹⁴ US air traffic control technology dates back to the 1950s.¹⁹⁵ The Pentagon is still coordinating its nuclear forces with 8-inch floppy disks, and the Navy pays Microsoft to support out-of-date operating systems.¹⁹⁶

Trillions of gallons of water leaked from old pipes costs the US more than \$2.6bn each year, and about 240,000 water main breaks occur every year, releasing 850 billion gallons of untreated wastewater into rivers and lakes.¹⁹⁷ A project manager with the Army Corps of Engineers says that the US network of river dams and locks “has reached the end of its useful life.”¹⁹⁸

The national parks are groaning under the strain of budget cuts, with a \$12bn backlog of deferred maintenance.¹⁹⁹

The costs of this inattention show up in wasted time. Traffic congestion consumes up to 38 hours per person per year, costing \$121bn in wasted time and fuel.²⁰⁰ Infrastructure problems cause \$105m of losses per year for UPS. “It’s ugly. We operate inefficiently and redundantly, because we have got to deal with the congestion,” said Thomas Jensen, the company’s vice president of transportation policy.²⁰¹ Delays suffered by commuters have increased by 62% since 1990.²⁰²



In Q2 2017, federal infrastructure spending fell to the lowest level on record, and municipalities have cut back by 20% just since 2016. Deal volume among private infrastructure providers fell by 7.5% year-on-year during the first half of 2016, and the absolute number of deals fell by a quarter.

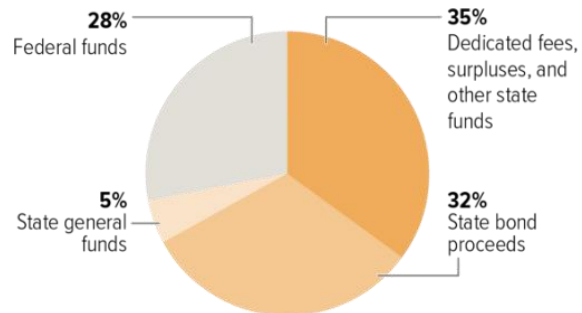
An analyst with J.P. Morgan faults the federal government for failing to provide the baseline funding to attract matching private capital.²⁰³

Shortfalls in infrastructure spending are frequently recovered by increases in user fees, which is both inefficient and frequently regressive. For example, Louisiana's use of court fees and fines to fund its court system has introduced a shocking conflict of interest into its administration of criminal justice by giving judges a financial incentive to find low-income defendants guilty, bearing "an unfortunate resemblance to an extortion racket."²⁰⁴

Since 1980, the United States has systematically underinvested in infrastructure by about 1% of GDP every year.²⁰⁵ World Economic Forum research indicates that the United States spends \$2.7trn on basic infrastructure to meet a need of \$3.7trn.²⁰⁶ Spending on infrastructure is at a 20-year low, and US roads, bridges and dams have received an average grade of D+ from the American Society of Civil Engineers.²⁰⁷ Construction productivity in the United States has dropped by more than half since the late 1960s.²⁰⁸

State Dollars and Borrowing Pay for Most Infrastructure Projects

Sources of state funding for infrastructure, 2015



Note: The National Association of State Budget Officers capital spending data includes the costs of new construction, purchases of buildings and major equipment, and major repairs and improvements.

Source: National Association of State Budget Officers State Expenditure Survey, 2016

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Recent reductions in US infrastructure investment are all the more surprising in the eighth year of an economic expansion.²⁰⁹ Because of a failure to invest in maintenance, annual rehabilitation spending just to stay current has risen to \$73-\$78bn, from just \$60bn in 2009.²¹⁰ State and local spending on construction has dropped by 11% just since 2015.²¹¹ Of 440 improvements suggested by the GAO to federal agencies since 2011, fewer than a third have been addressed.²¹²

The US builds less infrastructure in part because it has become much more expensive. Since 1993, the price of construction, measured in workers and materials, has risen by more than 75%.²¹³ Like healthcare, US infrastructure costs are the highest in the world. New York is building a \$4bn train station. Subway tracks in New York are built at ten times the cost of equivalent track in Denmark. Experts attribute these costs to labor laws mandating union labor and high wages, as well as excessive environmental regulations exploited by property owners, high administrative costs and toll bans.²¹⁴

In the United States, transportation programs are funded by revenues from the highway trust fund. However, because the tax rate is not indexed to inflation and raising it would be politically costly, it has languished unchanged since 1993.²¹⁵ Gas tax revenue peaked in absolute terms in 2006, owing to increased fuel-efficiency.²¹⁶ In recent years, the federal government has spent \$50bn on transportation, despite gas tax revenue of only \$35bn.²¹⁷ US highway spending has fallen 19% from its peak in 2002.²¹⁸ By fixing gas taxes at nominal rates, politicians must expend political capital just to keep up with inflation.²¹⁹ The Congressional Budget Office predicts an annual road funding gap of \$120bn per year by 2024.²²⁰ In 2016, Congress finally raised road funding by 4%—by raiding the operating capital of the Federal Reserve.²²¹

As this chapter has made clear, the reasons behind inadequate US infrastructure are known and can be addressed. Foremost among these is misalignment of incentives. For example, most successful

infrastructure initiatives consist of incremental improvements on previous infrastructure, but politicians and other funders “have a tendency to fall in love with novel, path-breaking, expensive projects that frequently go astray, resulting in arguments against spending more on infrastructure.” Although these megaprojects frequently overstate benefits and understate costs, politicians fall for the pitch routinely because they have an incentive to.²²² Despite opening a \$4bn train station in Manhattan, New York has been completely unable to fund the Metropolitan Transportation Authority's five-year capital plan. There are no ribbon-cutting ceremonies for signal upgrades and track replacements. By putting off repairs, their costs increase many times over: a road that could have been patched a decade ago will now have to be entirely resurfaced.²²³ Additional incentive misalignments result from constitutional structure: many state and local authorities are prohibited from running deficits, and term limits make politicians less likely to invest their political capital in long-term projects.²²⁴

