The infrastructure conundrum: Improving productivity

Infrastructure productivity can and should be much better. Here's how to start improving.

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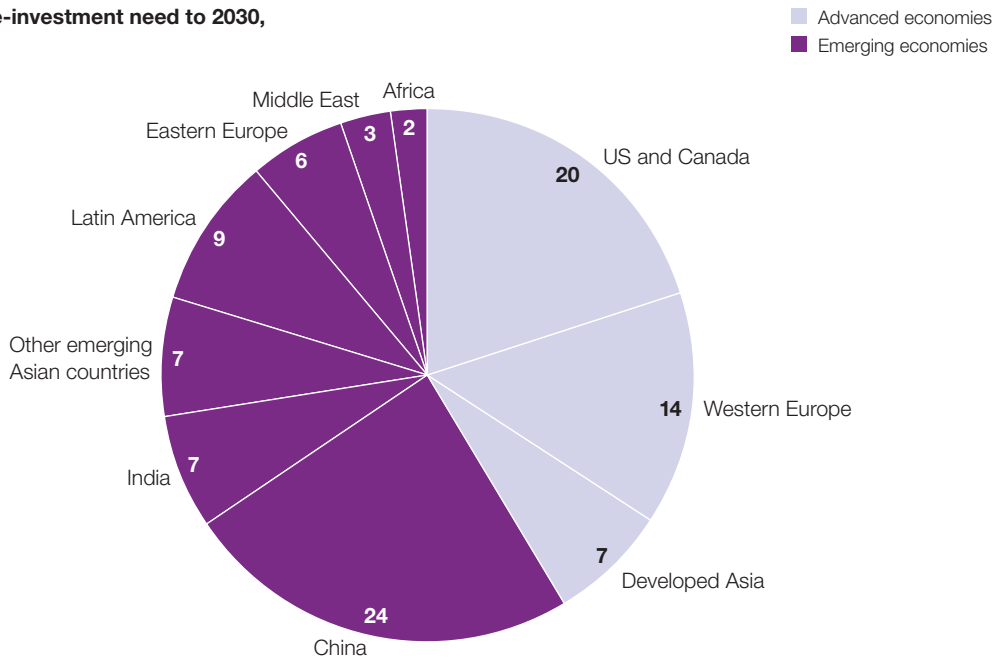
From now through 2030, the world will need to spend at least $57 trillion to build the ports, power plants, rails, roads, telecommunications, water systems, and other infrastructure that the global economy needs.[1] For advanced economies, the priority is to renew aging and dilapidated infrastructure; for emerging ones, it is to build the structures required to support growth—this is the larger part of the total bill (Exhibit 1). Our research, based on 400 global case studies,[2] suggests that governments could boost infrastructure productivity by $1 trillion a year in three ways: improving project selection, streamlining delivery, and making the most of existing investments. None of these actions requires radical change, and successful examples exist.

1. Project selection. Beyond palpable abuses of spending power, the more common problem is that decisions about whether or not to build are sometimes made without considering the larger socioeconomic objectives of the country. This happens when officials look at projects one by one rather than considering how each particular project fits into the entire portfolio. Or they do not evaluate whether other projects might have better returns. This matters: research shows that countries that take the time to get the planning right are able to eliminate noneconomic projects and reduce project overruns in the projects they do launch. The key is to create a rigorous, transparent, and fact-based process to decide what needs to be done, and in what order (see sidebar, "Infrastructure diagnostic").

Exhibit 1

Emerging economies account for 60 percent of required infrastructure investment.



Source: McKinsey Global Institute

None of this is easy; in fact, it is almost bewilderingly complex. Take trying to calculate the socioeconomic benefits of a project. The relatively simple part is to calculate the direct benefits. This proposed road, if built, will shorten travel time by X minutes, and there are Y thousand people traveling every day, adding up to Z time saved. But that is only the beginning. With a better road, companies can recruit in a wider region, finding higher-skilled labor. How can that be calculated?

