

motion

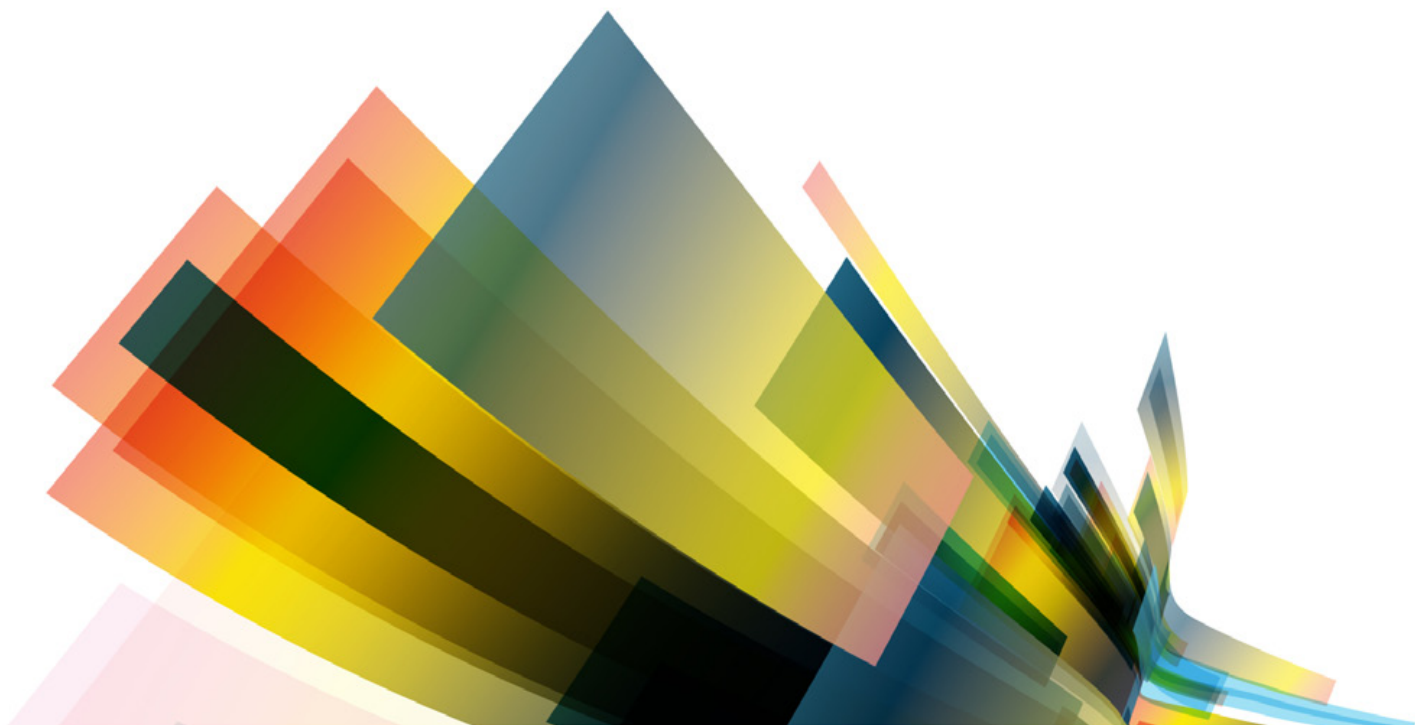
M A G A Z I N E



Tackling Transport's Funding Dilemma



SPECIAL SECTION | Norway's new National Transport Plan



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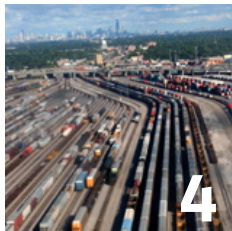
M A G A Z I N E



As you have opened motion, the magazine of the International Transport Forum, I hope that two things will have happened when you close it again: That you will have picked up something new, something interesting, something you didn't know already about the world of mobility and transport. And, second, that you will have actually enjoyed the read. Transport topics have an undeserved reputation for being dull and technical; some have warned us that doing an issue on "Funding Transport" would compound the problem. I don't think that is true, and that this issue of motion proves it. Today, mobility is such an omnipresent phenomenon and so interweaved with our daily lives that many of us tend to not even think about it anymore – it's almost like eating and sleeping. But transport is full of fascinating stories and profound insights into the workings of societies in developed countries and emerging economies alike that can be brought to light. I hope that you will find this issue of motion captures some of that fascination and sheds some light on one of the most difficult challenges facing our societies: How can we find the money to ensure that the growing, and also changing, demand for mobility does not overwhelm our existing infrastructure and services, while in parallel full use of new technologies is made to reduce the environmental burden and promote a more inclusive society? What financial mechanisms can we bring to bear to ensure mobility solutions that provide citizens with access to schooling, health services, job opportunities - to name but a few of the things that many of us take for granted but would not if it weren't for the complex transport systems that put them into our daily reach. I do hope the articles on the following pages stir your interest in these important questions for our future and encourage you to think about them.

Sincerely,

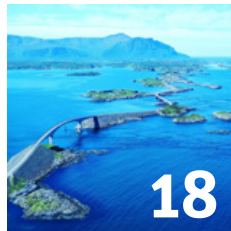
Jose Viegas
Secretary-General



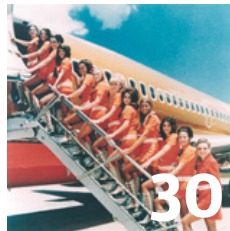
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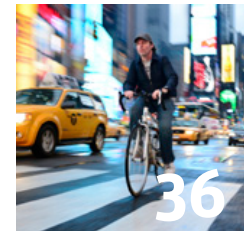
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Tackling Transport's Funding Dilemma

Demand for mobility is exploding, but public budgets are tight – policy makers are seeking new ways to fund transport infrastructure and services.

By David Crossland

It can take a freight train longer to get through the city limits of Chicago, America's biggest rail hub, than it does to get to Los Angeles, 3 250 kilometres away, says a new report on US infrastructure.

The vehicle fleet in Asia doubles every five to seven years while the urban population grows by 44 million each year, and road congestion already costs the region's economies an estimated 2 to 5% of their GDP, says the Asian Development Bank (ADB).

Many developed nations are failing to upgrade their creaking rail, road and urban transit systems quickly enough, while emerging economies are struggling to adapt their infrastructure to their population growth. Both are putting their economic development at risk.

Sacrificing prosperity?

According to a 2012 OECD report, demand for mobility is set to explode in coming decades. Air passenger travel could double, air freight triple and container traffic quadruple by 2030. Urbanisation may see more than 70% of the global

population live in cities by 2050, and the number of cars rise from 1 billion today to 2.7 billion.

Investing wisely in transport and building the right kind of infrastructure to meet the needs of coming generations is one of the greatest challenges governments face at the outset of the 21st century. If governments get it wrong, they may sacrifice future prosperity, fail to contain global warming, and fall behind in alleviating the everyday misery that billions of people face in accessing basic needs and services – to health services, to education, to jobs or to markets – because transport systems do not exist, are derelict, not efficient and not adapted to the needs of users.

Counting the trillions

But the current generation of policy makers face a most difficult dilemma: a shortage of long-term finance is adding to an already serious funding problem. The global financial and Euro debt crises have put a major strain on public budgets, forced banks to tighten their lending and made private investors cautious.

The timing could not be worse. By the end of this decade, the world's leading economies will need to inject more than EUR 14 trillion (USD 18.2 trillion) into infrastructure and other long-term projects to produce even modest growth, according to a report published by the Group of Thirty, made up of senior bankers and economists, in February 2013.

9 trillion

Annual long term investment in 2010 into infrastructure by the same group of countries, in Euros

DATA FOCUS

14.3 trillion

Annual investment needs until 2020 into infrastructure and long-term projects, including transport, by nine leading economies that produce 60% of global GDP, in Euros



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The report found that in nine major economies accounting for more than 60% of global GDP, annual long-term investment of EUR 14.3 trillion (USD 18.8 trillion) will be needed in real terms by 2020. By comparison, the countries' long-term investment totalled EUR 9 trillion (USD 11.7 trillion) in 2010. And another recent report by the ADB concludes that the countries of Asia and the Pacific alone will need to invest EUR 6 trillion (USD 8 trillion) in transport until 2020.