Iron triangles

Recent rail projects in the United States have cost more than seven times the international average, and a recent project in New York featured hundreds of ghost workers on the state's payroll. According to the New York Times, “public officials have stood by as a small group of politically connected labor unions, construction companies and consulting firms have amassed large profits.” The study cites lack of competition, close relationships between contractors and bureaucrats, and shoddy institutional design as explanations for the high costs.²²⁵ US mass-transit costs are far higher than European equivalents, and high costs diminish the network that can be created, thus undermining the potential political coalitions that would support the project.²²⁶ A still-active Depression-era law requires that workers on federal projects be paid not a market wage but a “prevailing wage,” calculated by officials.²²⁷

The cozy relationship between union officials, bureaucrats and politicians extends to the pensions offered to public employees. By systematically understating the extent of the

benefits and assuming overly optimistic rates of return, public-sector unions have been able to lock in massive long-term benefits for much less valuable short-term pay concessions. As a result, the unfunded liabilities in US state pension systems have tripled in the past decade from \$339bn to \$1trn. Some states have actually made congenial optimism a requirement for new actuaries -- Montana's guidelines, for instance, state that any applicants advocating more conservative valuation standards “may be disqualified from further consideration.”²²⁸

Political considerations are particularly salient in the United States because of overlapping jurisdictions, resulting in more political constituencies to satisfy. As projects are modified to suit

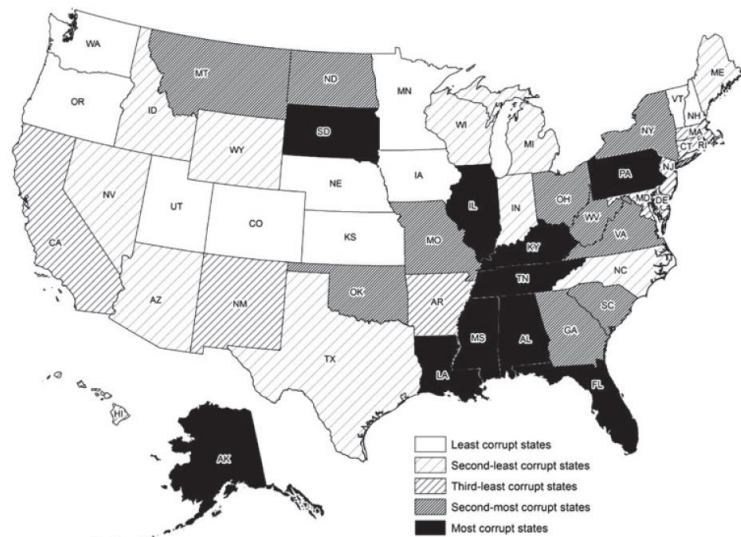


Figure 1 Public Officials' Corruption in U.S. States: Average, 1976–2008

Source: Liu, C. and Mikesell, J. L. (2014), *The Impact of Public Officials' Corruption on the Size and Allocation of U.S. State Spending*. *Public Admin Rev*, 74: 346–359.

these political requirements, the resulting “scope-creep” causes project costs to balloon, which may even result in project cancellation.²²⁹ Without a central point of responsibility, absurdities can ensue. A bridge in Oklahoma began to show cracks in 2014, but because the bridge was a Depression-era project, state officials had to receive certification from Oklahoma’s historical preservation office before beginning repair work. Then a threatened minnow, the Arkansas River shiner, further complicated matters.²³⁰

The sharp reduction in pork-barrel spending in the 2000s coincided with a decline in infrastructure projects.²³¹ While such pet projects were portrayed in the press as boondoggles benefitting insiders at the taxpayers’ expense, at least some of them appear to have been necessary infrastructure projects on their own merits.

Veto points

A study estimated that federal highway projects have more than 200 regulatory steps, taking a decade or more to complete.²³² Typical highway projects now take at least ten years to get through the approvals process, against five years just a decade ago. Even government agencies struggle with the complexity -- the Army Corps of Engineers needed 16 years to get a permit to dredge the harbor in Savannah, GA, consulting with at least 10 federal and state agencies along the way.²³³ Some of the United States’ most innovative roads and railroads pre-date the permit system.²³⁴

New highway projects often take between nine and 19 years from permitting to completion. It took 20 years to grant a permit for a mine in Alaska, for example, and 14 years to expand an existing reservoir in Colorado. Adding a runway at Seattle’s international airport required just four years of construction—but obtaining the permits took 15 years. As the head of the American Association of Airport Executives pointed out to Congress, “It took longer to build that runway than the Great Pyramids of Egypt.” Rather than expend political capital making a tough decision about the Keystone XL pipeline, the Obama Administration allowed it to linger in permitting review for nearly a decade, which even union leaders were moved to call a “cynical manipulation of the approval process.”²³⁵

There is currently an excessive number of these veto points in US infrastructure planning.²³⁶ Only 3.6% of the 2009 stimulus package was spent on infrastructure because, as President Obama ruefully put it, “there’s [sic] no such thing as shovel-ready projects” because each project is subject to significant review under the National Environmental Policy Act (NEPA), enacted in 1970.²³⁷ According to one expert, “environmental review has become a bureaucratic swamp that bogs down vital projects and [is] a potentially lethal weapon in the hands of anyone who opposes a project.”

