

Research by



Assessing the global transport infrastructure market: Outlook to 2025

2015



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Outlook to 2025 Transportation

Transport infrastructure investment is projected to increase at an average annual rate of about 5% worldwide over the period of 2014 to 2025.

Sub-Saharan Africa leads the pack with the fastest average annual growth rate of over 11%. Meanwhile, Asia-Pacific remains by far the largest transport infrastructure market, with investments increasing from \$557bn per year to nearly \$900bn per year in 2025.

On the downside, transport infrastructure investment levels in Western Europe are expected to take a long time to recover due to continual fiscal austerity – returning only to 2008 levels in 2022.

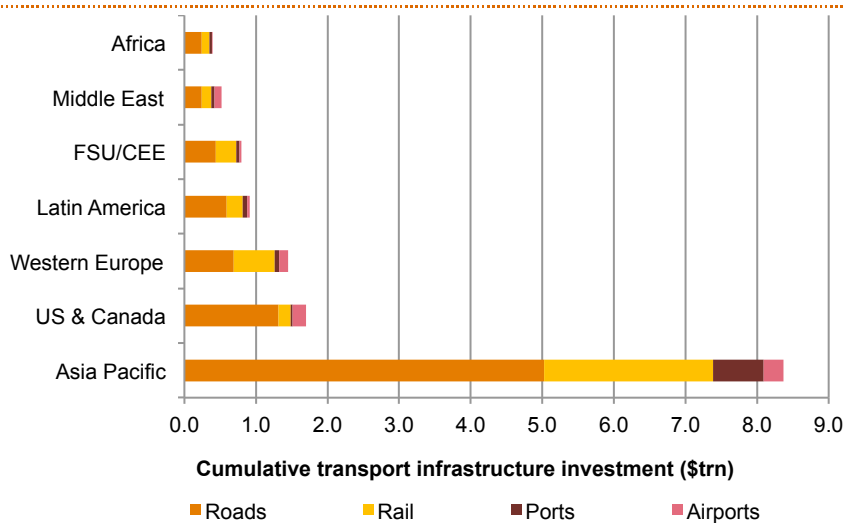
Growth by subsector

Considering individual subsectors, ports are predicted to grow the fastest at 5.8% on average per year over the forecast period (led by large investments in Indonesia, for example), while airport investments are expected to slow down to an annual growth rate of 2.6%.

Roads will likely remain the biggest area of investment, especially for growth markets. This is partly due to the rise in prosperity and, hence, car ownership in developing countries.

Railways, by contrast, are forecast to have a relatively strong growth in those advanced economies with mature transport markets like Western Europe where there is a growing opinion in favor of public transport – and particularly in the UK and Spain where high-speed networks are expected to undergo further development.

Cumulative transport infrastructure investment to 2025



Source: Oxford Economics

Growth by region

Transport infrastructure investment in **Western Europe** will likely be modest in the near future, given the already well-developed transport networks in many of the advanced countries as well as continuing fiscal constraints and a high demand for more social infrastructure, especially in healthcare. Infrastructure spending will likely be limited to targeted schemes for relieving traffic congestion. Rail investment, however, is poised for growth. For example, after a six-year slump, Spain is expected to see renewed investments in railways between 2016 and 2025. With this mix in subsector investments, Western Europe's share of global transport infrastructure spending is forecast to remain broadly unchanged from 11% in 2014 to 10% in 2025.

Likewise, with mature transport networks in the **US and Canada**, investment is expected to grow by an average of just 3% per year over the coming decade. Overall, a decline in the US-Canada share of global transport spending – from 14% in 2014 to 11% by 2025 – is expected. The lack of emphasis on transport spending is best illustrated by Canada's investment in airports, which is projected to decline year by year and will see modest returns only in 2023.