Additionally, decisions are sometimes made on a political basis rather an economic one. There can be a lot of horse trading: "I agree on this project if you agree on that one." Even more common is a simple lack of knowledge. McKinsey has found cases where the cost of infrastructure in one country was up to 50 percent higher than in a neighboring country with similar characteristics—a discrepancy driven by different approaches to design, engineering, management, procurement, and sourcing.

Despite these challenges, there are ways that project delivery can be improved. One example is Infrastructure Ontario (IO), a corporation owned by the province of Ontario that provides a wide range of services to support the government's initiatives to modernize and maximize the value of public infrastructure and real estate. Over the past decade, IO has implemented a long-term investment

plan and essentially rebuilt the province's hospital infrastructure, building more than two dozen new structures. IO has organizational independence, clear responsibilities, and a close partnership with the private sector. South Korea's Public and Private Infrastructure Investment Management Center is a similar organization; it has saved 35 percent of the nation's infrastructure budget by rejecting 46 percent of projects that it reviews, compared with 3 percent before it was established. The United Kingdom set up a cost-review program that identified 40 major projects for prioritization, reformed overall planning processes, and then created a cabinet subcommittee to oversee delivery. These measures reduced spending by as much as 15 percent.

2. Streamlining project delivery. In simple terms, "delivery" refers to getting the job done. Both the supplier and the client bear responsibility for this, and both parties can often fall short.

In the construction sector, labor productivity, when measured in real value added per hour worked, has been flat or worse in many developed economies for decades. In the United States, productivity in the construction sector has fallen about 20 percent since 1989; in the rest of the country's economy, it has risen almost 40 percent. Germany has seen the same trend, to a slightly lesser degree, since 1991 (see "Thinking of infrastructure globally, acting locally," on page 77).

One reason for stagnating productivity is the construction industry's structure. For smaller projects, the sector is fragmented; the ten largest companies account for only 3 to 4 percent of global market share. Therefore, there are limited scale efficiencies, investments, and innovation. At the top end, for bigger projects, there are sometimes not enough capable bidders to compete. What's more, incentives are usually structured such that neither the agents representing the public nor the contractors are rewarded for innovating and taking risk.

It is a core responsibility of governments to provide infrastructure. However, this area typically accounts for less than 5 percent of the budget. As a result, infrastructure often receives less attention than it should. There are ways for government to increase the focus on infrastructure while also saving money. Convoluted permit and land-acquisition processes are major causes for cost overruns. By accelerating these processes, governments can cut costs. They can also improve management of contractors, by rigorously tracking their performance. These are important tasks, but ones that tend not to receive a lot of political credit.

In addition, infrastructure is a long-term investment, which can lead to complications when it intersects with the political cycle, which is often much shorter. It's not uncommon for a government

to plan a project, and then run into numerous problems. The next government will go through a lot of pain to actually build the planned project and face the bad press for any overruns. Then the third government cuts the ribbon and takes the praise. None of the three is accountable from end to end. There is little incentive to invest and plan well right from the start.

Then, there is the human element. In most projects, the skill set and capabilities of the project manager makes the difference. McKinsey analysis has found that only about 20 percent or so of project managers routinely deliver projects under budget and on time. A small minority are clearly unfit for the work. The bulk of people in the middle sometimes do well and sometimes not so well. Building their capabilities could lift productivity significantly.

An investment in early-stage planning, typically spending 3 to 5 percent of the total projected cost, is critical to improving project delivery. This involves making the commercial case as well as completing the technical drawings, specifications, risk assessments, and environmental and social-impact analyses. Eager to break ground, clients often rush this phase, later landing in trouble. Banks and donors often do not want to fund early-stage development but should insist that it occur; not investing in planning often leads to disaster. Preliminary McKinsey research has found that countries that consistently invested 1 percent or less up front experienced much larger overruns in time and costs that reached 50 percent or more. In one drastic example, the owner made 42,000 change requests in the course of a single project.