Such delay is not cost-free: a six-year delay more than doubles the effective cost of projects, and there are often significant environmental costs to the delays themselves because delay prolongs the inefficiencies that the project is designed to solve.²³⁸ A recent bridge connecting New York and New Jersey required 47 permits from 19 federal, state and local agencies. Despite negligible environmental impact (the new bridge used the same right of way and foundations as the old bridge), the final environmental assessment exceeded 10,000 pages, with another 10,000 pages of appendices. At prevailing reading speeds, reading this document would take a full two weeks of working time. It is important to note that, far from serving a serious purpose, such reviews ensnare projects in “a jungle of trivial detail.”²³⁹

As a former EPA general counsel has estimated, 90% of the detail in federal impact statements serves no useful purpose in project evaluation but is presented defensively to be of use in the

inevitable ensuing litigation. No one designed the system to operate this way—early environmental assessments under NEPA were tens of pages long—but after courts created a private right of action under the statute, lawsuits over environmental review statements “became surrogates for questioning the wisdom and design of projects.”²⁴⁰ Offshore wind farms, for example, have had their environmental impact questioned by wealthy beachfront property owners anxious about preserving their ocean views. Such NIMBYism allows project opponents to use environmental review as a weapon to demand concessions, undermining the public interest by imposing dramatically higher costs and delaying environmental benefits. In addition, the very uncertainty that environmental review imposes on project scheduling has served as a major deterrent to the involvement of private capital. In effect, NEPA as interpreted has transferred power from democratically-elected officials to unaccountable project opponents, officials and courts. Experts recommend a radically streamlined review process, with a hierarchy setting out particular officials with responsibility for each phase of the review. This could reduce the cost of review by 50%, and the duration of review to “two years, not ten.”²⁴¹

The absurdity of the permitting process was not deliberately chosen, it was an “accident of legal accretion.”²⁴² Prominent economist Larry Summers blames the sclerosis on “a gaggle of regulators and veto players...every actor is reasonable in his or her own terms, but the final result is wildly unreasonable.” Such failure is costly in terms of democratic legitimacy: “faith in government’s ability to do big things depends on its success in executing routine responsibilities,” and Summers wonders whether a vicious cycle in reduced expectations and poor results have bred a dangerous cynicism.²⁴³

Cost-benefit analysis

Federal infrastructure funding is badly targeted, with little attention to cost-benefit analysis. For example, federal spending per 1,000 miles traveled varies from \$12 in Georgia to \$98 in Alaska. A similar number of miles are driven in Tennessee and New Jersey, but Tennessee receives 42% more federal funding.²⁴⁴ Many cities simultaneously invest in public transit and subsidize driving by requiring new buildings to have parking spaces.²⁴⁵

Of \$828 in economic stimulus spending after the 2008 recession, just \$55bn went to transportation and water projects. This spending was directed to sparsely-populated areas at twice the rate of densely-populated ones, despite significantly higher construction costs in densely-populated areas. Emphasis on rural construction reflects the bias towards rural areas embedded in the US’s federal structure. Despite cancelling the infamous “bridge to nowhere” under public pressure, Alaska did spend federal money building a road to the empty bridgehead.²⁴⁶

In the past decade, the United States missed a tremendous opportunity to invest in its infrastructure by taking advantage of exceedingly low interest rates and spare capacity in the construction sector. In fact, government and municipal bond issues actually *declined* over the period in question, and states are now investing relatively less in infrastructure than they did in the 1980s. According to an analyst with Moody’s Investors Service, “The collapse in interest rates corresponded with the recession and with a political trend toward antitax sentiment. Even as state and local governments are looking at lower bond yields, they are facing a public that is reluctant to pay more taxes.” The requirement, common in many states, to put tax increases to referendum has made politicians even more reluctant to propose projects, even when they are clearly necessary - Wisconsin voters have rejected over 40% of such initiatives, for example. California is slashing its transportation plans by a draconian 28%, and Florida actually went five years without approving *any* new spending on public schools and universities. An analyst with S&P says that while a

reduction in new projects may be a rational response to straitened budgetary circumstances, “forgoing timely repairs to existing structures could drive up costs in the long run.” Federal grants for state transportation projects are also drying up—they totaled \$68bn in 2016, down from an average of \$80bn over the last decade. ²⁴⁷

The rampant growth in entitlement programs is now resulting in an increasing federal deficit *even when the economy is growing*. Spending on discretionary programs is being crowded out. By 2022, virtually every dollar of tax revenue will be committed in advance. ²⁴⁸ According to an analyst with S&P, states have maintained austerity-oriented budgets despite recent economic growth, and have begun to cannibalize infrastructure and education investments to feed the growth in entitlements. ²⁴⁹ Fundamentally, the US systematically underinvests in infrastructure because the funds that would have paid for it have been spent on entitlements. ²⁵⁰

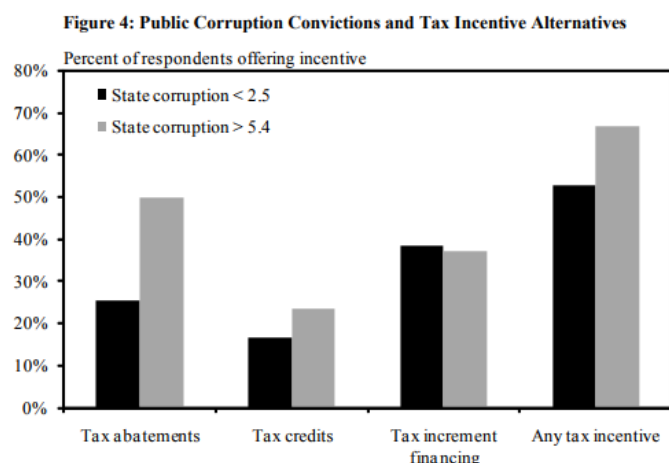
Traditional corruption

More than 25,000 Americans have been convicted of corrupt acts since 2000. ²⁵¹ As theory would predict, US states with high numbers of corruption convictions have higher public spending - about 5%, or an extra \$1,308 per citizen. High corruption diverts spending into “bribe-generating” areas, such as new construction. States with high levels of corruption convictions have been found to have higher public payrolls and engage more frequently in deficit financing to conceal the true cost of public spending. These states also spend relatively less on education and more on police and prisons. ²⁵² The nine most corrupt US states are Alabama, Alaska, Florida, Illinois, Kentucky, Louisiana, Mississippi, Pennsylvania and Tennessee. ²⁵³

For example, Pennsylvania’s state police have diverted hundreds of millions a year to their own coffers from the state’s gas tax, the highest in the nation and passed expressly to fund road construction and maintenance. This legally dubious tactic has been called unconstitutional by local officials and politicians but, incredibly, has not yet been challenged. ²⁵⁴