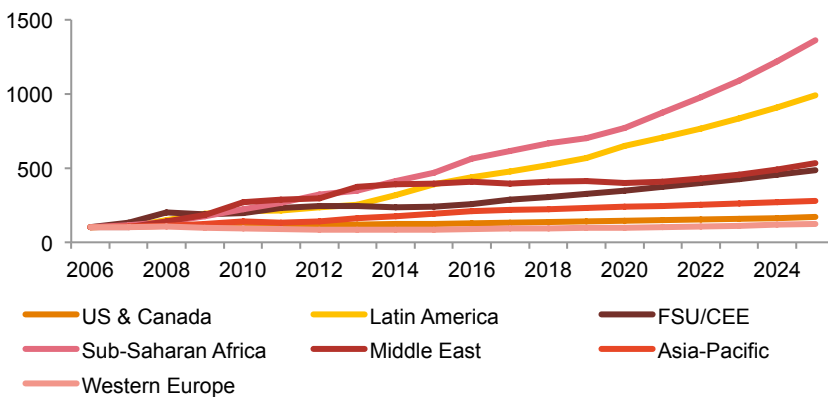
By contrast, large-scale development of transport networks will likely continue in many **Asia-Pacific** economies, given the shift in economic power from the West to the East, the rise in Asian wealth and rapid urbanisation. Significant investment in road infrastructure to accommodate ever more cars, along with investment in public transport infrastructure to relieve congestion in urban areas, is expected. Strong growth in sea port infrastructure is also anticipated to support expansion in international trade.

Rising wealth levels in **Latin America** are expected to drive strong increases in car ownership and, in turn, a need for investment in road infrastructure. Road spending is expected to increase by an average of 11% per year between 2014 and 2025, more than double the world average rate. Increased prosperity will likely also generate demand for other forms of transportation: Investment in sea ports is expected to grow at a similar rate to that in roads due to both increased consumer demand for imports and commodity exports. Airport spending is also expected to increase, particularly during the first half of the forecast period as the first stage of development of the new airport in Mexico City gets under way.

While megaprojects such as the metro for Riyadh and Qatar airport grab headlines, roads still make up the largest subsector for transport spending in the **Middle East**. The rate of car ownership is expected to increase sharply over the coming decade; consequently, the investment in roads is expected to increase as well – by almost 116% over this period to reach \$31bn per year by 2025.

Growth in transport infrastructure spending to 2025

2006=100



Source: Oxford Economics

While the **Former Soviet Union/Central Eastern European** (FSU/CEE) countries currently devote a smaller percentage of infrastructure investments to transportation than the global average, this is projected to change over the forecast period. For most of the FSU countries, investment in good transport networks remains relatively important due to the need to transport extractive outputs to other markets. Spending on ports, in particular, is expected to increase an average of nearly 10% annually from 2014 to 2025. In contrast, non-mineral exporting countries like Poland and Hungary will have much slower growth in transport spending.

Sub-Saharan Africa is the fastest growing regional infrastructure market, with a projected average increase in transport spending of over 11% per year from 2015 to 2025. Most of this growth is expected in roads and ports.

Transport development and economic structure

Worldwide, the performance of transportation and logistics companies varies greatly. One of the main reasons for this is the quality of infrastructure, which is fundamental to their effective operation. The importance of good logistics performance for economic growth, diversification and poverty reduction is now firmly established. The transportation and logistics industry forms the backbone of modern global supply chains. The logistics industry encompasses freight transportation, warehousing, border clearance, payment systems and, increasingly, many other functions outsourced by producers and merchants to service providers.

The World Bank logistics performance index shows that there is a wide difference between country performances, and this issue is difficult to tackle because each country has its own challenges and there is no single solution.¹ It is important, therefore, to consider each country's unique situation

when devising a strategic plan for transport infrastructure investments. For example, in the US and Indonesia, where distances between cities are relatively great, domestic air is a major mode of transport. By contrast, in Western Europe, there is less need for domestic airport capacity because the cities are closer together, and road and rail networks are robust and efficient.