“Once you sort out the revenue end, then the finance follows”

Dieter Helm, Oxford University

Far-reaching reforms

“Far-reaching reforms in the international financial system will be needed to ensure that rising demands for long-term capital can be met efficiently,” warns Jean-Claude Trichet, former president of the European Central Bank and Chairman of the Group of Thirty. If reforms are not undertaken the world will likely face significant shortfalls in finance in coming years, says Mr. Trichet.

Yet there is no real shortage of money per se, say analysts. But not enough is being done to channel private investment into infrastructure projects. The world's sovereign wealth funds, pension funds, insurance and private equity investment funds are gradually recovering from the financial crisis, and are looking for places to invest.

Fundraising by dedicated private infrastructure funds, for example, has improved significantly since 2009, when just EUR 7.3 billion (USD 9.5 bn) was secured by infrastructure general partners, says Elliot Bradbrook, an analyst at London-based private equity consultancy Preqin.

Chicago Railyard

Tackling Transport's Funding Dilemma

Strong appetite

The EUR 28.9 billion (USD 24.7 bn) raised by unlisted infrastructure funds in 2012 was still some way short, however, of the EUR 34 billion (USD 44.6 bn) collected at the industry peak in 2007. "Institutional investors are now considerably more cautious when making new fund commitments," notes Bradbrook, "although investor appetite for infrastructure funds remains strong."

Governments need to think harder about innovative ways to raise capital, according to Dieter Helm, a transport economist at Oxford University. "There is no lack of funding in the markets," says Helm. "I think people focus on the unwillingness of people to invest without asking the question: What is the problem for investors? The problem for investors is pretty straightforward: how do they know they're going to get their money back? It is all about the revenue."

28 billion

Amount raised in 2012 by unlisted infrastructure funds, in Euros

34 billion

Amount raised in 2007 by unlisted infrastructure funds, in Euros

DATA FOCUS

Helm, who has advised the British government and the European Commission on energy and transport issues, favours the concept of turning infrastructure into a so-called regulatory asset base (RAB), in which private investors are guaranteed a return on their investment either from payments by travellers or the taxpayer, or a combination of the two. The asset is placed under the management of an autonomous board of regulators and thereby, at least in principle, freed from political influence.

Sorting out the basics

"The good news is that most governments in Europe and the U.S. have realised they have an infrastructure problem, but they have to sort out the basics first," said Helm. "Instead of worrying about not enough people wanting to finance projects due to the credit crunch, they must realise



that the fundamental issue is: is someone going to pay, and are we guaranteed that they actually will pay? Once you sort out the revenue end, then the finance follows."

An idea like RAB could help to address a core issue plaguing infrastructure in developed economies: a lack of maintenance, and a lack of investment in upgrading and expanding transport systems. The British government is considering transforming the country's road network into a regulatory asset base to encourage private investment.

"The traditional funding models are essentially public initiative and public funding either through dedicated taxes or from general tax revenue," observes Kurt Van Dender, chief economist of the International Transport Forum. "That works fairly well as long as you are developing the network and that development benefits the economy at large. But once the network is built, the benefits of any additions are likely to be limited to specific regions and specific types of users."

Tapping added value

Funding such projects through general tax revenue is often difficult to justify politically, given the manifold demands on budgets. This is where the concept of "value capture" - identifying and charging the direct beneficiaries of new projects through fares or local business taxes - comes in.

"Improving public transport in a city often has spatially concentrated impacts on real estate values. From that comes the idea to make the beneficiaries, the property

developers, the businesses that operate in these places, contribute to this infrastructure through specific beneficiary charges,” explains Van Dender.

London's Crossrail project is one of the still few examples for application of the concept. Due to open in 2018, the new rail line will cover 118 kilometres of track, directly connecting all London's main business centres including Heathrow, the City and Canary Wharf, with the aim of cutting journey times around Europe's largest conurbation. The Greater London Authority plans to raise some EUR 4.8 billion (USD 6.3 bn) by levying a business rate supplement on non-domestic properties over a certain value in London.

“Far-reaching reforms will be needed to ensure that rising demands for long-term capital can be met efficiently”

Jean-Claude Trichet, former President, European Central Bank

Tolling Station, near Paris, France



Keith Laverack/Flickr.com (CC/ND)

Tackling Transport's Funding Dilemma

Think life-cycle!

Local rates will also help fund the planned Grand Paris Express, a EUR 20.5 billion (USD 26.9 bn) plan to add 200 kilometres of rapid transit lines with automatic trains serving the region surrounding Paris. "The principle of charging the user will become more widespread," believes Van Dender: "This is a reasonable way of trying to fund networks."

RAB, Public-Private Partnerships, user charges and value capture models all help to bring economic rationality into investment decisions because they force all the players to think about the life-cycle of the project, rather than just the political cycle of the next election. "They introduce a much-needed longer-term perspective in decision-making," believes Van Dender.

User charges do not always work effectively, though. The U.S., which faces considerable infrastructure challenges, levies a fuel tax that goes into the Highway Trust Fund.

Banking on infrastructure

"The way the fund allocates this money to projects is highly politicised, and the fuel tax has not been increased since 1993 — so in real terms it has fallen 30 %," said Van Dender. The difference is thus made up by putting general tax revenues into the Highway Fund, meaning the user charge element is being steadily eroded.

And so is the infrastructure. Freight bottlenecks like in Chicago and other forms of congestion cost about 1.6 % of U.S. GDP every year, according to the 2012 Transportation Infrastructure Report by the Building America's Future Educational Fund, a bipartisan group of elected officials around New York Mayor Michael Bloomberg and former California governor Arnold Schwarzenegger.

The report says that in 2010, Americans spent a total of 4.8 billion hours stuck in traffic, wasting 1.9 billion gallons (8.7 bn litres) of fuel, at a total cost of USD 101 billion (EUR 77.3 bn).

Against this backdrop, the idea to create a national infrastructure bank has been gaining traction. The second Obama administration is pursuing plans to create

a bank that would rely on federal funds to leverage private sector capital to the tune of up to USD 500 billion, to complement existing infrastructure programmes such as the Highway Trust.

Leverage from project bonds?

Europe, struggling with major public budget constraints caused by the debt crisis, faces similar infrastructure problems. Consequently, the European Investment Bank (EIB), the Luxemburg-based bank owned by the EU's member states — which some regard as a blueprint for a U.S. infrastructure bank — is testing new ideas as well.

One approach is the Project Bond Initiative, launched by the European Union (EU) in 2012 to stimulate capital market financing for infrastructure. The Europeans believe every Euro channelled from the EU budget into the Project Bond Initiative could generate about 20 Euros of infrastructure investment.

In a pilot phase, some EUR 230 million (USD 300.6 m) is being contributed by the EU budget to encourage capital market contributions worth more than EUR 4 billion (USD 5.2 bn) for infrastructure investment in the transport, energy and communications sectors.

Enlarging the tool box

"We have to adapt instruments for funding transport infrastructure to the new conditions following the crisis," says Patrick Boeuf, Head of Division Roads at the EIB, who is involved in the development of new financial instruments including project bonds.

"Public funding is becoming scarcer and the available volume of private funding in the form of commercial debt provided by banks is no longer able to satisfy all the needs," warns Boeuf. "The idea is to enlarge the tool box and attract a small percentage of the trillions of Euros available in pension funds and insurance funds."

Project bonds could be sold in the market as part of Public-Private Partnerships, and the bonds would have their credit quality enhanced by funding from the EIB. "The project bond will be sold to institutional investors to reduce funding costs and open the door to a new class of investors," explains Boeuf.



Timlana18/Flickr.com (CC/NC/ND)

Financial District, London

Wider benefits

It may turn out a promising new way for Europe to harness much needed private capital for essential transport projects. If it proves successful, the wider economic benefits can be very significant – the USD 5.25 billion (EUR 4 bn) expansion of the Panama Canal, for instance, has unleashed billions of dollars of investment up and down the U.S. East Coast to get ports ready for the bigger ships that will be able to pass through the Canal from 2015.