US states with high numbers of corruption convictions also tend to spend relatively more on tax abatements, credits and tax-increment financing to attract private companies and fund infrastructure projects. Tax-increment financing is typically based on optimistic forecasts of future tax revenue, and this mismatch creates a new source of debt. States turn to these financing methods as a last resort, and “jurisdictions in states with troubled political cultures are more likely than others to have dysfunctional tax and regulatory systems that make it difficult for them to compete for businesses except by offering special incentives.”²⁵⁵

The United States lost between \$31bn and \$60bn in Afghanistan and Iraq through waste, fraud and abuse in building and highway projects characterized by substandard building and cost overruns. Many of the associated contractors, such as



Source: Felix, A. and Hines, J. 2011. Who Offers Tax-Based Business Development Incentives? The Federal Reserve Bank of Kansas City Economic Research Department, November 2011.

the construction company KBR (formerly Kellogg Brown and Root) and the oil-services company Halliburton, enjoyed close ties to politicians and government officials.²⁵⁶

New York's governor recently proposed a massive infrastructure investment, but analysts are concerned that the plan focuses excessively on new construction and stints maintenance and upkeep. Similarly, the governor recently shut down an anti-corruption panel reviewing abuse of expense accounts by local politicians. In both cases, the governor's political interests appear to have intervened, and the people of New York have been unable to organize effectively to force action in the public interest.²⁵⁷

Policy Recommendations

The only long-term way for infrastructure to be built in the public interest is if the public is interested. Reformers should agitate for measures that make it easier for the public to monitor and evaluate the performance of their elected officials.

The good news is that the scope of the problem has been exaggerated. In 2016, The American Society of Civil Engineers released a scathing report called "Failure to Act," alleging that inadequate infrastructure spending could cost the US \$4.6trn by 2025.²⁵⁸ This appears to be an overheated estimate, doubling and even tripling comparable estimates compiled by various federal agencies. Should that \$4.6trn of extra spending be forthcoming, however, it would be a substantial return on the \$12m that the American Society of Civil Engineers spent lobbying Congress in recent years.²⁵⁹

Analysts estimate that an increase of \$150bn in annual infrastructure spending could generate \$270bn in economic growth, if properly targeted.²⁶⁰ An equivalent program to the New Deal today would require spending an *additional* \$400bn per year on infrastructure, approaching current annual spending on national defense.²⁶¹ Declining internal migration has prevented Americans from taking advantage of distant opportunities, and a modern version of the Homestead Act, encouraging migration to centers of economic activity, could address this problem.²⁶²

Regulatory hurdles and veto points attenuate the planning process. Streamlining regulations and adopting international best practices could save hundreds of billions of dollars.²⁶³ Other measures include prototyping of proposed programs before attempting them at scale, applying user feedback and approving smaller, more focused projects with predictable costs and benefits.²⁶⁴ US law privileges property ownership while mandating high labor costs and imposing inefficient regulation. There is significant scope for a political bargain on infrastructure.²⁶⁵

The CBO recommends increasing the productivity of highway spending by charging drivers for their highway use, allocating funding on the basis of benefits and costs, and linking funding more closely to performance metrics. The efficiency of infrastructure spending more generally could be improved by ending the tax-exempt status of municipal bonds and recovering the foregone tax revenue.²⁶⁶

Where ought the money to come from? Growth in entitlement spending is crowding out all other federal spending, growing 15% faster than revenues since 2003. Cutting a mere 1% of the *growth* in entitlements would liberate \$100 billion per year.²⁶⁷ More than 20% of federal gas tax revenue is currently diverted to other programs. If it were restricted to highways, the fund would be 98% solvent.²⁶⁸ Federal support for state infrastructure projects should be conditioned on adoption of sound budgeting.²⁶⁹

According to Aaron Klein, a transport expert at the Brookings Institution, “We have been living off the investments of the past, without doing enough to keep them up, and we’ve failed to build out the systems of the future.” He points out low-cost measures that could leverage existing infrastructure more effectively, like coordinating different forms of public transit and the freight and rail systems.²⁷⁰

Rather than directly funding infrastructure projects, the Trump administration's infrastructure plan simply offers tax credits to investors willing to back transportation initiatives. As explained above, the projects funded under such an arrangement would be the most promising, with the highest returns – in other words, the projects that would have been funded anyway. Nobel laureate Paul Krugman called this an attempt “enrich a few well-connected people at the taxpayers’ expense while doing very little to cure our investment shortfall.”²⁷¹ By leveraging private capital to do most of the heavy lifting, operations and maintenance would be stinted, and the federal subsidy would be lost to middlemen.²⁷² The plan also reverses the longstanding federal-state relationship in infrastructure financing, reversing what had been an 80-20 federal-state split and asking states to provide 80% of project finance.²⁷³

Public-private highway partnerships have a mixed track record in the United States. All projects to-date have relied on toll revenue, and half were either bought out or suffered a bankruptcy of the private partner.²⁷⁴ A better alternative to public-private partnerships might be municipal bonds explicitly earmarked for infrastructure, matched by a subsidy from the federal government. Project selection takes place at the local level, and the funds are used to pay for repairs, maintenance, and other infrastructure needs that lack a revenue stream. This arrangement was piloted during the 2009 financial crisis, and financed thousands of projects.²⁷⁵

There is some good news—bridges are in better shape than they were 15 years ago, with fewer of them functionally obsolete. A federal law requiring baseline operational maintenance spending by states went into effect in 2012. While federal spending on bridges has stayed flat since 2013, state spending has more than doubled.²⁷⁶ Squeezed between rising road construction costs and lower tax revenue from fuel-efficient vehicles, more than half of US states have raised their gas taxes since 2013.²⁷⁷

Larry Summers articulates a kind of “broken windows” theory for infrastructure, arguing that pervasive infrastructure rot can sap popular confidence in government's ability to get things done. He urges Americans to be “much less accepting of institutional failure,” and to “demand that public officials make our existing infrastructure work.” He reminds Americans that future generations will have to bear the burden of our deferred maintenance as well as our Treasury debt.²⁷⁸