In recent years, as road congestion becomes an increasing problem worldwide, railways have become popular again, especially high speed and urban rail (even though such projects are complex and take a long time to plan). London's Crossrail – the £14.8bn train line project that will increase railway capacity in the capital by 10% and is expected to carry up to 72,000 passengers per hour at peak times – has been discussed for more than 70 years and is still under construction (but should begin full operation in 2018). There is also a lot of pressure, due to the increase in urbanisation, to find transport solutions to reduce congestion in cities. In many of the largest cities in growth markets such as Jakarta, Bangkok and Manila, a major transport infrastructure upgrade is vital to allow the city to function effectively. These cities are rich enough to fund their own infrastructure but find implementation a difficult challenge due to lack of experience and inefficient planning processes.

Understanding growth market challenges and opportunities

Since the global financial crisis, spending on infrastructure has been constrained by the general squeeze on government expenditure while the long-term infrastructure gap continues. In some growth countries like Indonesia and India, the lack of transport infrastructure investment has been inhibiting growth. However, there are some signs of change with new governments in those countries.

China has led the way in spurring transport infrastructure investment.

Since 2011, the 12th Five-Year Plan adopted by the National People's Congress has shifted focus to domestic consumption and production of higher-value-added products, which, in turn, has led to changes in Chinese road investments. Also, since 2014 the central Chinese government has widely promoted public private partnerships (PPP) and has recently launched a transportation PPP programme of \$205bn, so more investment is expected from the private sector.

In the rail sector, the Ministry of Transport of China has developed a list of prioritised international megaprojects in support of the 'One Belt One Road' initiative such as the China-Laos, China-Pakistan, China-Thailand and China-Russia Railways.

In the airline sector, an IATA study forecasts that the Middle East passenger airlines' compound annual growth rate for 2013–2017 will be the highest worldwide at 6.3%, followed closely by Asia-Pacific at 5.7%². Demand from the growing middle class in Asia will likely help counterbalance the lack of public investment by improving the business case for private deals, driving total airport investments up from \$13.2bn to \$18.7bn between 2015 and 2025.

Understanding developed market challenges and opportunities

In some developed countries, the global financial crisis has also increased support for investment in roads and other infrastructure to drive economic and employment growth. For example, the 2009 American Recovery and Reinvestment Act (ARRA) was created to offset the decline in state and local spending on transport infrastructure. The prevailing opinion was that a stimulus package would have a direct potential boost on the economy and would also indirectly stimulate wider economic growth. But the lack of land space for new roads in some developed countries is becoming a growing

problem. Also, strong environmental movements are often opposed to additional road space, and they often campaign for more environmental protection legislation that ultimately results in unexpected infrastructure project costs after the project started. The Stuttgart 21 railway and urban development project in Germany is a good example. In 2010, after workers began cutting down trees for building work, they were forced to stop due to native beetles and bats living in the trees. The rail company was compelled to develop a protection plan for the animals.

Despite these challenges, there are still growth opportunities in many developed countries as the need for infrastructure improvements to address regional imbalances and capacity problems – principally in the road and rail sectors, but also in airports – remains. For example, the European Union put in place in the 1990s a transport infrastructure policy, the Trans-European Transport Networks, (TEN-T) programme, which is a planned set of road, rail, air, and water transport networks that has been helping passengers and freight connect better across the continent. This policy aims to boost international trade and to close gaps between transport networks, remove bottlenecks that still hamper the smooth functioning of the internal market and overcome technical barriers such as incompatible standards for railway traffic.

Funding of roads and railways

Whilst there is an active market for private investment in sea ports and airports that have strong commercial business cases, the funding of railways and roads is more challenging because they tend to be more dependent on public sector subsidy. Funding for roads, for example, has been in decline due to reduced revenue from car-based taxes as a result of the production of more fuel-efficient vehicles.

At the same time, despite the squeeze on public expenditure in some

developed countries, there is a lack of political support to implement widespread charging regimes to ration road space. Yet in other countries, toll roads are accepted as a fact of life and often the only option for a cash-constrained government as the toll revenue is seen as a commercially viable basis for non-government project financing.