The challenges are even greater in Asia, where there is huge scope for boosting private investment. The ADB estimates that the public sector still accounts for 70% of total financing there. The private sector contributes only around 20%, with the remainder coming from development aid.

Some are convinced that the need to make transport infrastructure projects more attractive investment propositions for private capital will have the positive side effect of channelling funds to where they are most needed.

Oxford University Professor Dieter Helm is among those who argue that public-sector dominance above a certain level can cause efficiency problems: “All sorts of infrastructure has been built in all sorts of places because it’s driven by politics and not the market.”

David Crossland worked for Reuters from 1994 until 2004, first in Frankfurt and then in Berlin as chief political correspondent. He has since freelanced for leading British and American newspapers as well as for the online service of Der Spiegel, the German news magazine.

How to Spend

The pursuit of growth reshapes governments' thinking about spending priorities for transport. Attracting private capital to build GDP-boosting infrastructure will need a robust project appraisal culture and resilient regulatory frameworks.

By Ellen Thalman

For most people, the names Victoria and Elizabeth evoke British royalty, gilded pomp and noblesse oblige. Two namesakes of Britain's longest-reigning queens have recently been carving out a groundbreaking reputation for themselves with a rather more down-to-earth profile: Two tunnel-boring machines are digging part of a 118-kilometre rail link under London, called Crossrail. When it opens in 2018, the GBP 14.8 billion (c. USD 22.4 bn) track will connect business districts and commuter areas from east to west.

Global debt crises and austerity policies have led to a shift in the way governments approach transport policy. On the one hand, financial prudence and cost-control are top priorities, meaning less money is available. On the other hand, boosting economic growth and higher productivity is paramount — and here transport is seen as a potential game changer. The focus now is therefore on the centres of economic activity, and where money is spent: on removing bottlenecks in business corridors or creating highly productive gateways.

In Europe, linking the periphery to economic hubs has been a primary goal of the European Union's TEN-T projects, 30 individual projects aimed to augment "cohesion" in the 27-member union by 2020. Now many experts see governments' attention to such projects waning.

"Prioritising the periphery led to lack of attention to productivity-oriented transport spending," observes Kurt Van Dender, Chief Economist at the International Transport Forum in Paris. Now, the new focus on growth "leads to different priorities".

The quest for growth

London's Crossrail project, for example, seeks to strengthen business in the UK's economic core. It will link more rail lines than any other underground line in the city, and will eventually connect Heathrow Airport, the West End, Canary Wharf and the City to commuter areas in the east and west of the British capital. The publicly-funded project is expected to add GBP 44 billion (c. USD 66.8 bn) to the UK economy in the long term.

But policy makers still have to balance the quest for growth with other goals, even if the emphasis has shifted since the crisis. Reducing the environmental impact of transport for instance, remains important. And ensuring that transport systems provide access for citizens to educational institutions, health services and the job market will also rank near the top of what needs to be done.

In the face of competing demands in a context marked by austerity, governments need a strong appraisal culture to separate hard facts from mere hopes when picking priority projects — combined with a well-oiled regulatory machine that collects and tracks the data that should drive such decisions.

Appraisal culture

Well-conceived cost-benefit analyses for highly developed economies should evaluate the marginal payoffs for additional investments in transport infrastructure — and help justify decisions by making their rationale transparent. The UK's strong appraisal culture, for instance, was part of the reason transport cuts were relatively limited after deep public spending cuts in the 1980s. Cost-benefit analyses helped policy makers demonstrate where they would create most value through investment.

But some countries rely on highly specific forms of such cost-benefit analyses — and while this may reflect specific circumstances, it limits the ability to learn from others'

44 billion

Amount the London Crossrail project is expected to add to Britain's GDP, in GB Pounds

DATA FOCUS

14.8 billion

Projected cost of London's Crossrail link, in GB Pounds

It

Looking up at
the Crossrail
Tunnel Boring
Machine



experiences. No common standards exist at present on how to evaluate large transport infrastructure projects. A more systematic approach to project appraisal, as used for the EU's TEN-T projects, would be helpful by bringing coherence and long-term thinking into decision-making, suggests the ITF's Van Dender.

Governments should adopt strict criteria when looking for companies to lead a project, says Bob Poole, Director of Transportation Policy at the Reason Foundation, a Florida-based libertarian think tank: "This is like a long-term marriage contract. They must anticipate what might happen down the road and this can be worked out in principle in advance." Poole has some praise for the World Bank for its work in developing guidelines for long-term public-private partnerships (PPPs) for airport and railroad projects, especially in developing countries.

The lure of cash

The dire need for revenues may lure governments to simply opt for the highest offer in a competitive bidding process – but that may not always be the best strategy, even in financial terms. When the Brazilian government recently awarded long-term concessions to private companies to modernise three airports, the prices paid exceeded valuations by several hundred percent, raising eyebrows. Investors worry that operators who overpay may not be able to provide necessary upgrades for lack of cash.

Not all countries are equally keen on private sector funding of transport networks. Switzerland, for example, has rarely gone to the private sector. "We take a network view of the whole thing," says Gregor Saladin of Switzerland's Federal Office of Transport (BAV). "We don't have lines where you can fund a part with PPP money and divide the benefits." And among the different modes the approach to working with private partners often depends on historical experience or the specific legal situation. Thus, most U.S. and Canadian rail transport groups are listed on the stock market, while in Europe rail systems tend to be at least partly government owned. Conversely, while a number of European

countries, such as Spain and Italy, have a lot of experience with private companies managing user-funded toll roads, U.S. toll roads have been largely government operated.

Poole argues that in any case "a model with a built-in market test should play a larger role". For example, when a private company finances a toll road or airport, 25 to 30% of the investment is equity, while the rest is debt secured by toll revenues or airport landing charges. "That's very important from a resource allocation point of view," observes Poole: "This forces a market-tested evaluation of whether the debt can be paid off, but also whether it will provide a return."

For decisions on capital allocation, expectations about future returns are shaped to a considerable degree by resilience of the institutional framework. "Investors are fundamentally looking for stability in the regulatory and business environment," says Richard Abel, a managing director at Macquarie Infrastructure and Real Assets in London. "Of course, there is an economic cycle. But what governments can do is run open and transparent competitions ... and provide a stable and predictable regulatory regime."

Ellen Thalman has written for Dow Jones and the Wall Street Journal for over 10 years. She lives as a freelance journalist in Berlin, Germany.



INTERVIEW

"Renew, upgrade"

motion What challenges does Germany currently face in the financing of infrastructure?

Peter Ramsauer Funding transport is one of the most fascinating and important issues in the world, and so I would like to start by thanking the organisers of the International Transport Forum for selecting this as the theme of this year's summit, which is to be held in Leipzig from 22 to 24 May. The German approach to this topic will consist of three elements – renew, modernise, upgrade – which we consider to be the pillars supporting the “funding transport” roof.

Germany's network of motorways and roads is one of the best-developed in the world. And we want things to stay that way. Because growth and employment are not possible unless there is efficient transport infrastructure and a high level of mobility. That is why, when I was appointed Minister of Transport in 2009, I stated that my objective was to facilitate mobility rather than hampering it. I attach equal importance to all modes of transport and believe that they have to be interlinked in the best way possible. This is the only way they will be able to deploy their strengths in an optimum manner.

Our transport infrastructure has to be maintained, renewed and upgraded as demand requires. However, we do not have all the funds we require for this. We are thus prioritising projects, giving

"We must not wear out infrastructure to the bone."

Peter Ramsauer

modernise,

Peter Ramsauer, Germany's Federal Minister of Transport, Building and Urban Development, on why he is prioritising maintenance, how Germany is moving towards the user pays principle and where PPPs make sense

structural maintenance precedence over the construction of new infrastructure. We are spending the money at our disposal in those places where there is the most pressing need to repair transport infrastructure and remove bottlenecks. In other words, where there is the greatest demand and where the greatest benefit to the national economy can be derived.

We must be under no illusions about what we can achieve. As traffic levels continue to rise, we must do more and more to maintain the structural fabric. We must not wear our infrastructure down to the bone.

