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RESEARCH PAPER

INFRASTRUCTURE FOR ECONOMIC GROWTH AND DEVELOPMENT: ADDRESSING THE INFRASTRUCTURE FINANCE GAP

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**MIRVAC SCHOOL OF SUSTAINABLE DEVELOPMENT
BOND UNIVERSITY**

Infrastructure for Economic Growth and Development: Addressing the Infrastructure Financing Gap

A review of the role that infrastructure plays in strengthening economic development and poverty reduction and reducing trade costs to support improved regional cooperation and integration in Commonwealth countries.

Abstract

Infrastructure is one of the most important tools for accelerating economic development in developing and transition economies and in concert with a nation's institutional and policy settings, it is one of the key drivers of economic development, local and international trade, improved living standards and the relief of poverty. However, the benefits are not always uniform across nations, the results vary significantly between industries and improved social returns from additional investment have more to do with the procurement method and operational efficiencies than the amount of money that is employed.

Introduction

Infrastructure offers important benefits to developing economies and evidence from several recent studies suggests that it is one of the major drivers of economic development, regional trade and poverty reduction. However, it also forms part of complex and regulated networks, investment levels are low or accounted for by depreciation of existing capital stock and, in the absence of private investment and competition, social return is well below that of alternate asset classes. These elements suggest inefficiencies in its operation and create a major challenge for governments in developing countries. How do governments' increase the rate of investment and improve asset allocation and operational efficiencies to capture and sustain the wider benefits available from this important group of national assets?

Infrastructure Defined

Infrastructure has essentially two highly differentiated forms. First, the assets that deliver economic services such as roads, ports, railways, water and energy. These services are generally measured in economic terms such as their contribution to economic growth, increased productivity or reduction in private sector costs. Many of these assets are delivered by government although in recent years, privatisation of government business enterprises and shortage of state capital has led to greater private participation. Performance is generally measured at two levels. At the macroeconomic level, governments can measure improved productive capacity, growth performance, greater productivity and reduced industry costs. This may involve physical as well as financial measures of investment (Sanchez-Robles 1998). At the microeconomic level, the benefits include improved enterprise profitability, short and long-term growth in employment and incomes, and evidence of improved competitiveness.

A second group of services is described as public goods or social infrastructure and refers to services in health, education and public buildings such as police stations, court buildings and public housing. Social infrastructure services are generally measured by the contribution that they make to human capital development using indicators such as educational outcomes, life expectancy, health standards and labour participation rates.

Recent innovations have broadened these measures to include value for money analysis, qualitative measures of public service delivery and public value.

Infrastructure as an Asset Class

Infrastructure is a capital-intensive asset class, requires long investment horizons and, with limited exception, it is generally a wasting asset. That is, investment economics are determined by the economic life of the underlying asset that produces the service. Infrastructure also exhibits low fixed and variable cost structures and its operational effectiveness is generally measured and financed on a lifecycle basis. Accordingly, infrastructure requires large amounts of capital, involves high sunk costs and there is an inherent mismatch between the financial economics of these services and the political cycles that influence the policy directions of government. Around 90% of infrastructure is provided by the state in developing economies although innovative procurement methods over the past 20 years have led to greater private investment using the outsourcing of non-core state services, public private partnerships and relationship or alliance contracting.

Infrastructure is essentially a counter-cyclical asset class. In capital markets, it demonstrates a negative correlation with other asset classes and leading economic indicators. Accordingly, it offers a good hedge for portfolio investors and fund managers. In Australia, fund managers make up around 72% of listed infrastructure investments well above the average 56% for other asset classes. Infrastructure also is an attractive investment for private consortia in unlisted form which accounts for around 67% of new investment in developed economies. In developing economies, this asset class is attractive to foreign investment and offers geographical and asset class diversification benefits for mixed asset portfolios.