Fundamentally, infrastructure will improve when American political culture acquires the maturity to compromise and make long-term investments. This is a skill that the American people have not thought important to select for in their political class in recent years, but there is hope of change on this front. The way out is first to elect pragmatists able to make deals and then hold them accountable for pursuing the public interest rather than their own. As James Surowiecki at the New Yorker put it, “it’s good for government to do big things, great things. But it’s better if it can do them under budget.”²⁷⁹

Analysis

Corruption is a symptom of failed governance, but can itself act to weaken the governance environment.²⁸⁰ Weak governance is linked to reduced quality, increased cost and greater delays in public construction.²⁸¹ Corruption causes lower worker productivity, decreases investment, and reduces annual growth rates. Where capital markets are heavily integrated, with highly elastic capital flows, corruption causes capital to flow to more amenable institutional environments. This undermines a common view that “development improves political institutions.” The data suggest that causality flows the other way—better political institutions lay the groundwork for future prosperity.²⁸² According to econometric research, efficient state institutions actually *cause* high investment and growth.²⁸³

The catalyst for redressing institutional corruption is most likely to come from below, as electorates demand increased accountability. This groundswell can be buttressed by measures to improve transparency.²⁸⁴ Governance failures are a principal explanation of infrastructure shortcomings. Wary of engaging with the political level, the development community has addressed corruption at the sectoral level, tinkering with institutions rather than facing up to populism, patronage, and other political distortions. But the political level explains a large part of growth divergences among similarly-situated countries.²⁸⁵

Large projects with unique or complex specifications are relatively more susceptible to corruption. Projects occurring in a corrupt context are also more likely to be victimized by self-dealing. Despite this, the vast project management literature is almost completely silent on corruption risks. Engaging with the political level is controversial, and development actors and project managers often prefer to focus on safe, technical issues.²⁸⁶

Dynamic contracting is a promising mechanism for coping with corrupt project contexts. The Indian universal identity (UID) number project was reluctant to choose a single contractor to register India’s citizens, because of worries about incentives. Instead, “the UID team devised a dynamic model. There are three contractors...[and] the firm that does the fastest, most accurate job gets 50% of the work, the others get 30% or 20%. This allocation is reassessed frequently, so if the second-best firm starts doing better, it picks up some work from the leading firm. In other words, each contractor is constantly competing against the other two. That keeps everyone sharp.”²⁸⁷ Digital technology allows for the reduction of even the largest projects to smaller increments for which known costs and benefits can be established.

The influence of money in politics creates incentives towards short-term thinking, undermining the public interest.²⁸⁸ Indeed, it is a mystery why rent-seeking is not higher. The so-called Tullock paradox refers to the meager bribe revenues in light of the huge payoffs at stake. As we have seen, bribes tend to average around 10% of the contract's value. In short, why is more not spent on lobbying? One answer may be the existence of powerful norms against self-dealing. However, these norms appear to be fading -- total lobbying expenditures more than doubled between 1998 and 2010. Government appears to be relatively more “for sale” than in past decades.²⁸⁹

Building poor-quality, poorly-operated infrastructure in the wrong places accounts for most of the negative development impact of corruption. For example, evidence suggests that Africa's real return to public investment is basically zero.²⁹⁰ As a result, minimizing the damage caused by infrastructure corruption would involve countering the incentives to build the wrong things in the wrong places by creating a procurement process that routinely selects projects with high economic return, and implementation processes focused on quality, such as paying for outputs based on an

independent physical audit. Remaining corruption will still be problematic, as it will corrode trust in government and drive honest contractors out of the market, but development prospects are best-enhanced by focusing on the most damaging corruption first.²⁹¹

Aid performs better in the presence of strong institutions.²⁹² However, aid may also displace local investment in strong projects, freeing up local resources to be either distributed as rents or invested in white elephants.²⁹³ For years until 2008, Uganda's Ministry of Roads operated a complex system of political patronage based on “a well-oiled machine for generating corrupt earnings from kickbacks.”²⁹⁴ However, the difficulty of skimming from donor funds resulted in low uptake of available donor funding. To reduce corruption in infrastructure, developing countries should focus their efforts on improving governance generally. Private involvement changes the nature of these governance challenges, but does not eliminate them.²⁹⁵

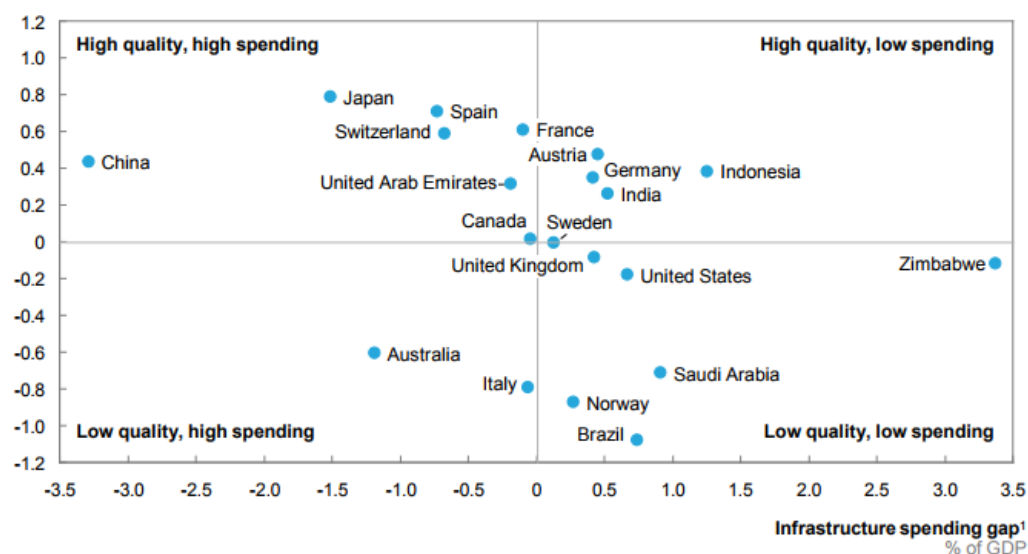
The diffusion of responsibility in government means that no official is forced to take responsibility for cost overruns and project delays. Regulations are simply applied, without pricing in externalities (delays, vehicle repairs, etc.). This failure of accountability is mirrored by politicians' failure to insist on reasonable deadlines, and may ultimately be caused by a failure of citizens to hold their politicians accountable for reasonable performance, perhaps owing to reduced expectations. There is a dynamic relationship between government effectiveness and popular confidence in government, and this feedback loop can result in virtuous cycles of citizen mobilization or vicious cycles of disengagement and distrust.²⁹⁶

In an international comparison, more corruption was associated with *higher* public investment in infrastructure as well as with *lower* infrastructure quality, smaller returns on investment, and less expenditure on operations and maintenance. In other words, corruption increases public investment while simultaneously making it less productive. Consequently, high public-sector investment is not necessarily a good thing, particularly in high-corruption countries and especially among those with significant political corruption at the highest levels.