And so my objective is to invest around two-thirds of investment funds in renewing the existing networks.

m You are committed to strengthening funding cycles. What has Germany achieved so far?

▶ Since 2005, heavy goods vehicles using federal motorways have had to pay a distance-based toll. This marked the start of a changeover from 100% public purse funding to the user pays principle.

In 2011, the first step towards a funding cycle for roads was taken. Since then, all revenue raised from the tolling scheme has been ring-fenced for investment in federal trunk roads. This has also resulted in more transparency in the use of toll revenue. Since August 2012, around 1 135 km of near motorway standard four-lane federal highways have been included in the tolling scheme, thereby widening this revenue base even further. The inclusion of these highways has generated an additional 61.5 million euros since it was introduced.

In 2012, revenue from tolls totalled 4.36 billion euros. So you see – what comes from the roads goes back to the roads.

m For some years now, you have been using public-private partnerships as a procurement option in the construction of federal trunk roads. What is your personal opinion on how successful this has been in Germany?

▶ We have to use existing funds more efficiently. And so it is imperative that we adopt new approaches to the funding of transport infrastructure.

The advantages of public-private partnerships are obvious: construction processes are optimized and there is less need for the public sector to monitor progress. The lessons we have learned so far in the construction of federal trunk roads are, without exception, positive: schemes can be delivered more efficiently and more quickly.

Everyone benefits from this – the public and private sectors and motorists. But it is also clear that public-private partnerships are not a universal panacea. Thus, before any project is started, in-depth studies have to be carried-out to prove that it represents value for money.

Nevertheless, public-private partnerships are definitely a major pillar for further improving the quality of the federal trunk road network in Germany and, above all, improving it more quickly. ■

DATA FOCUS

1 135 km

Length of roads in Germany that are part of tolling schemes

4.36 billion

Revenues from road tolls in Germany in 2012, in Euros

The Discovery of Transport

Institutional investors eye long-term transport projects as a hedge against volatile markets – but many shy away from innovative projects

By John Borland

For Lisbon policy makers reeling under the weight of accumulated debt, last year's sale of national airport operator All Nippon Airways (ANA) for EUR 3 billion (USD 3.9 bn) – after initial valuations at about EUR 2 billion (USD 2.6 bn) – was an unexpected Christmas present.

Investment fund managers focused on transport and other infrastructure assets took away a more sobering message. After a decade of growing interest in the once-sleepy sector, the sale reflected competition that is driving up prices, driving down prospective returns and in some cases forcing investors to rethink their investment strategies.

“It's not as bad as the last asset price bubble,” says Global Infrastructure Partners (GIP) Chairman Adebayo Ogunlesi, whose fund was part of a consortium that was outbid for ANA. “But certain assets are what bankers call ‘fully valued.’”

Evolving markets

For public-sector officials in Europe and North America seeking private participation in transport projects, this may sound like good news. After all, if more firms are vying for transport assets, it should be easier to find partners, and maybe even attract funding on easier terms.

Yet this will only be true in certain cases. To understand how best to tap this rising interest in their sector, policy makers will have to still better understand how investors' perceptions of risk and reward are evolving in today's markets.

Interest in transport infrastructure investments has grown steeply over the past decade. According to Preqin, a research firm covering the “alternative assets” sector, the annual number of transport-sector deals made by unlisted fund managers (as opposed to less common exchange-listed funds), averaged between eight and 10 a year in the early 2000s. But this rose sharply to 80 deals by 2007, and even after the crash has remained in the 40s or 50s.

Nervous investors

Most investment managers treat transport as part of a broader infrastructure category, set off from equity or fixed-income investments such as bonds. Interest in the category as a whole is rising fast for several reasons. Big investors are nervous today about U.S. and European central banks' liquidity policies, fearing an eventual return of inflation. As hard assets, transport holdings represent a hedge against inflation, as well as against the recent volatility of equities markets.

Pension and insurance funds have their own need for long-term, stable investments that match their disbursement schedules. Canada and Australia have been leaders in this regard, with pension-linked funds investing in transport assets worldwide.

Pinpointing precisely which funds have the largest transport holdings is difficult, as deal terms are not always made public. However, a relatively short list of names comes up repeatedly. According to Preqin, for



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example, Macquarie Infrastructure and Real Assets (MIRA), a multi-fund group representing Australian pension funds and other private investors, has made by far the most individual transport infrastructure deals in the last half-decade, followed by Australia’s AMP Capital Investors and France’s Meridiam Infrastructure.

In search of scale

Global Infrastructure Partners (GIP), an independent fund that owns several major ports and airports, closed financing last year on a EUR 6.3 billion (USD 8.25 bn) new fund, the largest infrastructure-focused fund to date. The Canada Pension Plan Investment Board (CPPIB) and the Ontario Municipal Employees Retirement System (OMERS) both have sophisticated in-house infrastructure teams, with billions of dollars in the transport sector.

A quick look at these big funds’ holdings explains why they may be of limited help to policy makers seeking money for new projects, however. Airports, ports, railway lines and toll roads dominate. And in all but a very few cases (and a few

unusual firms), these funds focus on previously constructed rather than new or “greenfield” projects.

Part of this is simple economies of scale. Very large funds, with billions to invest, need large-scale investments – hundreds of millions or even billions of dollars, in some cases – to make it worth their time and risk. Very large deals also typically attract fewer competitors – GIP’s 2009 Gatwick Airport purchase had no other bidders, for example – although Portugal’s airport sale shows that this is changing.

Low risk, low return

However, relative risk and likely rewards – the assessment of risk-adjusted return – are the primary drivers for funds’ investment decisions.

Transport infrastructure returns tend to be low, even “boring,” as some investors say. But risk levels, though varying across

Stock exchange
Trading Floor



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project type, are also comparatively low. Assets such as toll roads, airports and ports, where cash flows depend on traffic flows, have traditionally been viewed as the riskier end of the category, with long-term public-private partnership-style projects potentially less so.

In today's market context, the sector appears less boring. Historically low interest rates, sovereign debt fears and market volatility have driven down risk-adjusted returns for bonds and equities. Moreover, a string of recent policy decisions for instance in Spain, Norway and Great Britain have sharply increased fears of political risk in the once-safer utility and energy sectors, which compete with transport for infrastructure-focused investors. All this has increased transport's relative draw.

Risky Greenfields

This appeal does not necessarily extend to greenfield projects, or new construction, however. Managers cite a higher risk of construction delays, cost overruns, a lack of historical traffic data, and also of unreliability of politicians. Because the risk

is unpredictable it is very hard to model potential returns. Many of the largest funds thus avoid these projects altogether.

Not all funds think this way, of course. France's Meridiam has been a leader in early-stage transport investment, working closely with governments and construction firms from the earliest stages to design, fund, and operate projects around the world. The company's project appraisals are quite stringent, however. "We want to see a clear economic case for the project," says Meridiam Chief Strategy Officer Julia Prescott. "We want to make sure that it fits into expectations for the economy, has clear political support, that there is a clear procurement process, and that it's likely to be delivered in an acceptable amount of time."

What matters

All fund managers point to contract details as critical in their final decisions. This may involve financing or repayment terms, risk-sharing strategies, or the decision-making rights of equity holders. Striking a balance between political and economic factors is often tricky, and cannot be rushed, managers say.

“These things must be structured properly,” says Markus Hottenrott, Chief Investment Officer at Morgan Stanley Infrastructure. “Governments should bring in experienced outside consultants before putting contracts to bid”, he advises. “There are so many professionals out there who know how to do this.”

Finally, geography matters a great deal. Though developing countries have vast transport infrastructure needs, many of the largest firms see these areas’ governments and currencies as posing too much risk to engage with outside the context of a few specifically targeted funds.

“When, not if”

But even the developed world poses political risk. Some U.S. states and cities have developed a reputation for unreliability, putting contracts out to bid, for example, and then scrapping private-sector components under political or other pressure.

“At one point in time, people thought there would be more build-out of transport infrastructure through private funds,” says Kelly DePonte, Managing Director of Probitas Partners, a research firm that surveys investor sentiment. “But in part through all the stops and starts, that hasn’t happened nearly as much as thought. One thing that would attract money would be real commitment.”