The funding and financing of railways also continue to be a challenge as public sector project owners often naively believe that passenger fares, possibly supplemented by property development profits, can cover the costs of construction, financing and operation. This is usually not the case, but time spent trying to make the project viable means much delay before the inevitable acceptance that a commercially viable deal structure with public sector support needs to be developed if the project is not to be abandoned.

Innovation, technology and cross-border collaboration driving strategic investments

Investment in technology is necessary to support intermodality as transport networks get more complex and crowded. Mixed-mode journeys are common due to the strengths and weaknesses of various transportation options, and Intermodal Journey Planning software using online web applications or mobile device apps can be a good way to plan journeys and keep track of disruption.

As an alternative to building more capacity, the roads sector is also looking to adopt new technology, which can be applied to improve the efficiency of existing infrastructure. The ability to use technology to collect and manage large amounts of data and provide that information to drivers has a big impact. Three examples are England's Smart Motorway technology that allows the removal of redundancy in road space through increased road monitoring, the

use of mobile phone technology to track movement data and communicate with drivers, and the use of smart phone apps to inform drivers about parking space availability to improve parking efficiency in cities. The European Commission has been working on the European Railway Traffic Management System project to harmonise railway systems so that trains can cross national borders more efficiently.

Other new technology also makes an impact by enhancing vehicle capability. For example, autonomous vehicles are being discussed widely and some companies are making progress in this area. However, due to regulatory and other obstacles, they are unlikely to have a big impact on infrastructure spending in the near term.

Public-private collaboration in transport infrastructure

Past experiences show that there is a strong need for investment in infrastructure to be better coordinated with the requirements of logistics and other infrastructure operators. It is important for the operators to be involved in public infrastructure investment planning to ensure the efficient use of capacity. But many infrastructure owners and operators are national champions who do not have a global view or easy access to global best practices. On the other hand, construction companies are becoming increasingly international, enabling the transfer of technology and working practices. But the industry would benefit if operators, who understand the markets, were also bigger and more influential, compared with governments and construction contractors.

There are many cases, in ports and public transport, of new infrastructure being built but failing to attract enough volume for the designed capacity.

In the rail sector, there are also cases of investments where rolling stock investments haven't been coordinated with infrastructure.

However, there are also examples of good collaboration, such as the £5.8bn Intercity Express Programme (IEP) in the UK that is being handled as a PPP of up to 35 years. It involves the procurement of 700 seat high-speed trains specified to run on existing tracks (and subject to a coordinated programme of infrastructure improvements) as an alternative to the approach elsewhere of building new high speed dedicated lines (though these are also planned in the UK). And there have been many airport and port terminals where operators have played a lead role, making the design of the infrastructure market-led.

The general squeeze on government expenditure makes it even more critical to choose investment projects wisely. That is why new approaches to assessing the costs and benefits of projects – in particular, to better capture the wider economic benefits as well as better understand the costs of delays, deferrals or inaction – will have to be developed. Such approaches should enable authorities to better prioritise their budget spending. Due largely to budget constraints, there is also continuous pressure to finance investments through the private sector, even if ultimately, due to European public sector accounting standards (EPSAS), privately financed projects will often end up on the public sector's balance sheet. This will be a continuous challenge.

Market appetite for private sector investment

The global financial crisis has reinforced the belief that infrastructure is a strong asset class. In developed markets, the appetite to invest in infrastructure is strong, not least because many alternatives offer relatively low returns. While pension and insurance funds have significant sums to invest, they are

often reluctant to take the risk of financing the build stage of transport infrastructure projects. Even for brownfield projects, the financial failure of several toll road projects in major countries – for example, the Indiana Toll Road in the US, which filed for bankruptcy after the toll revenue failed to meet company expectations, and the Sydney Cross City Tunnel tollway in Australia, which also suffers from low traffic volumes and was too highly leveraged – has caused investors to take a more cautious approach towards pricing and structuring future projects with high demand risk.