Economists and public officials favor high capital spending because of its supposed growth effects, but poor project selection and the crowding-out of operations and maintenance typically result in a substantial drop in the average productivity of public investment in corrupt project contexts.²⁹⁷

Infrastructure quality vs. spending

Quality relative to income
Index



¹ Difference between historical spending levels from 2008–13 and the investment spending as a share of GDP that will be needed in 2016–30.

SOURCE: IHS Global Insight; ITF; GWI; National Statistics; World Economic Forum; World Bank; McKinsey Global Institute analysis

Rather than push for ever-more infrastructure spending, policymakers should improve the efficiency of existing spending by curbing corruption. According to a survey of executives, countries with more corruption tend to have worse infrastructure, and that corruption has been shown to cause the infrastructure problems. This result also holds within countries. Regions with more corruption than the national average tend to have worse infrastructure.²⁹⁸

Many of the most expensive infrastructure boondoggles have taken place in common-law countries, implying that the property-rights protections and limits on eminent domain may play a role in inefficient project outcomes. Common-law jurisdictions also feature larger degrees of political fragmentation, which imposes delays on infrastructure projects.²⁹⁹

Inefficiency may result from corruption's negative effect on firm labor productivity. Private ownership appears to reduce (but not eliminate) this inefficiency. Introducing an independent regulatory agency improves the situation considerably. "...the negative effects of macro-level governance failures can be significantly reduced with well-designed micro-level institutions."³⁰⁰ Both Canada and Australia have agencies dedicated to assisting with infrastructure projects.³⁰¹ In both Hong Kong and Singapore, "the reduction in corruption went hand in hand with the establishment and strengthening of an independent anticorruption agency with widespread powers." The top political leadership was also committed to anticorruption efforts.³⁰² However, even independent regulatory agencies must be selected by the executive, so they cannot be systemically exogenous.

There may be structural limits to infrastructure construction stemming from the consensus required to implement it. The emergence of nation-states in Europe was driven by the growing financial demands of war, as was the bipartisan consensus that enabled the great 20th century infrastructure drives in Europe and the United States. The contemporary absence of such pressures can explain some of the ossification of modern bureaucracies. Historically, substantial investments in primary education have been made at times of military tensions. In the absence of security threats, politics is less effective. There is a balance between the size required for military survival and the heterogeneity of the population. In the absence of security threats, it may be advantageous to be small and cohesive.³⁰³ Even in democratic countries, great infrastructure projects were frequently the achievements of unaccountable power brokers with near-dictatorial powers and a long-term view. A technocratic infrastructure bank could remove some of the political constraints, but like the Federal Reserve or the European Commission, would do so at the expense of its own democratic legitimacy.³⁰⁴

Corruption in public procurement is the second-most common source of political destabilization in African countries, and could be "among the key factors that would explain the blockage of its economic development."³⁰⁵ According to the UN, "high levels of corruption and losses in budgetary resources eventually reduce government legitimacy, which may in turn lead to social unrest and ultimately regime change."³⁰⁶ If a government is unable to fix serious problems in public infrastructure, it can lose legitimacy rapidly. In this sense, infrastructure corruption has systemic effects which, as we saw, can actively change the governance environment to make systemic corruption more common. This viral behavior makes corruption a security threat, as the US's Defense Department is belatedly acknowledging.³⁰⁷

The model we have developed for infrastructure corruption predicts that small, cohesive democracies will have robust infrastructure, and that authoritarian governments will spend great sums on white elephant projects while skimping on operations and maintenance. Large, heterogeneous democracies will struggle to muster the consensus required to build sufficient

infrastructure absent external pressures such as the threat of war. Observed evidence accords with these predictions. For example, infrastructure bottlenecks have been constraining growth in Brazil, India, the Philippines and South Africa, all large, heterogeneous democracies.³⁰⁸ It may be possible to elicit public-spirited behavior from politicians through institutional changes promoting transparency and accountability. However, a society without the baseline cohesion and social trust required to agree on a definition of the public interest provides cover for powerful interests to enrich themselves while immiserising the public.

Table 2. Key corruption risks at key steps of project preparation

	Project development and initial screening	Formal appraisal and independent review	Project selection and detailed design	Budgeting
Corrupt acts the PIM feature can address	<ul style="list-style-type: none"> Political influence to promote projects for the personal gain of decision-makers or their supporters Promotion of projects in return for contributions to party funds Bribery or lobbying by private consultants and/or contractors to propose projects for private gain 	<ul style="list-style-type: none"> Deliberate underestimation of costs and the inflation of benefits to get uneconomic projects approved Political influence to favour large projects and new construction over maintenance 	<ul style="list-style-type: none"> Over-design to increase fees and profits Design to favour one contractor Incomplete designs that leave room for changes that can later be manipulated High cost estimates to provide a cushion for later diversion of funds 	<ul style="list-style-type: none"> Political influence to "hijack" the budget process, that is, getting projects designed for private or political gain into the budget without proper appraisal ("jumping the fence") Implementation of projects that have not been included in the budget
Consequences of bypassing steps	<ul style="list-style-type: none"> "White elephant" projects with little or no social benefit Loss of investment through incomplete or aborted projects 	<ul style="list-style-type: none"> Neglect of maintenance Projects with low economic returns Excessive cost overruns 	<ul style="list-style-type: none"> Above average unit costs Incomplete design that prevents an accurate estimate of costs (which can lead to acceptance of tender prices below actual costs) 	<ul style="list-style-type: none"> Inadequate funds in capital budgets for appraised projects Budget constraints leading to late payment by the client
Links to further corrupt acts at later stages	<ul style="list-style-type: none"> Extraction of bribes for lucrative design contracts for projects that are never built 	<ul style="list-style-type: none"> Extraction of bribes for the award of lucrative design and/or construction contracts. Collusion to siphon funds during project implementation 	<ul style="list-style-type: none"> Incomplete design and/or unrealistically low tender prices that create opportunities for cheating during implementation as well as collusion to siphon funds 	<ul style="list-style-type: none"> Late payments that weaken the moral authority of clients, allow opportunistic behaviour and create a major reason why contract conditions are not enforced

