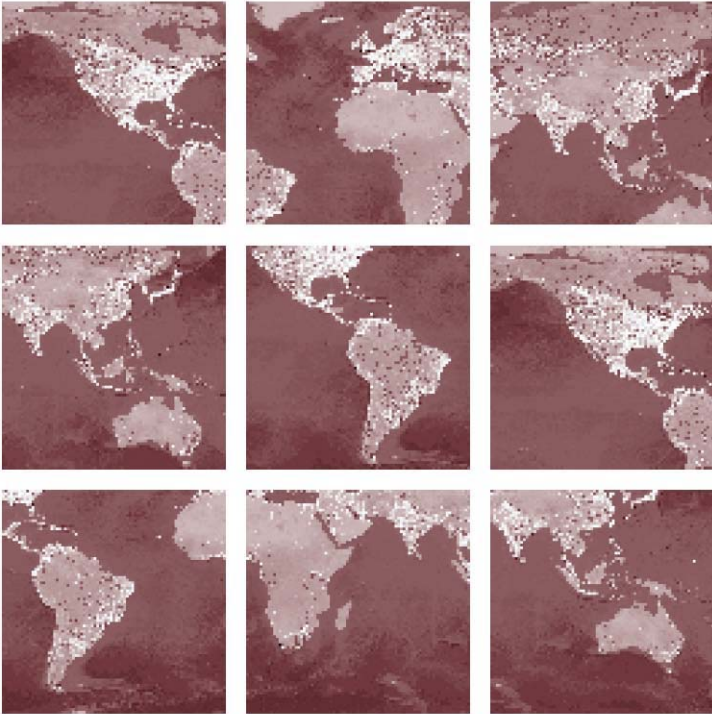


CHAPTER NINE

BUILDING THE BRICS: INFRASTRUCTURE OPPORTUNITIES

June 2006





BUILDING THE BRICs: INFRASTRUCTURE OPPORTUNITIES

Infrastructure is a key part of our BRICs story: it is vital to growth and plays an important role in reducing income inequality. We show a snapshot of current infrastructure stocks in the BRICs and highlight a related piece that estimates infrastructure spending over the next five years.

Our 'BRICs dream' envisions a world in which savings, population growth and productivity gains interact with good governance, sensible policies and strong institutions to yield impressive real GDP growth for Brazil, Russia, India and China. Infrastructure is a key part of this story. It is vital to economic growth and plays an important role in reducing income inequality. As globalisation deepens, infrastructure will arguably become even more important for countries seeking a role in the 'just-in-time' global economy.

The charts overleaf provide a snapshot of the current state of infrastructure in the BRICs.

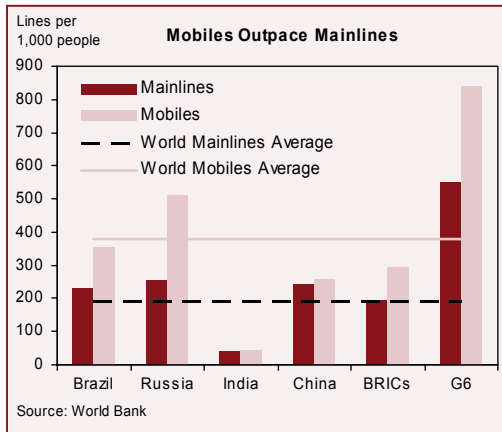
- **Mobile telephony** has experienced explosive growth over the past decade. In 1995 only three people in 1,000 had mobile phones in China; by 2004 more than 250 did. Russia has jumped from fewer than one per 1,000 to levels approaching those in the G6.
- **Electricity** consumption is widely divergent, with Russia using about 70% of the G6 average and agricultural India consuming only 10% of Russia's level. The roles are reversed in roads: India's network is comparable to those seen in the G6 (in quantity if not in quality), while the lack of roads in vast Siberia means Russia has a much smaller network.
- Access to 'improved' sources of **water and sanitation**, which can have an important impact on productivity, has risen in India and China since 1990. Urbanisation has been a major driver of this progress, although India's gains have outpaced the rate of urbanisation.

We have used our long-term GDP growth projections to estimate the aggregate demand for mainline and mobile phones, electricity generation capacity and roads in the BRICs over the next five years. Our estimates point to aggregate investment of nearly \$2trn, which implies annual spending of about \$390bn or 8.5% of today's GDP. About 60% of this would support new investment, with the rest for maintenance.

On our projections, roads will account for the largest share of investment in the BRICs (40%), followed by electricity (28%) and mobile phones (27%). Spending on mainline phones is likely to account for just 6% of the total, highlighting the extent to which mobiles have eclipsed mainlines (a story that is true around the world).