The market for financing greenfield projects in emerging markets relies heavily on traditional infrastructure construction contractors and international financial institutions like the World Bank. This explains the trend for more secondary market transactions, which will enable investors to realise their investments and reinvest in new projects. However, some markets are not tolerant of the idea of an early exit for such contractors, so there remain obstacles to the development of secondary markets.

But the private sector is willing to invest in transport if the project is properly researched and the risk allocation is correct. Investments seem to be more interesting when related to high traffic transport nodes (e.g., port terminals, airports and large railway stations), especially with international routes because of their potential to generate additional revenue, which is even more attractive if in US dollars. A key factor to unlocking these opportunities is better project preparation, which we consider in more detail later.

Possible obstacles to investment in infrastructure

Many infrastructure projects around the world suffer from obstacles such as local political opposition, technical challenges or other unexpected issues that were not addressed when the

feasibility study was prepared (if there was one). In general, better design can help to avoid claims and disputes in the construction phase while better procedures for project planning, preparation and approval will allow projects to be built much faster. But in many growth markets, the major issue for governments is that they lack experience in how to prepare the projects.

Political challenges in developed countries

One of the main obstacles to transport investment in Western countries is the high level of deficit governments are facing, which has created challenges, especially in terms of committing large amounts to infrastructure. The gestation period for projects is usually substantially longer than political mandates, making longterm planning difficult and unreliable. Also, longterm economic planning is susceptible to economic shocks such as the recent decline in crude oil prices. These issues often have a ripple effect and lead to "start-stop" procurements.

But even when the will to restart stalled programs exists, coordination of the skills base and supply chain can be difficult. In the High Speed 2 and Network Rail electrification programmes, for example, there are concerns about whether the UK has sufficient skills in terms of design, engineering and construction as well as project management resources to deliver and meet investor expectations.

First time builder: developing countries

Developing countries face additional challenges when they are building infrastructure for the first time. This is the case with some Nigerian infrastructure projects where the current supply market is inadequate and experience is lacking. A good example is the Lekki Expressway where the concession was bought back by the government due to difficulties in collecting revenue via tolling – a concept that was alien to its users. As is

the case with other African countries, there is always a risk of poor construction and a lack of effective longterm maintenance programmes, making it difficult to attract investors.

A positive trend is a move towards greater use of Build-Operate-Transfer (BOT) contracts – rather than engineering, procurement and construction (EPC) contracts – to help improve planning and construction, but both require sophisticated management by the client.

In the ports sector, development of hinterland infrastructure for mineral, oil and gas ports is increasingly important. But the new port in Apapa (Nigeria), for example, has been built without an integrated approach. This has led to problematic situations where boats wait for days for their turn to dock. And when they finally do, they unload their cargo onto trucks that must queue for hours.

Some drivers from other sectors

In the energy sector, there has been major investment in transport infrastructure related to high oil and gas demand, especially in Russia and its surrounding countries, as supply routes evolve and countries seek to secure their import and export routes. The aborted South Stream pipeline project hasn't discouraged Russia from seeking to negotiate a new gas pipeline in Turkey, for example. In the public sector, targets for reduction of CO2 emissions are used as a justification for transport investments. But, in reality, the drivers for such investments have more to do with the will to reduce congestion (with some exceptions, e.g., railway electrification in the UK).

Recommendations to public and private sectors

The expectation of continued growth in transport infrastructure investment brings the current difficulties in preparation and delivery of projects into sharper focus. If governments and investors are going to deliver good projects and realise good socio-economic and financial returns, they need to continue to improve the way in which projects are prepared and delivered. Transport projects tend to be more complex than those in other sectors, often because they involve more stakeholders and because they are not self-contained and involve the integration of a number of different systems.

Project preparation is key to the successful delivery of a nation's infrastructure needs. This preparation should begin at the national strategy level and include a review of the needs of the nation from an infrastructure perspective. Such a study will help identify individual projects required to fulfill national economic goals and ensure a coordinated rather than an ad-hoc approach to infrastructure development.