Yet because so many major transport assets have already been privatised in Europe, investors are looking to the U.S., where private participation in many areas of transport is still comparatively new, as the next big market. “In the U.S., the opportunity is still in front of us,” says Philippe Camu, global head of Goldman Sachs Infrastructure Partners. “It’s a question of when, not if.”

John Borland has worked at the California Journal and more than seven years at News.com. Since setting up as a freelancer in Berlin, he has written for Wired News, MIT’s Technology Review, and Scientific American online.

Transport Players

Global Infrastructure Partners (GIP)

Funders: Institutional and private investors

Capital: **USD 13.9 billion**
across 2 funds,

USD 2.8 billion at least
in transport

Major holdings: Gatwick, Edinburgh, City of London airports; Port of Brisbane; Great Yarmouth Port Company; International Trade Logistics

Macquarie Infrastructure and Real Assets (MIRA)

Funders: Pension funds, governments, other institutional investors

Capital: **USD 36 billion**,
in 32 separate funds.

One-third of holdings,
by asset value, in transport sector

Major holdings: Brussels Airport; Arlanda Express (express rail, Sweden); Bristol Airport; Condor Group (ferry services, UK); Chicago Skyway, Indiana Toll Road, Dulles Greenway

Canada Pension Plan Investment Board (CPPIB)

Funders: Canada Pension Plan

Capital: **USD 10.3 billion**
infrastructure portfolio,

approx. **USD 4.6 billion**
in transport

Major holdings: Highway 407 (Toronto); Grupo Costanera (toll roads, Chile); Westlink M7 (toll road, Australia)



NO



A new National Transport Plan for

RWAY

SPECIAL SECTION

on the occasion of Norway's 2013 presidency
of the International Transport Forum

INTERVIEW

“Big Investments Are Needed”

Marit Arnstad, Norway’s Minister for Transport and Communications, explains how her country is investing in tomorrow’s transport



motion All eyes are on Norway this year, as it holds the presidency of the International Transport Forum. What is your vision of 21st century mobility?

Marit Arnstad My vision is to create a transport system of the 21st century that is effective, accessible, safe and environmentally friendly.

We need to build an effective transport system with improved traffic flow and reduced time of travel in order to strengthen the industry’s competitiveness and maintain the settlement patterns. Accessibility is important. The transport system needs to be universally designed to ensure that all citizens can use it. Our transport policy is based on a vision of zero accidents resulting in fatalities or serious injuries. And we want it to contribute to limiting greenhouse gas emissions and reduce the environmental impacts of the transport sector.

At the international level, I believe we need to link people closer together, improve transport of goods and reduce transport’s contribution to climate change.

m What can the world of transport learn from the Norwegian experience?

▶ Others will have to judge if there is anything to learn from us. But there is an area I would like to mention where I think we have something to offer.

We have had an ambitious road safety policy for many years and in the international context, we have performed well. There are still too many people being killed and seriously injured in road traffic accidents,

“We need better contract strategies and more foreign entrepreneurs to increase competition for contracts.”

Marit Arnstad



Geiranger fjord: Norway's topography makes transport a challenge

Jarle WAHLENER

but our work is showing positive results. Several measures have contributed here - increased funding for road safety, better roads, better driver training and more traffic controls for instance. But ITS, research on the topic, international policy measures and the car manufacturers themselves have also contributed to improved road safety.

m And what have you picked up from other countries?

▶ We learn a lot from others. Many of our engineers are educated abroad and work on infrastructure projects when they come home. We also learn from foreign contractors involved in the construction of road and railway projects in Norway.

At the International Transport Forum's 2013 Summit in Leipzig we will have a meeting with potential contractors from around the world about business opportunities on the basis of projects the Norwegian government has just announced as part of our National Transport Plan 2014-23.

Norway also engages in a lot of international cooperation. We believe this is fruitful for all parts, because no country can ever be the best at everything. We must learn from each other. This year's ITF summit exemplifies this.

m You mentioned Norway's 10-year National Transport Plan, the NTP for the 2014-23 period. What are your priorities for the coming decade?

▶ The government will focus on developing public transport, cycling and walking in the major cities. This is the best way to meet the increased demand of passenger transport in urban areas. Individual motor traffic has to be reduced, because of

the land it uses up and because of the pollution associated with it.

To put in place infrastructure that allows more public transport, cycling and walking in urban areas, the state must foot a larger portion of the bill than before. In order to get this funding, local and regional governments must co-operate with the state and introduce measures to reduce car traffic.

Between the major cities, the construction of double-track railways will be prioritised to increase the capacity and speed of rail traffic. This holds particularly in the greater area.

m What about the traditional modes – road, rail, shipping, aviation?

▶ Our fine-meshed road network is the backbone of the Norwegian transport. This is especially true in rural areas. To ensure good conditions for people and businesses, it is important to vigorously develop the road network.

In this context, the government will be taking great care that the road network will be developed in ways that contribute to further reduction of road fatalities and serious injuries from traffic accidents. Between the major cities, the construction of double-track railways will be prioritized to increase the capacity and speed of rail traffic. This holds particularly in the greater area.

Another key priority is operations and maintenance. Due to decades of insufficient funding, large parts of the road and rail network is run-down and in need of renovation. There are also major challenges in aviation and maritime transport, but not to the same extent as for road and rail.



City tram in Bergen

m Since you took office as Norway's Minister of Transport and Communications in June 2012, you have been advocating a more efficient transport system. What is your main message?

▶ To provide the best possible transport system, we need to combine roads, rail, sea and air traffic. Which transport modes that are best suited varies. In and between urban areas, it is important to invest in railways and bus lanes, while roads are important in rural areas. Efficient transport also means that we need to design better and build more coherently.

“PPPs will constrain our financial leeway in future budgets”

Marit Arnstad

We must streamline at all levels. We need better contract strategies and more foreign entrepreneurs to increase competition for contracts. We need a construction market that is capable of dealing with all the new investment projects.

In order to ensure rational development of large projects that take a long time to complete, the government also should be committed to continuous development over several years. Thus, in the annual budgets, important projects are prioritised

and secured good progress through project financing. Efficient and predictable funding leads to faster completion and less expensive projects.

All in all, we need to get more out of the money we spend!

m What can be done on the planning side?

▶ A high-level group is set up to consider measures to solve our planning challenge, including stronger state-level management of key national transportation projects. We need to streamline the planning system. It is a great feature of democracy that local authorities and other interests may express their opinion on roads and railways that will affect the community for decades.

Today, however, it takes an average of ten years to plan road and rail projects in Norway. This is way too long. The planning time has to be reduced. By doing this we will also reduce the costs.

But the government will also need to demand greater efficiency from the subordinate transport agencies in order to release funds for development, operation and maintenance.

m As an oil-rich nation, Norway faces less constrained budgets than other countries. Is there a role for private capital in Norway's transport funding and financing? How is that changing?

▶ The private sector plays an important role in Norwegian transport. Private entrepreneurs from Norway and from abroad are involved in the construction of roads and railways. Private transport companies are also essential in moving people and goods, especially on the roads and in the air.



Tore Hunstad, Norwegian Public Roads Administration

Norway's rough environment poses risks for road safety

m Public-Private Partnerships are being touted across the globe as an option to overcome funding constraints and help improve efficiency. Is that a path Norway is pursuing?

▶ The present government is not in favour of PPPs. By establishing such partnerships, the government has to pay down debt over several years after the projects are finished. Thus, PPPs will constrain our financial leeway in future budgets.

To meet requirements related to infrastructure maintenance and investments, the state budget appropriations have been significantly increased over the last years.

However, a greater part of road construction projects are partly funded by the government and partly funded by road toll. In order to get funding for a toll-road project from the central government, local authorities need to support it.

A toll-road project also requires approval from Parliament. Toll companies run toll-road-projects by borrowing private capital.

m Looking beyond Norway's borders, global demand for mobility is growing rapidly. Do you see an "infrastructure gap" in global transport that threatens to hold back growth? Or is the bigger danger a degradation of existing systems, so that maintenance should be prioritised?

▶ I see both challenges. If possible, I think it is best to address them simultaneously. But generally speaking, it is difficult for me to recommend addressing one challenge or the other, because each country's situation is different.