Investment Performance

Infrastructure improves a country's productive capacity and output. Its role in economic growth is less clear with evidence of reverse causation running between growth and infrastructure investment. Nevertheless, evidence from both developed and emerging economies over the past 20 years suggests that the causation predominantly runs from investment to growth. Economies with good infrastructure will generally grow faster than those without with medium-term improvement in regional industry and trade specialisation, exports, competitiveness and growth. The evidence from regional economies in developing nations suggests that those possessing better transport, energy and telecommunications infrastructure demonstrate stronger sustained growth performance than regional economies less well endowed. Further, studies of regional economies in Pakistan suggest that those with inferior infrastructure will lose investment and skilled workers to neighbouring economies with good infrastructure, further widening the development gap over time.

Infrastructure has been shown to make a direct and positive contribution to growth, productivity performance reduced private sector costs, employment and incomes. The growth effects are also indirect with capital deepening, the investment decisions of private companies and complimentary state policy settings in areas such as regulation and regional trade cooperation.

The results are highly differentiated between sectors, with the highest social returns generally associated with the telecommunications and transport industries. This suggests that the asset allocation decisions of government and the choice of procurement method will have a significant impact on investment economics and overall national competitiveness. However, there are several additional factors involved here that influence the rate of return including:

- The level of private sector participation in asset provision and its management
- Policy settings that favour private property, a strong domestic banking sector, expedient regulatory oversight and foreign investment
- The capacity and efficiency of networked supply chains.

There remains some uncertainty about the sustainability of infrastructure investment growth rates with evidence of diminishing returns and conditional convergence to regional growth performance averages over the long-term. Nevertheless, sustained growth is evident in regional economies that undertake long-term programs that adopt a supply-led infrastructure investment approach, where there is an integration of urban and infrastructure planning processes, and measures are taken to improve public procurement methods and efficient management of existing supply chains.

INFRASTRUCTURE INVESTMENT			
Contribution to Growth			
GDP %	1990	2000	2008 est.
South East Queensland	1.3	1.5	2.7
Australia	0.9	1.4	1.7
United States	0.9	1.2	1.4
Hungary	0.8	2.4	2.8
Romania	0.5	1.1	3.2
India	1.8	3.1	5.2
China	1.7	3.9	7.2
Trinidad	1.3	1.5	1.6
Fiji	0.5	0.6	0.6

SOURCE EBRD 2006, WDF 2007, Regan 2008

Table 1 The contribution of infrastructure to growth

Economic Growth and Economic Development

The international research examining the effects of infrastructure investment employs quantitative performance measures including growth in gross domestic product per capita (economic growth) and productivity. However, economic growth per se is not always a suitable proxy for economic development and fails to take into account uneven distributional outcomes. Adelman (2003) argues that economic development is a wider concept embracing self-sustaining growth, structural changes in patterns of production,

technological improvements, social, political and institutional modernisation and widespread improvement in human conditions (Grabowski, Self and Shields, 2007). These results are only captured in data over long time intervals thereby limiting short-term policy feedback and delaying timely responses. In recent years alternate measurement mechanisms have become available through a more scientific approach to infrastructure procurement. These include value for money tests in place of lowest procurement cost, the use of output in place of input specifications, the integration of design, construct and management processes and, the lifecycle costing of infrastructure services. Value for money evaluation offers both quantitative and qualitative measures of infrastructure investment performance and provides government with direct responses against economic development criterion.

Optimising Returns from Infrastructure Investment

There are a number of ways for developing nations to gain significant returns from infrastructure investment. The majority of improvements will be derived from better institutions, policy initiatives to strengthen regional trade opportunities, local and regional capital markets, foreign investment and entrepreneurship. These are changes that achieve sustainable results if introduced incrementally and, after significant work on adapting organisational culture. Nevertheless, they each assist the creation of an environment conducive to economic growth. There are a number of accompanying initiatives that can produce short-term improvements in economic development, the relief of poverty and foster regional trade liberalisation and growth. These concern improved supply chains and infrastructure networks and reforms to infrastructure procurement processes and regulation. Recent evidence suggests that these are initiatives are improving the economic and social benefits of infrastructure investment in developed and developing nations (World Economic Forum 2008, World Bank 2009).