Source: Wells, Jill 2015. "Corruption in the construction of public infrastructure: Critical issues in project preparation." Chr. Michelsen Institute, U4 issue, no. 8 (March 2015).

Table 3. Corruption risks at various stages in the delivery of a construction project

Stages	Risks	Main actors
Project appraisal	<ul style="list-style-type: none"> • Political influence or lobbying by private firms that biases selection to suit political or private interests • Promotion of projects in return for party funds • Political influence to favour large projects and new construction over maintenance • Underestimated costs and overestimated benefits to get projects approved without adequate economic justification 	<ul style="list-style-type: none"> • Government ministers • Senior civil servants • Procurement officers • Private consultants (e.g., planners, designers, engineers, and surveyors)
Project selection, design, and budgeting	<ul style="list-style-type: none"> • Costly designs that increase consultants' fees and contractors' profits • Designs that favour a specific contractor • Incomplete designs that leave room for later adjustments (which can be manipulated) • High cost estimates to provide a cushion for the later diversion of funds • Political influence to get projects into the budget without appraisal 	<ul style="list-style-type: none"> • Government Ministers • Senior civil servants • Procurement officers • Private consultants (e.g., planners, designers, engineers, and surveyors)
Tender for works and supervision contracts	<ul style="list-style-type: none"> • Bribery to obtain contracts (leaving costs to be recovered at later stages) • Collusion among bidders to allocate contracts and/or raise prices (potentially with assistance from procurement officers) • Interference by procurement officers to favour specific firms or individuals • Going to tender and signing contracts for projects that are not in the budget 	<ul style="list-style-type: none"> • Procurement officers • Private consultants (e.g., supervising engineer) • Contractors
Implementation	<ul style="list-style-type: none"> • Collusion between contractor and the supervising engineer (with or without the client's knowledge) that results in the use of lower quality materials and substandard work • Collusion between contractors and the supervising engineer to increase the contract price or adjust the work required in order to make extra profits, cover potential losses, or recover money spent on bribes 	<ul style="list-style-type: none"> • Procurement officers • Private consultants (e.g., supervising engineer) • Contractors and subcontractors
Operation and maintenance, including evaluation and audit	<ul style="list-style-type: none"> • Agreement by the supervising engineer to accept poor quality work or work below the specification, leading to rapid deterioration of assets • A lack of allocated funds for maintenance, as new construction takes precedence in the project identification stage for future projects 	<ul style="list-style-type: none"> • Procurement officers • Private consultants (e.g., supervising engineer) • Contractors and subcontractors

Source: Wells, Jill 2015. "Corruption in the construction of public infrastructure: Critical issues in project preparation." Chr. Michelsen Institute, U4 issue, no. 8 (March 2015).

INDEX OF EXAMPLES

Pre-qualification and tender

1. Loser's fee
2. Price fixing
3. Manipulation of pre-qualification
4. Bribery to obtain main contract award
5. Bribery during sub-contract procurement
6. Corruptly negotiated contract
7. Manipulation of design
8. Specification of overly sophisticated design
9. Inflation of resources and time requirements
10. Obtaining a quotation only for price comparison
11. Concealment of financial status
12. Intention to withhold payment
13. Submission of false quotation
14. Falsely obtaining export credit insurance

Project execution

15. False invoicing: supply of inferior materials
16. False invoicing: supply of less equipment
17. False work certificates
18. Excessive repair work
19. Overstating man-day requirements
20. Inflated claim for variation (1)
21. Inflated claim for variation (2)
22. False variation claim
23. Issue of false delay certificate
24. False extension of time application
25. False assurance that payment will be made
26. Delayed issue of payment certificates
27. Concealing defects (1)
28. Concealing defects (2)
29. Set-off of false rectification costs
30. Refusal to issue final certificate
31. Requirement to accept lower payment than is due
32. Extortion by client's representative
33. Facilitation payment
34. Overstating of profits
35. False job application

Dispute resolution

36. Submission of incorrect contract claims
37. Concealment of documents
38. Submission of false supporting documents
39. Supply of false witness evidence
40. Supply of false expert evidence
41. Bribery of witness
42. Blackmail of witness
43. False information as to financial status
44. False statement as to settlement sum
45. Over-manning by law firm
46. Excessive billing by lawyer
47. Complicity by lawyer

Source: GIACC 2008. "Examples of Corruption in Infrastructure," Global Infrastructure Anti-Corruption Centre May 2008.