However, I have the impression that infrastructure in many countries is well developed. In a news report on Norwegian

television, a representative of the Austrian authorities recently said that the highway network was almost completed. In such cases, it is important to facilitate good maintenance.

In other countries, there are still significant infrastructure needs. On the basis of what I have mentioned above, Norway is among the countries where big investments in new infrastructure are needed.

m As the International Transport Forum's 2013 president, how do you hope to move the funding debate forward with your colleagues from around the world at the 2013 Summit?

▶ We must never forget that this is about utility. Allocations must serve a purpose. We need good infrastructure, since efficient transport and the safe movement of passengers and freight is essential for a well functioning society.

How should funds be acquired in an efficient manner? There are several options. Funds can be obtained by budget allocations, through user fees, or from third-party beneficiaries.

Which solution is best varies from country to country and from sector to sector. Based on knowledge, the best suited solution should be picked. Thus, I think it is wise to take a pragmatic approach. ■



NATIONAL TRANSPORT PLAN 2014-2023

A Plan to Meet Future Needs

In April 2013, the Norwegian government unveiled its plans for strategic transport investments in the coming decade

In April 2013, the Norwegian government presented its White Paper on the National Transport Plan 2014-2023. The plan deals with how the Government intends to develop the transport infrastructure in Norway over a 10-year period.

Norway's geography poses exceptional challenges for transport. Located in the harsh climate of Scandinavia, it is also burdened with a difficult terrain. Large parts of the country are unsuitable for settlement or agriculture, with rugged mountains separating habitable regions and fjords cutting deep into the country, often making it impossible to reach a destination via an easy route.

Norway's coastline is one of the longest in the world, and even without the indents created by the many fjords, Norway is a long, stretched out country - the distance

between its southernmost and northernmost points is identical with the distance between the southernmost point in Norway and Rome in Italy.

Every four years, the Norwegian government presents a White Paper on a National Transport Plan (NTP) with a 10-year horizon to address the many transport challenges the country faces.

While the White Paper is not binding, the financial implications are reflected in annual budget propositions to the Storting, Norway's parliament.

On 12 April 2013, the Government introduced the NTP for the 2014-23 period in the Storting.

Formidable investments

This latest iteration of the NTP proposes an economic framework of NOK 500 billion (at 2013 rates, USD 86 billion) for further developing Norway's transport network. This is roughly an increase of 55% compared with the NTP of 2010-19, which had already represented an almost 45% increase compared to its predecessor when it was announced in 2009.

There has, in other words, been a formidable emphasis on transport in Norway in recent years. Moreover, since the current government took office in 2005, it has actually spent more on transport than proposed in the economic framework of the NTPs, underlining the importance it gives to transport. In addition to the NOK 500 billion committed in the 2014-23 NTP, the Government proposes raising NOK 100 billion in road tolls to co-finance road investments.

Within the new NTP's economic framework, 61% of funds will be allocated to roads and 35% to rail. Four per cent will go to maritime transport, which is largely self-financing, as is aviation. Thus, the focus in the National Transport Plan 2014-23 is on land-based transportation.

Staggering population growth

Norway has one of the highest population growth rates in Europe, and one of the strongest economies. More people and continued economic growth will lead to

55%

Increase in funds compared to previous NTP

86 billion

Funds allocated for Norway's 2014-23 National Transport Plan, in US dollars

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The Oslo-Lillehammer line connects Norway's capital with the host city of the 1994 Olympic winter games

a sustained increase in demand for transport of people and goods in the coming decades. To meet the challenges, a future-oriented transport system has to be flexible and utilise the advantages of the individual transport modes. It also has to allow for the best possible interaction between them.

By developing a more environmentally friendly and efficient transport system, Norway will absorb the impact of most of the traffic growth in both freight and passenger transport and create a system that allows users to choose between different transport solutions for different purposes. Because Norway is large and the population dispersed, another important aspect reflected in the National Transport Plan 2014-23 White Paper is the objective of a balanced regional distribution to ensure accessibility for all citizens.

Norway is experiencing a staggering population growth. In 2012, the population passed the 5 million mark and is expected to grow to 6 million within 16 years. A large part of this growth takes place in urban areas, especially in and around the four major cities of Oslo, Bergen, Trondheim and Stavanger. Percentagewise, Oslo is among the fastest-growing capitals in Europe.

Municipalities must commit

Because population growth is associated with congestion and land use, it makes efficient transport in urban areas a challenging task. As there will not be enough space for individual vehicles, other solutions are needed.

The Storting has set the ambitious goal of meeting the growth in passenger transport demand in the urban areas by increasing the share of public transport, walking and cycling. To achieve this, the government proposes to allocate more

public funds for infrastructure projects in urban areas. Yet this also requires a commitment from counties and municipalities to facilitate the use of public transport, cycling and walking - for example through higher road tolls or rush-hour charges.

In Eastern Norway, new Inter City rail lines will play a key role in meeting the increased transport demand in the greater Oslo area. These will enable daily commutes that do not add to emissions and to congestion on the roads.

High speed links for Oslo

As most of the railway network in Norway consists of single track lines, average speed and capacity have been quite low. Thus the government proposes to continue the construction of 167 kilometres of double track railway lines, designed for speeds up to 250 kph, in the greater Oslo area.

This key initiative will lead to shorter travel times and more departures and improve services for both passengers and freight in the region. In addition to meeting the increased demand for transport, the development of the Inter City lines is intended to help spread the population growth out of Oslo. Some rail investment in the cities of Bergen and Trondheim are also envisaged.

The share of cycling among transport modes in Norway is currently at 4%. According to newly released research, the potential for bicycle use in Norway is somewhat below the current level in Denmark (which is at 15% nationwide and 25% in Copenhagen) because Norway's topography and climate impose limits on cycling activity.



TRANSPORT IN NORWAY

Cycling

significantly contribute to more roads with good accessibility and high level of safety.

The world's deepest sub-sea tunnel

A long-term ambition for Norway is to develop the Coastal Highway Route E39 into a more efficient corridor that does not have to rely on ferry connections. The route runs along the west coast of Norway from Kristiansand in the south to Trondheim in central Norway, a distance of almost 1100 kilometres. To achieve the Government's long-term goal, eight ferry connections will have to be replaced by tunnels or bridges.

Combined with other improvements on the route, it is estimated that the travel time will be reduced between 7 and 9 hours, to a total of about 12 to 13 hours. This will dramatically improve connectivity for people and businesses in Western Norway.

The Government proposes to start with the Rogfast tunnel, a key project west of Stavanger. With a length of 25.5 km and running 392 metres under Bokna fjord, the Rogfast tunnel will be the world's longest and deepest sub-sea road tunnel.

No more road deaths

The basis for all road safety initiatives in Norway is "Vision Zero" - the idea that there should be no fatalities or serious injuries as a result of traffic accidents. Road users, car manufacturers and the government have a shared responsibility for road safety and for realising this ambitious vision.

In the past several years, the Government's intensive work on road safety has yielded positive results. With current forecasts predicting continued traffic growth, it will be a challenge to

Double the share of cycling

Nevertheless, the government aims to double the share of cycling during the plan period, and it is committed to doubling the annual funding for pedestrian and bicycle projects within 2017 to help achieve this. Again, the co-operation of county and municipal governments will be needed to get more people walking and cycling in order to benefit from the many advantages, not least reduced greenhouse gas emissions, better health and less noise.

Despite a growing population, Norway has the second lowest population density in Europe after Iceland. Thus, it is Norway's road system that binds the country together and is the basis for most transport. This is especially true in rural areas. The often harsh weather conditions of the Nordic climate make it difficult to keep some roads open during the winter. To ensure good conditions for people and businesses which rely on road transport, it is important to actively develop the road network.

Decay of the existing road network is a significant problem. To reduce deterioration, operation and maintenance is important. But the Norwegian government also intends to develop several major highways in all parts of the country. This would

TRANSPORT IN NORWAY

Road





TRANSPORT IN NORWAY Maritime

further reduce the number of crashes. Since 2005, however, the number of deaths and serious injuries fell by about 30% in Norway, despite a growth in traffic of about 12%.