1. Improved Networks

As a highly networked group of assets, infrastructure service delivery is as efficient as the weakest link in the supply chain. This is most evident in the energy, port, and land transport and communications sectors where there is strong reliance on efficient delivery of services against agreed pricing benchmarks and just-in-time distribution networks that minimise production costs and optimise delivery times. There is ample evidence of high cost imposed by supply chain bottlenecks and poor regulation and the disincentive that this creates for complimentary investment (Everett and Robinson 2007). Bottlenecks may be created by underinvestment in support services, a mismatch of public and private asset ownership, delayed or restrictive regulatory interventions and frequently, lack of cooperation between government departments, government business enterprises and provincial authorities. A solution to this lies in long-term infrastructure planning and improved procurement methods both of which can be achieved with the development of local capabilities and industry specialisation.

2. Regional Economy Trade Agreements and Capital Markets

Local capital markets offering bond and equity securities provide opportunities for local companies to participate in the infrastructure market creating access for long-term finance at lower cost, facilitating foreign investment and regional cross-border transactions. This is most effective when coupled with broader regional cooperation to

reduce trade barriers and policies favouring industry specialisation, competition policy and foreign investment.

3. Better Regulation

Improved microeconomic performance can be achieved with efficient regulation, policies that favour competition policy and improved planning of future infrastructure services. Alternate procurement methodologies such as alliance contracting and public private partnerships have shifted away from adversarial traditional contracting to reasonable regulatory frameworks that provide a balance between incentives for above average performance and abatements and liquidated penalties for performance below agreed benchmarks. Recourse to litigation in the event of disputes has given way to pro-active contract management, mediation and arbitration. The change in regulatory approach has made a significant contribution to the improved value for money outcomes being achieved with these methods.

4. Private Sector Investment

Evidence from developed and developing economies over the past 30 years confirms that infrastructure investment and operations managements undertaken by government agencies and business enterprises generates suboptimal performance outcomes at the enterprise level with flow-on adverse effects for the broader economy. The explanation is well documented in the public choice literature and can be attributed to failure to observe comparative industry performance benchmarks, the lack of incentives, community service obligations and when output pricing is not determined on the basis of costs of production. An additional factor is public sector borrowing in local and international debt markets which “crowds out” or reduces the pool of capital available to private firms. However, in relation to state infrastructure investment, it has the opposite effect or “crowds in” or stimulates private investment in supporting infrastructures, property development and supporting services.

Private sector investment in infrastructure in the form of BOOT, BOT and outsourcing contracts provides lower-cost services to government than those generated by traditional procurement or government business enterprises (Hodge 2000; Regan 2008). Alternatively, private investments in the form of medium term service concessions are built around incentives for sustainable performance which can be measured against benchmark rate of return criteria. Private investment may also be used to encourage skills transfer, vocational training and local employment quotas. Contracts that involve these conditions will assist development of local capabilities and bring important multiplier effects to the local economy in service exports, employment and incomes.

5. Procurement Methods

The poor track record of traditional procurement has been evident for a long time in both developed and developing economies. For infrastructure projects, it is associated with cost overruns, late delivery and poor service delivery outcomes with consequential impacts on supply chains and infrastructure service charges. Most traditional procurement is adversarial in nature and costed around a detailed state input specification in which the agency defines the exact design parameters, the dimensions, plant content and finishes of the asset. Little thought is given to lifecycle costing and qualitative service outcomes. More recent procurement options such as asset franchises

(or built own operate transfer contracts), outsourcing, alliance contracting and public private partnerships adopt a non-adversarial contracting form featuring an output or service specification that leaves the choice of delivery method up to the bidders. A value for money method is used to select a bidder in which lifecycle costing, quantitative and qualitative measures of services delivery are taken into account.