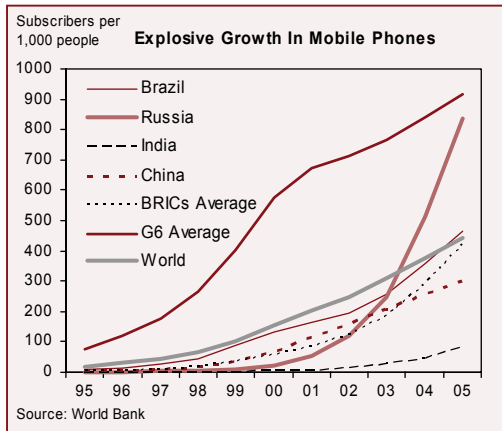
With our longer-term BRICs dream in mind, we have also estimated what is needed to bring infrastructure up to current G6 levels. This is quite a challenge: the aggregate gap between the BRICs and the G6 in electricity, telecoms and rails is a staggering \$10trn, or more than twice the BRICs' current GDP. This process of 'catching up' could take about 25 years.

Sandra Lawson, David Heacock and Anna Stupnytska
June 14, 2006



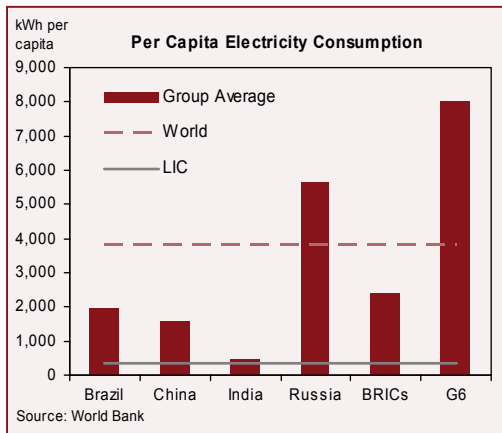
Calling the BRICs ...

- Both mainline and mobile telephone penetration in the BRICs have seen a sharp increase in the last 10 years, with the number of mainline telephones per capita increasing over 157%, compared with 6% growth in the G6 and 57% growth worldwide between 1995 and 2004. But mainlines have been eclipsed by the phenomenal growth in mobile phones, which now outstrip mainlines worldwide, as well as in each of the BRICs.
- India is the clear laggard in both mainlines and mobiles per capita, despite its growing international role as an outsourcing centre.



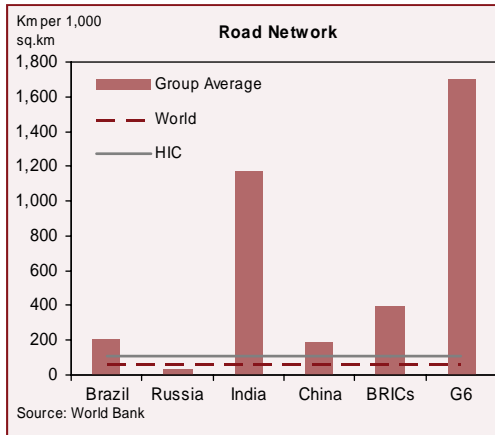
... Especially by Mobile

- The prevalence of mobile telephones in the BRICs has grown exponentially since 2000, lagging the developed world by roughly five years. In 2004, the BRICs' average mobiles per capita surpassed the world average for the first time.
- Russia has seen the most rapid increase, with the number of mobiles per capita more than quadrupling between 2002 and 2004. The number of Russian mobile telephones per capita now stands at roughly 61% of the G6 average, versus 35% on average for the BRICs.



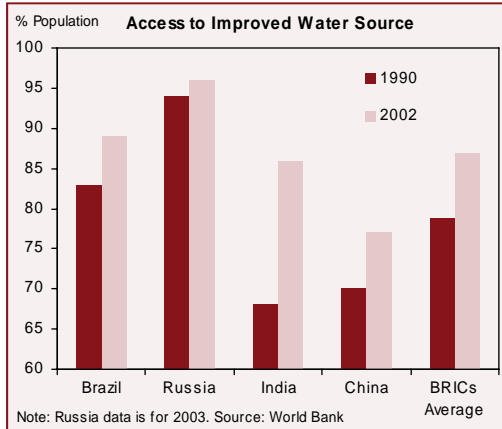
Electricity Consumption Shows Wide Divergence

- Average BRICs electricity consumption is three times lower than that of the G6 and is roughly equal to the world average level.
- Russia is the outlier on the high end; it consumes as much electric power per capita as Italy and about 70% of the G6 average. Per capita consumption in the other BRIC countries is much lower. Per capita consumption in India is just 6% of the G6 level and only slightly above the average of low-income countries globally.