At the same time, it is critical that the right legislative, judicial, institutional, financial, fiduciary and technical frameworks are in place. This includes upskilling, monitoring institutions such as the ministry of finance, enacting laws that allow private participation to occur, and establishing regulatory frameworks for each industry that allow long-term pricing certainty for potential future investors.

The project identification process should identify a long list of potential projects, which in turn would be shortlisted by means of high-level pre-feasibility studies to determine relative feasibility and bankability. Assessment criteria for the shortlisting process are likely to include a mix of national importance/criticality and financial feasibility rather than purely economic returns. For each of the shortlisted projects, a detailed financial feasibility assessment should be undertaken to determine the potential value, benefits and returns associated with the project, whether it can be financed by private capital and, if not, what level of subsidy might be required. This process will determine the projects that should be pursued. There are many examples of projects where such preparation has not been undertaken and the project has failed.

If the government is seeking private investment, a detailed feasibility study, undertaken in cooperation with well-respected international advisors, provides assurance to potential investors around the key risks associated with a project and its bankability, thus ensuring a higher level of interest in the project and a greater chance of overall success. The same steps are applicable even where the government is not seeking to attract private investors or private contractors in order to ensure that the project is set up for successful delivery.

Overall, our forecasts present a positive picture of a growing market for transport infrastructure, but it is important to ensure that this money is invested carefully and wisely, delivering increasing value to the funders, including all of us as users, taxpayers or investors.

¹ The World Bank, *Connecting to Compete: Trade Logistics in the Global Economy*, 2014.

² International Air Transport Association, *IATA Airline Industry Forecast 2013-2017*, 2013

Contributors

Strategic direction

Julian Smith

PwC Indonesia

Transportation and logistics

Marie-Claude Weyber

PwC Germany

Transportation and logistics

Economics

Graeme Harrison

Oxford Economics

***To have a deeper conversation
about this subject, please contact:***

Julian Smith

Global transport and logistics leader
Capital projects & infrastructure
PwC Indonesia
Plaza 89, Jl H.R. Rasuna Said Kav. X-7 No.6
Jakarta 12940
smith.julian@id.pwc.com
Tel: +62 21 52890966

Richard Abadie

Global leader
Capital projects & infrastructure
PwC UK
7 More London Riverside, London,
SE1 2RT
richard.abadie@uk.pwc.com
Tel: +44(0) 20 7213 3225

Neil Broadhead

EMEA
Capital projects & infrastructure
PwC UK
Embankment Place, One Embankment Place,
London WC2N 6RH
neil.broadhead@uk.pwc.com
Tel: +44 (0) 20 7804 4423

Mark Rathbone

Asia-Pacific
Capital projects & infrastructure
PwC Singapore
8 Cross Street #17-00, PWC Building,
Singapore 048424
mark.rathbone@sg.pwc.com
Tel: +65 6236 4190

Peter Raymond

North and South America
Capital projects & infrastructure
PwC US
1800 Tysons Blvd.,
McLean, VA 22102
peter.d.raymond@pwc.com
Tel: +1 703 918 1580

This report from PwC, with research by Oxford Economics, is part of an overall package of materials that provides the first consistent data analysng projected capital project and infrastructure spending across the globe. For investors, public officials and companies planning capital investments, it highlights the sectors and countries expected to benefit from this investment resurgence. And it provides insight into the factors driving the expected investment growth. In developing this analysis, Oxford Economics used data sets to provide consistent, reliable, and repeatable measures of projected capital project and infrastructure spending by sector and country. Historical spending data is drawn from government and multinational organisations' statistical sources. Projections are based on proprietary economic models developed by Oxford Economics at the country level. The results for this report have been estimated using the following underlying data sources: World Health Organisation, UNESCO, World Bank, Annual Capital Expenditures Survey, Association of American Ports, Edison Electrical Institute, Office of Highway Policy Information, Federal Highways Authority, Department of Transportation, National Clearinghouse of Educational Facilities, Department of Education and Oxford Economics. The analysis, completed over the first half of 2015, incorporates all available information at that time.