	Traditional		PFI-PPP	
	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>
Cost overruns	24-51%	73%	2%	22%
Late delivery	4-39%	70%	-16%	24%

Source: a Mott McDonald 2004; b NAO 2003.

Table 2 Performance of traditional and PFI (PPP) procurement 2002-04

Alliance contracting is a collaborative approach to procurement with a state agency and private firm entering into an agreed price contract with sharing of project risk. This is structured as a combination of incentives and penalties with cost overruns and cost savings shared between the parties. However, unlike public private partnerships, alliances are asset procurement and do not always include lifecycle management obligations under the same contract. Internationally, both methods of procurement are widely used to deliver infrastructure in more than 85 countries.

Procurement methodology that brings a rigorous risk-weighted approach to major projects using a competitive bid process, private sector expertise and innovation is achieving qualitative and quantitative benefits to the state not available with traditional procurement. Public private partnerships in particular, are achieving significant improvements in efficiency, lower costs and improved service delivery. A wide body of evidence supports the following findings (Regan 2008):

- Public private partnerships are bringing forward the delivery of major projects
- The model is achieving value for money, reducing procurement costs and delivering more projects on time and within budget than traditional methods
- Public private partnerships are improving the science of state procurement and have led to wider application of Gateway Review and alliance contracting methods with significant user benefits
- Certainty with lifecycle costing
- Improved quantitative and qualitative user and service outcomes
- High levels of construction and design innovation and new technologies.

Public private partnerships also bring opportunity benefits and permit government to increase investment levels as well as improvements in performance at the enterprise level.

SURVEY OF PROCUREMENT OUTCOMES ^a

		On Budget	On Time	User Benefits ^b
Traditional Procurement	<i>e</i>	25%	34%	27%
	<i>d</i>	27%	30%	35%
	<i>f</i>	55%	63%	55%
Gateway Programs	<i>d</i>	69%	73%	65%
Alliance Contracting	<i>e</i>	77%	78%	<i>Refer notes</i>
PFI (UK)	<i>f</i>	78%	76%	n.a.
PPP (Australia)	<i>g</i>	79%	82%	74%
UK Defence Contracts	<i>h</i>	17% (14%)	8% (24%)	Met requirements

SOURCE

MR 2008

NOTES

a Sources as noted. Sample sizes vary. Parenthesis denotes average overruns for sample.

b Qualitative assessment from independent NAO 2004, 2006 reports. Defect reporting.

d 2000-01 results: NAO 2001 Modernising Construction. Delivered on or under time and price.

e 1999 results: NAO 2005 Improving Services Through Construction Part B.

f 2004 results: NAO 2005 Improving Services Through Construction Part A.

g Fitzgerald 2005; Audit Office Reports Victoria & NSW 2004-08; IPA 2007.

h NAO 2004, 2006 MOD Defence Contracts.

Table 3 Procurement Comparison 1999-2008.

Conclusion

The international evidence for developing economies suggests that investment in economic infrastructure has important direct impacts on national and regional economies. Benefits at the macroeconomic level include improved productive capacity, output growth, increases in multi-factor productivity with flow-on effects to higher standards of living. Investment in social infrastructure improves human capital especially health and educational standards and vocational training. Infrastructure investment brings improvements at the microeconomic and industry levels in the form of better profitability, employment and incomes. Infrastructure investment also generates positive and sustainable externalities including poverty alleviation, specialisation, and regional trade. The evidence suggests that the benefits are greater when accompanied by institutional and policy frameworks that entrench private property rights, regional trade cooperation, the development of local capital markets, and the dismantling of regulatory impediments to private investment and trade. The challenge for emerging economies is to identify appropriate programs to integrate the planning and infrastructure supply activities of government, procurement practices and, creation of a favourable environment for both local and foreign infrastructure investment and management.

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