Preliminary statistics for 2012 show that 148 people lost their lives and that 639 people were severely injured in traffic accidents on Norway's roads.

Due to this positive trend, the Government's aim is to reduce the number of people killed and seriously injured in road traffic by 50% during the plan period 2014-23. The proposed government initiatives in terms of investment, operation and maintenance of roads are expected to contribute to a further reduction, but shifting goods and passengers from road to rail, changing road-user behaviour and safer vehicles are of course also important elements of Norway's road safety strategy.

Aviation and maritime transport in Norway

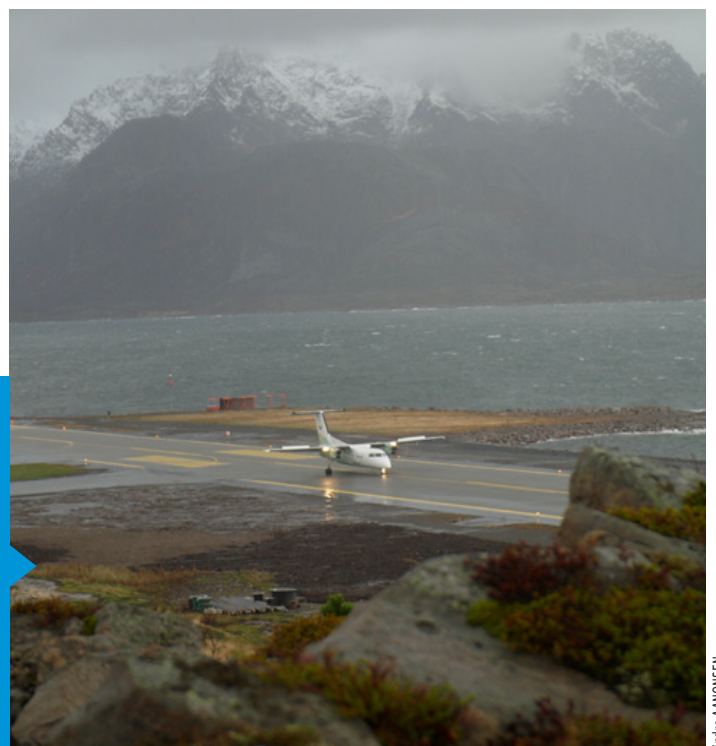
In view of Norway's geography, it is not hard to imagine that aviation and maritime transport play important roles in the country's transport system. There are 52 airports in Norway – quite a high number for a population of 5 million. Good air services are of great importance to the settlement, employment and economic development in both rural Norway and in the central regions. In rural areas in the West and North, people and businesses are in many cases entirely dependent on air transport to manage their everyday lives.

Aviation infrastructure is largely self-financing and therefore not included in the financial framework for the NTP 2014-2023. The overall responsibility for aviation infrastructure is still with the government, through a public agency called Avinor.

The majority of Avinor investment funds in the plan period are earmarked for improving the major airports in the cities of Oslo, Bergen, Trondheim and Stavanger. The projects will ensure that airports can accommodate traffic growth and maintain their role as central hubs in the Norwegian transport infrastructure.

For large volumes over long distances, maritime transport is the dominant form of transport for the carriage of goods in Norway. As with aviation, maritime transport is also more or less self-financing, and the municipalities are responsible for the ports. One of the goals of NTP 2014-23, is to shift freight volume from road to sea. To facilitate this change, the government will provide funding for the development of a number of major ports.

At some places along Norway's rugged coastline, the weather conditions are quite harsh from time to time. The Stad peninsula on the west coast between Bergen and Trondheim is such a place. Under bad weather conditions the vessels have to wait instead of passing Stad. The risk of accidents is also higher compared to other coastal stretches. To avoid these problems, the government optionally wants to start construction of the world's first ship tunnel at Stad. The tunnel length will be approximately 1 700 meters and construction may start during the second half of the plan period. ■



TRANSPORT IN NORWAY Aviation

INTERVIEW

“We create favourable

Mengyong Weng, Vice-Minister of Transport, on China’s priorities for transport infrastructure, funding mechanisms and the importance of public transport

motion The breath-taking transformation of China in the past two decades has led to exploding demand for transport services and infrastructure. China is investing enormous amounts, but not everything can happen at once. What criteria do you apply to select priority projects and initiatives?

Vice-Minister Feng The central government's construction-dedicated fund focuses on expressways, national and provincial trunk highways and rural roads. For expressways, priorities are projects which are parts of the national expressway network and some expressways essential to regional development. For national and provincial trunk highways, priorities are national highways and some provincial highways.

And for rural roads, priorities are paved roads connecting western villages, roads in least developed areas as well as the rehabilitation of some roads and bridges.

m How does China finance transport infrastructure construction to promote transport development?

► The main source of the central government's investment in highway construction is a vehicle

purchase fee which has been collected since 1985 and transformed into a vehicle purchase tax in 2000.

Also, China has adopted a policy of "borrowing loans for construction, and tolling for repaying debts" to expand financing means for local governments. The introduction of a fuel tax in 2009 ensures funding for the maintenance of traditional highways.

In terms of ports, the port construction fee charged since 1986 has provided a major source of funding for the central government's investment in port construction. And we also create favorable conditions to attract private and foreign capitals.

m By 2012, there were 120 million automobiles in China, including 53 million private cars, up by 23% from 2011. This rapid growth adds more pressure to urban congestion and environmental pollution. How can individual mobility be better balanced to contain such negative effects?

► Firstly, China is stepping-up efforts to promote a public transport-oriented model for urban development, highlighting the guiding role of public transport in urban planning. Secondly, we accelerate improving the conditions and standards of urban public transport services to enhance its attractiveness. Thirdly, the optimisation of urban road networks and traffic management to increase efficiency continues. Fourthly, the government is speeding-up the construction

23%

Increase in the number of automobiles in China from 2011 to 2012 (to a total of 120 million)

DATA FOCUS

conditions”

of the public transport information service system, in order to encourage the public to plan their travel rationally. Finally, we conduct transport demand management effectively to better balance individual mobility.

m As of 2011, more than half of China’s population live and work in cities, and in 2050 it could be an unprecedented 70%. In what ways are urban public transport challenges associated with rapidly growing mega-cities being addressed?

► Prioritising the development of public transport is the most effective way to alleviate the pressure on urban transport. Our *Guidelines on Prioritized Development of Urban Public Transport*, issued in December 2012, provide the direction and policy guarantee for the development of urban public transport.

According to the Guidelines, the Ministry of Transport will study and adopt specific measures to further intensify the efforts to support and guide the prioritised development of urban public transport with the campaign of “Developing Transit Metropolis” as a platform. ■



"China is stepping-up efforts to promote a public transport-oriented model for urban development"
Mengyong WENG

Flying High at

Budget airlines are forcing network carriers to rethink their strategies – but is low cost aviation sustainable?

By Mary Beth Warner

In 1994, an airline named Kiwi Travel International Airlines began offering low-fare flights between Hamilton, New Zealand and Brisbane, Australia. Soon, the airline began to expand to other cities. In response, Air New Zealand, through a subsidiary, founded own Freedom Air, which set up on the same routes, offering cheaper prices than the upstart rival.

With larger resources, Air New Zealand was able to operate at a loss and within short order Kiwi Air (whose CEO was later convicted of fraud) was forced out of business. "Air New Zealand spent EUR 23 million to get rid of them," says Michael Lück, associate director of the New Zealand Tourism Research Institute based in Auckland. "If you knock out your competition, of course it's good for an airline."

In every region of the world, the so-called network legacy carriers are struggling for ways to beat back low-cost airlines that are challenging them for a piece of the aviation market. At the centre of this struggle is a conflict about aviation's core business model: some argue that the new competition is forcing network carriers to become more efficient and offer better service.

Benefits and burdens

"The benefits to the consumer of low-cost carriers are clear,"

argues William Swelbar, a researcher at Massachusetts Institute of Technology (MIT) in the U.S. "They make air travel affordable for the masses, and they force network carriers to stay efficient and watch their costs." But others counter that the prices offered by low cost airlines are unsustainable and undermine the financial viability of the airline industry as such.