3. Underutilization. The cheapest, least intrusive infrastructure is that which doesn't have to be built. "Intelligent" transportation systems, which use advanced signaling to squeeze more capacity out of existing roads and rail lines, can sometimes double asset utilization at a relatively low cost. Active traffic management on England's M42 roadway, for example, directs and controls the flow of traffic; this has reduced journey times by 25 percent, accidents by 50 percent, pollution by 10 percent, and fuel consumption by 4 percent—at only 20 percent of the cost of widening the road.

Pricing mechanisms and improved maintenance are other ways to increase existing capacity. But such simple fixes are underused, often for political reasons. Take congestion charges. If there is no charge to use the road at 6 a.m. and a $5 fee an hour later, some people will move their commuting time to save money, smoothing out demand. That is the theory, and it has worked in Riga, Singapore, and even central London, where the red-and-white "C" (see the image on page 63) has become a familiar urban icon. The Panama Canal also uses congestion pricing, and so do many airports and railways, charging more to the boats, planes, and trains that want to use the facilities at more popular times of day. In each case, the result is that more traffic moves along, with fewer jams.

Although effective, congestion charges provoke opposition. There are ways, however, to make a case for their implementation. One is to demonstrate success. In Stockholm, residents were clearly ready to vote "no" on a referendum on the subject, so city authorities decided to test the idea by running a pilot plan for six months. When people saw how the system worked—traffic at peak hours fell by 20 percent—their opinions changed, and they voted to approve the program in 2006.

Infrastructure diagnostic

Getting policy right requires putting together the right information, and then drawing the right conclusions. But when it comes to infrastructure there's a problem: the information doesn't exist.

Competitiveness rankings from the Word Economic Forum and the International Institute for Management Development business school measure the availability of infrastructure. The Construction Sector Transparency Initiative and country- and sector-specific benchmarks, such as the UK Cost Review, measure costs. The International Monetary Fund's proposed Index of Public Investment Effectiveness compiles data on transparency, audit standards, and internal controls to evaluate governance. To complement these metrics, we have developed a three-part infrastructure diagnostic. It provides a comprehensive assessment of infrastructure delivery and offers a database of more than 500 examples of good and best practices.

Part 1. Establish a starting point. What's the state of the infrastructure? Does planned funding match future needs? Where are the biggest improvement opportunities?

Part 2. Measure effectiveness and productivity. Five areas are evaluated: project selection, funding and finance, delivery, asset utilization and maintenance, and governance. These five areas can be broken down into 30 categories and 78 subcategories, each representing a global best practice. For each category, we also codify average and low performances against a set of clear criteria, providing a basis for scoring each government's performance.

Part 3. Define outcomes. What's the cost of delivering a road in Country X compared to next-door Country Y? Do projects come in on time and on budget? Do they meet quality requirements? How many changes are required after first sign-off? The diagnostic considers quantitative indicators on availability, cost, and time to come up with an aggregate outcome, and also creates a basis for benchmarking.

The diagnostic compares participants not only against global best practices but also across regions, asset classes, and time. For each of the 78 categories, there are clear descriptions of good, average, and bad performance by international standards. Each category is scored from one (worst) to five (best). The final score, based on 400 criteria, reflects all participant responses. The goal is to help governments compare their performance, and also to learn from one another—something that doesn't happen nearly often enough.

Using the diagnostic, infrastructure providers can figure out where they are compared with their peers. Bad? Average? World class? This assessment can be done over the course of a day, a week, or a month.

So far, we have done roughly a dozen case studies, and some interesting patterns are emerging. One is that even the best countries score an average 3.7 out of 5.0, so there is room for improvement everywhere. Another is that in almost every single case, there are issues with capabilities and data, such as lack of an effective program manager and standard international benchmarks.