2nd pillar: Infrastructure

Rank/137	Country / Economy	Score	Trend	Distance from best	Rank/137	Country / Economy	Score	Trend	Distance from best
1	Hong Kong SAR	6.7	↔	<div></div>	70	Montenegro	4.2	↔	<div></div>
2	Singapore	6.5	↔	<div></div>	71	Egypt	4.1	↔	<div></div>
3	Netherlands	6.4	↔	<div></div>	72	Ecuador	4.1	↔	<div></div>
4	Japan	6.3	↔	<div></div>	73	Brazil	4.1	↔	<div></div>
5	United Arab Emirates	6.3	↔	<div></div>	74	Jamaica	4.1	↔	<div></div>
6	Switzerland	6.3	↔	<div></div>	75	Serbia	4.1	↔	<div></div>
7	France	6.1	↔	<div></div>	76	Bulgaria	4.1	↔	<div></div>
8	Korea, Rep.	6.1	↔	<div></div>	77	El Salvador	4.0	↔	<div></div>
9	United States	6.0	↔	<div></div>	78	Ukraine	3.9	↔	<div></div>
10	Germany	6.0	↔	<div></div>	79	Viet Nam	3.9	↔	<div></div>
11	United Kingdom	6.0	↔	<div></div>	80	Armenia	3.9	↔	<div></div>
12	Spain	5.9	↔	<div></div>	81	Argentina	3.9	↔	<div></div>
13	Qatar	5.8	↔	<div></div>	82	Tunisia	3.8	↔	<div></div>
14	Austria	5.7	↔	<div></div>	83	Romania	3.8	↔	<div></div>
15	Taiwan, China	5.7	↔	<div></div>	84	Guatemala	3.8	↔	<div></div>
16	Canada	5.7	↔	<div></div>	85	Sri Lanka	3.8	↔	<div></div>
17	Luxembourg	5.7	↔	<div></div>	86	Peru	3.8	↔	<div></div>
18	Portugal	5.6	↔	<div></div>	87	Colombia	3.8	↔	<div></div>
19	Sweden	5.6	↔	<div></div>	88	Moldova	3.7	↔	<div></div>
20	Iceland	5.6	↔	<div></div>	89	Bhutan	3.6	↔	<div></div>
21	Denmark	5.5	↔	<div></div>	90	Botswana	3.6	↔	<div></div>
22	Malaysia	5.5	↔	<div></div>	91	Gambia, The	3.6	↔	<div></div>
23	New Zealand	5.5	↔	<div></div>	92	Nicaragua	3.6	↔	<div></div>
24	Belgium	5.4	↔	<div></div>	93	Algeria	3.6	↔	<div></div>
25	Israel	5.4	↔	<div></div>	94	Albania	3.6	↔	<div></div>
26	Finland	5.4	↔	<div></div>	95	Cape Verde	3.5	↔	<div></div>
27	Italy	5.4	↔	<div></div>	96	Kenya	3.5	↔	<div></div>
28	Australia	5.3	↔	<div></div>	97	Philippines	3.4	↔	<div></div>
29	Saudi Arabia	5.2	↔	<div></div>	98	Rwanda	3.4	↔	<div></div>
30	Cyprus	5.1	↔	<div></div>	99	Tajikistan	3.3	↔	<div></div>
31	Ireland	5.1	↔	<div></div>	100	Bosnia and Herzegovina	3.3	↔	<div></div>
32	Estonia	5.1	↔	<div></div>	101	Dominican Republic	3.3	↔	<div></div>
33	Bahrain	5.1	↔	<div></div>	102	Lao PDR	3.3	↔	<div></div>
34	Norway	5.0	↔	<div></div>	103	Ghana	3.3	↔	<div></div>
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42	Malta	4.8	↔	<div></div>	111	Bangladesh	2.9	↔	<div></div>
43	Thailand	4.7	↔	<div></div>	112	Mali	2.8	↔	<div></div>
44	Poland	4.7	↔	<div></div>	113	Lebanon	2.8	↔	<div></div>
45	Uruguay	4.7	↔	<div></div>	114	Tanzania	2.8	↔	<div></div>
46	China	4.7	↔	<div></div>	115	Ethiopia	2.7	↔	<div></div>
47	Lithuania	4.7	↔	<div></div>	116	Zimbabwe	2.7	↔	<div></div>
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51	Azerbaijan	4.5	↔	<div></div>	120	Sierra Leone	2.6	↔	<div></div>
52	Indonesia	4.5	↔	<div></div>	121	Lesotho	2.5	↔	<div></div>
53	Turkey	4.5	↔	<div></div>	122	Uganda	2.5	↔	<div></div>
54	Morocco	4.4	↔	<div></div>	123	Mozambique	2.5	↔	<div></div>
55	Latvia	4.4	↔	<div></div>	124	Zambia	2.4	↔	<div></div>
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57	Iran, Islamic Rep.	4.4	↔	<div></div>	126	Liberia	2.4	↔	<div></div>
58	Jordan	4.3	↔	<div></div>	127	Congo, Democratic Rep.	2.3	↔	<div></div>
59	Trinidad and Tobago	4.3	↔	<div></div>	128	Benin	2.3	↔	<div></div>
60	Brunei Darussalam	4.3	↔	<div></div>	129	Cameroon	2.3	↔	<div></div>
61	South Africa	4.3	↔	<div></div>	130	Burundi	2.1	↔	<div></div>
62	Mexico	4.3	↔	<div></div>	131	Mauritania	2.1	↔	<div></div>
63	Slovak Republic	4.3	↔	<div></div>	132	Nigeria	2.0	↔	<div></div>
64	Kuwait	4.3	↔	<div></div>	133	Madagascar	2.0	↔	<div></div>
65	Costa Rica	4.2	↔	<div></div>	134	Chad	1.9	↔	<div></div>
66	India	4.2	↔	<div></div>	135	Yemen	1.8	↔	<div></div>
67	Namibia	4.2	↔	<div></div>	136	Haiti	1.8	↔	<div></div>
68	Kazakhstan	4.2	↔	<div></div>	137	Malawi	1.8	↔	<div></div>
69	Georgia	4.2	↔	<div></div>					

Source: World Economic Forum, [The Global Competitiveness Report 2017–2018]

- ¹ Wells, Jill 2015. "Corruption in the construction of public infrastructure: Critical issues in project preparation." Chr. Michelsen Institute, U4 issue, no. 8 (March 2015).
- ² Apolloni A. and Nshombo J.M, 2013. Public Procurement and Corruption in Africa: A literature review. *Rivista di Politica Economica*, April/June 2013, citing World Bank 1995. "Strengthening the Effectiveness of Aid. Lessons for Donors," Development in Practice Series, World Bank Publication, Washington, 1995, p. 56.
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