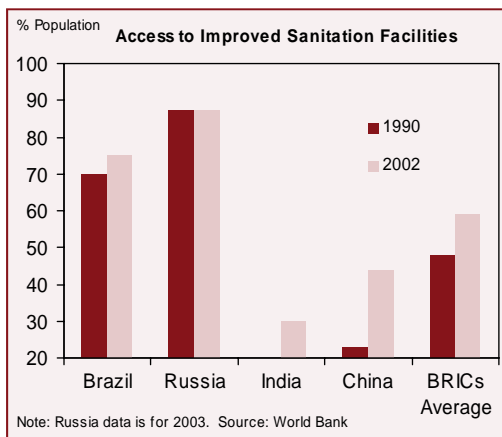
India Leads the Way in BRICs Road Networks

- Road networks across the BRICs are much less developed than in the G6, with road density on average only one-quarter the G6 level.
- This is one sector in which India trumps the other BRICs: its road density is nearly 70% of the G6 average and 18 times the world average. In contrast, Russia is the only BRIC country with road density below the world average, due to the extremely limited network in Siberia.



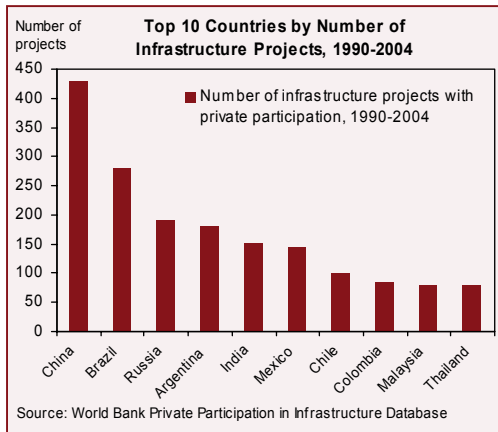
... While Sanitation Has Further To Go

- Access to 'improved' sanitation facilities is also closely tied to the level of urbanisation. However, compared with water access, there is a striking contrast within the BRICs, as 75% of the population in Brazil and 87% in Russia have access to sanitation facilities, compared with just 30% in India and 44% in China in 2002.
- China and India accounted for most of the 11% growth in the BRICs average access to improved sanitation facilities between 1990 and 2002; Brazil and Russia posted only marginal improvement. This suggests that further growth and development is needed to close the service gap between urban and rural populations.



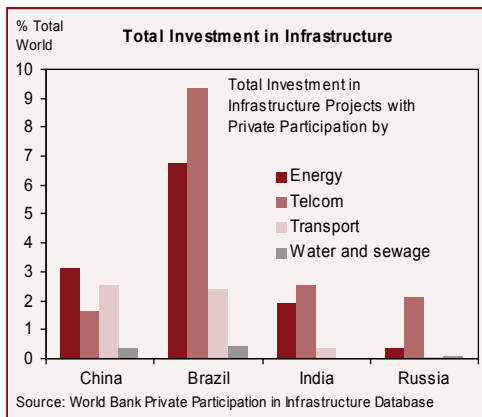
Water Access Increasing With Urbanisation ...

- 'Improved' water access in the BRICs is closely tied to urbanisation levels. Both Brazil and Russia began with higher levels of urbanisation in 1990, with 75% and 73% of the population living in urban areas, versus 27% and 26% for China and India.
- As the urbanisation gap has closed, so too has access to safe water: progress in India and China pushed the share of the BRICs population with access to improved water sources from 79% to 87% between 1990 and 2002. India's gains have outstripped its pace of urbanisation growth, probably helped by its higher population density.



China Leading by Number of Infrastructure Projects

- All four BRICs are among the top 10 countries ranked by the number of infrastructure projects with private participation since 1990. China tops the list, accounting for almost 15% of total projects, followed by Brazil with 9% and Russia with 6%.
- In Dollar terms, however, Brazil is in the leading position, having received almost 19% of total investment since 1990. China is ranked third (behind Argentina) and India fifth (behind Mexico).



Diverging Stories in Telecoms and Water Investment

- Telecoms has been the most successful sector in attracting private investment, accounting for over 45% of total private inward investment to the BRICs over the past 15 years. Flows fell significantly after the bursting of the technology bubble, and despite a mild recovery in 2004, they remain only half the peak in 1998, when Brazil divested the Telebras system.
- Water has received a mere 3% of total BRICs investment, with most going to Brazil and China. Improvements in regulatory regimes could significantly boost the potential for private-sector investment in BRICs water and sanitation utilities.