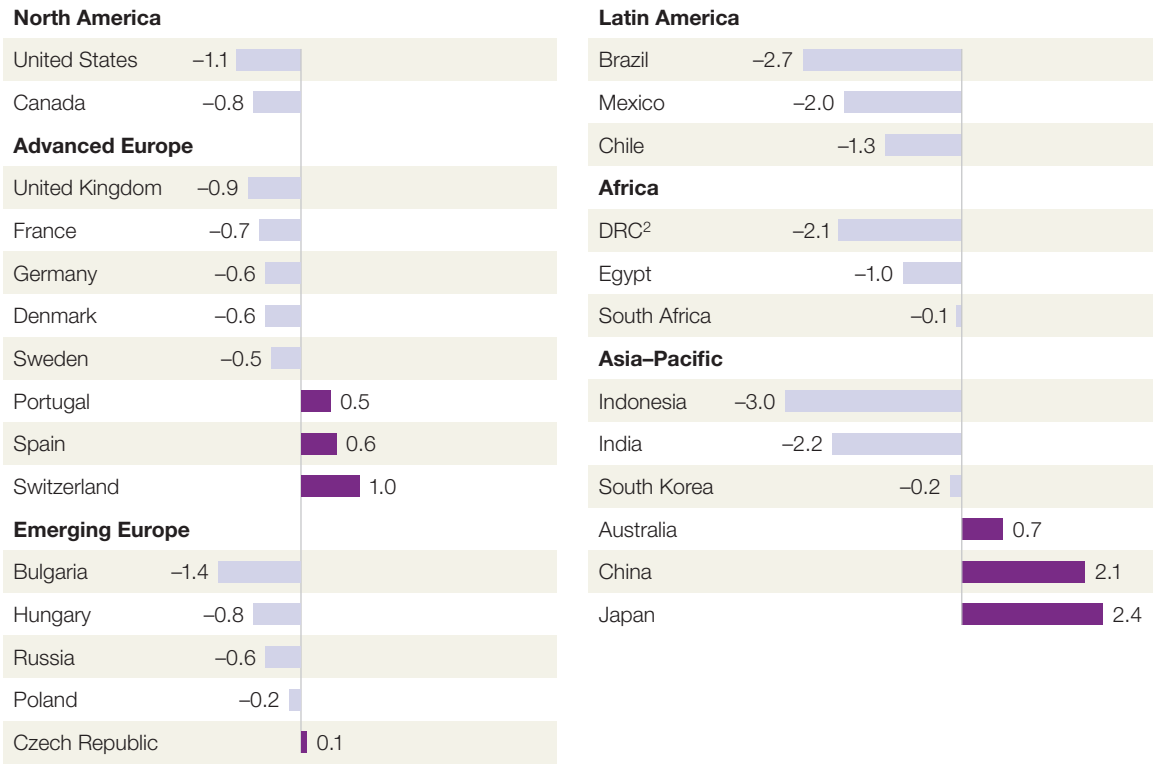
The diagnostic is and should be a moving target. Over time, many of the 500 best practices will only be good practices, as countries learn and improve. The assessment can work at different geographical levels—country, regional, or city—and with different asset classes. The strength of the diagnostic is that it provides a fact base in which to ground discussion. It marks the beginning of a systematic effort to analyze global infrastructure performance.

Another way to lower the cost of infrastructure is through better maintenance. Maintenance is not glamorous; in fact, it is time-consuming and sometimes tedious, and not nearly as exciting as cutting the ribbon on a new project. However, if assets are allowed to deteriorate, the costs of both operation and reconstruction increase markedly. And when countries do not make the most of what they have, they need to build new structures, which is much more expensive. Leading countries avoid this in part through good timing. They schedule maintenance often enough to avoid dilapidation and breakdowns. But they also seek to do so at the right times, to keep disruption to a minimum. The World Bank Group has estimated, for example, that if African

Exhibit 2

Most countries need to step up investment significantly.

Infrastructure investment gap,[1] % of GDP
Needed investment for 2013–30 growth vs historic investment for 1992–2011



[1] Gaps indicated relate to future growth projections, not to historic underinvestment nor to growth aspirations different from projections.
[2] Democratic Republic of the Congo.

Source: McKinsey Global Institute

Institutional investors have sufficient funds to finance all the world's infrastructure needs—as long as the projects are attractive. Even in poorer countries, the lack of access to money is not the problem. The challenge is to make investors feel confident that they will get their money back.

nations had spent $12 billion on road maintenance in the 1990s, this would have led to savings of $45 billion in reconstruction costs.

The role of money

Money plays a part in all three issues. If countries learned from one another with respect to best practices in productivity, cost cutting, and other practical measures, we estimate that total infrastructure spending could be reduced by almost 40 percent. It would be ideal—but unlikely—to recover that figure. Still, it gives an idea of the scale of the opportunity. One interesting development: the B-20, a business group that offers policy recommendations to the G-20 group of industrialized nations, has proposed setting up a "global infrastructure hub" to exchange best practices and develop benchmarks. In most countries, the annual spending needed to bring infrastructure up to the level required far exceeds what they have spent historically (Exhibit 2). In North America and Western Europe, the gap ranges between 0.5 and 1.1 percentage points of GDP per year and rises to 2.0 to 3.0 percentage points in Brazil, India, and Indonesia. Fiscal concerns have only made the infrastructure gap wider. This is such an enormous investment, especially given the fiscal constraints that many nations face, that the all-too-common response has been paralysis.

Institutional investors and others have sufficient funds available to finance all the world's infrastructure needs—as long as the projects are attractive. Even in poorer countries, the lack of access to money is not the problem. A vibrant bond market in Malaysia has contributed more than half of the private-sector infrastructure investments since the early 1990s. The challenge is to make investors feel confident that they will get their money back by capitalizing sensible projects that will be completed and then run well.

Even so, there is often a sizeable gap between the resources that are needed and the resources that are available. Public–private partnerships (PPPs) can help narrow that gap. But project-specific financing represented only around 20 percent of total infrastructure investment in the boom year of 2008 and collapsed to around half that level a year later. PPPs with private financing remain small in comparison to

traditional public or corporate financing by utilities and other private-infrastructure owners.

Still, there is a larger benefit to PPPs: they bring the discipline of the private sector to risk assessment, evaluation, and construction. Many PPPs also entail a 20- to 30-year concession that includes operations and maintenance. That long-term responsibility encourages the partnership to optimize the total cost of ownership, so there is no cutting back on maintenance. In this sense, PPPs have enormous potential. But they need to be managed carefully, with recognition of their limits.

Governments acknowledge the importance of infrastructure productivity, but most initiatives seem to assume that private-sector involvement will guarantee high productivity without improvements in planning, delivery, and governance. This attitude fails to recognize the efforts required to deliver complex PPP projects successfully and results in missing opportunities to raise infrastructure productivity. Moreover, just because capital is private does not guarantee it will be deployed perfectly; both the conditions of the contract and the capabilities of the provider need to be scrutinized.

Public financing is going to continue to be dominant. Particularly in the developed world, this money is cheap—well below 3 percent for ten-year government bonds in the United States and the United Kingdom. Public financing is especially important as a way to provide lower cost of capital in cases where risk is difficult to measure. In large, high-risk greenfield developments such as high-speed-rail networks, it may be the only option. To work most effectively, governments should provide certainty on infrastructure budgets beyond annual budgeting or electoral cycles, such as Sweden's ten-year plans for national transport. Capital recycling can free up funds for major projects; the Australian state of New South Wales, for example, has announced plans to sell off some publicly owned assets, such as ports and regional airports, to finance new investment.

Money is necessary to build the infrastructure the global economy needs, but it is not enough. Governance, commitment, and more than a little imagination are also required. As it is, the world spends much more money than it should for the results it gets. Even small improvements would bring huge benefits.

[1] If other forms of infrastructure are included, such as those associated with energy, mining, and real estate, the figure could be as much as $9 trillion a year.

[2] For more, see the full McKinsey Global Institute report, *Infrastructure productivity: How to save $1 trillion a year*, January 2013, on mckinsey.com.

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