About 110 low-cost airlines exist worldwide, with between 35 and 40 in Europe alone, says Sven Gross, professor at the University of Applied Sciences in Wernigerode, Germany. As they continue to woo air travelers, the more established airlines are being forced to cut labour costs, trim amenities, and rethink their own strategies.

Pacific Southwest, founded in 1949 in California, is credited as being the first low-cost airline, but the one which has served as an international model began by offering local service between three Texas cities in 1971: Southwest Airlines.

Points, hubs, spokes

Southwest Airlines had a uniform fleet, requiring easier maintenance, and offered point-to-point travel, instead of the traditional "hub and spoke" model. It also provided quick turnaround times, making additional daily flights possible. Its model helped the airline grow after the U.S. market was deregulated in 1978, and later as outside challenges nearly crippled its rivals.

In the immediate years after the terrorist attacks of September 11, 2001, low-cost carriers expanded in the

189 million

Number of passengers that travelled on low-fare airlines in 2011

60%

Projected share of European low-cost air travellers by 2020 (43% today)

DATA FOCUS

Low Cost?



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U.S., while the network legacy carriers such as United Airlines, Delta, American Airlines and US Airways faced high costs and declining revenue. Since 2001, the majority of U.S. network

“Traditional carriers see themselves as selling an experience”

**Kenneth J. Button,
George Mason University**

carriers were forced to declare bankruptcy and face major restructuring. While this included cutting thousands of jobs and outsourcing others, but allowed them to reach modest profitability again by mid-decade; in 2012 operating profit margin of U.S. airlines were between 0.2 percent (American) and 12.5 percent (Alaska Airlines).

As some of the low-cost carriers have matured, they have come to face similar problems to their older rivals. Southwest Airlines, whose pilots and staff gained in seniority and thus demanded higher wages, was the only low-cost airline with labour costs higher than non-labor costs in 2006, according to an MIT study.

Before the restructuring of U.S. network carriers, Southwest had a 2% per mile advantage on labor costs, according to MIT's Swelbar, while today, that is less than half a cent per mile. Overall, the cost gap between traditional and budget airlines has fallen by an average of 30% in six years, according to the Airlines Disclosures Handbook.

Gaining momentum

Southwest's fares are no longer always the lowest on a given route, Swelbar said, and low-cost-carriers are not growing as quickly in the U.S. market as they did 10 years ago. In other parts of the world, though, the low-cost movement is gaining momentum. In Asia, low-cost carriers account for 17 percent of the market and will grow, predicts Swelbar. In Latin America, most of the growth of low-cost carriers has been in Mexico and Brazil.

In Australia, which has three low-cost carriers, Tiger Airways, Jetstar, and Virgin Australia, the long distances between cities make air travel more appealing. And a lack of competition from other forms of transportation, such as high-speed rail, mean that prices are higher for tickets on low-cost carriers than they are in Europe or the U.S., said Michael Lück.

The low-cost carrier market in Europe, meanwhile, is growing at a substantial clip. According to the European Low Fares Airline Association (ELFAA) almost 189 million passengers traveled on low-fare airlines in 2011, up 9.5% from the year before. ELFAA

Flying high at low cost?

also touts that low-cost passengers account for 43% of the intra-Europe point-to-point scheduled travel, predicting that will reach 60% by 2020.

In search of new airports

Low-cost carriers on the continent benefit from short travel times, often under three hours, a deregulated market, and the availability of secondary airports that are much cheaper to operate from than the expensive hubs that network carriers rely on. The low-cost airports even include former Cold War facilities, such as NATO's former Hahn Air Base near Frankfurt, Germany. Now called Frankfurt Hahn, the airport is a major base for Europe's leading low-cost carrier, Ryanair.

At Frankfurt Hahn, airlines only pay fees for passengers, not for take offs and landings. An aircraft with up to 100 tonnes of take-off weight will thus only cost an airline EUR 400 (USD 525) per take off. At Frankfurt Airport, a major international crossroads, that same flight would cost an airline almost three times as much, with rates at EUR 1100 (USD 1440), says Gross.

The fact that many passengers are willing to travel to Frankfurt Hahn, located some 120 kilometers away from the city of Frankfurt and without direct train service shows how much significant numbers of air travelers are willing to forego customer service and convenience in favor of a cheap ticket.

Product vs experience

Siobhán Creaton, author of the book "Ryanair: The Full Story of the Controversial Low-Cost Airline," says that while Southwest Airlines still likes to have a "touchy feely" relationship with its customers, "it's all about the price" with Ryanair. "Any way they find they can make money from you, they will. But the low fares are what get people on board."

Ryanair did assume elements of forerunner Southwest's business model, such as keeping a lot of cash on the

books, focusing on short-hand routes and a 25-minute turnaround, observes Creaton.

Now serving more than 70 million passengers per year, Ryanair had already ranked number one among world airlines in operating profit margin in a 2007 study by the International Air Travel Association (IATA). And although the airline has the most customer complaints, it interestingly also has the most repeat customers, notes Kenneth J. Button, professor of public policy at George Mason University in the U.S. "They sell themselves as a product," Button said. "Whereas traditional carriers see themselves as selling an experience."

Tightening the vice

Faced with the success of Ryanair and its clones, many traditional airlines are joining in with low-cost carriers — by charging for extras such as seat assignments (Ryanair made EUR 625 million in so-called ancillary revenues in 2008), but also by creating their own budget brands. Lufthansa operates a low-cost subsidiary called GermanWings, and Air France has just launched Hop! as a cheap alternative for cost-conscious travelers for French and some European destinations.

All the while, low-cost carriers are tightening the vice by expanding into long-haul flights — a number of budget airlines in Asia are offering flights as long as seven hours.

So will the end result be healthy product differentiation or a destructive all-out price war? The jury is still out on that question, but some industry insiders doubt that aviation will make investors rich. In a speech in 2009 entitled "Five reasons why the airline industry will never be profitable", former Air Canada CEO Montie Brewer sounded a pessimistic note. He noted, among other things, that overcapacity is inherent to aviation and that the liquidation of airlines (think Air Kiwi) will not reduce capacity — just because a carrier shuts down, airplanes do not simply go away.

Mary Beth Warner has written for Time, National Journal, The Christian Science Monitor and Spiegel Online International. She is a graduate of Columbia University's School of Journalism.

Low-cost Legacy

Southwest Airlines was the trail blazer for today's budget aviation industry - By Andrew Curry

The year was 1967, and Texas lawyer Herb Kelleher had an idea. The Lone Star state needed another airline, one that would be appealing to businessmen with appointments elsewhere in the state yet cheap enough to make the four-hour drive from Houston to Dallas unattractive.

Kelleher — an outsized personality known for whiskey drinking, publicity stunts and ferocity in the courtroom — had his eye on cutting a cost other airlines took for granted: the spiralling charges associated with newer, more elaborate airport terminals. Three other airlines sued Southwest, but after three years of legal wrangling, the U.S. Supreme Court finally cleared the way for Kelleher's idea in December 1970.

Flat-rate flying

Six months later, on 18 June 1971, Southwest began flying with three airplanes to three airports. Tickets cost a flat USD 20 (EUR 15) per flight. That first year, the airline lost nearly USD 4 million (EUR 3m).

But the basics were already in place. There were only one-way tickets, no first class, no in flight meals (though drinks were free and peanuts plentiful) so that planes could be unloaded, cleaned and restocked in under 20 minutes. A key innovation was the preference for smaller, cheaper airfields: Dallas' Love Field instead of the brand-new Dallas-Fort Worth airport, Baltimore-Washington International instead of the American capital's National or Dulles Airports. This kept service charges and airport taxes low, savings the company passed on to its customers.

The market responded soon — perhaps also helped by the fact that in the early years Southwest stewardesses, hand-picked for their good looks, attended to passengers in hot pants and go-go boots. When the Airline Deregulation Act removed the restrictions that had prevented Southwest from offering flights to destinations outside of Texas in 1978, Kelleher's carrier was in pole position for expansion.

An airline like a bus company

To maximize efficiency, Kelleher ran the airline a little like a bus company. Pilots flew back-and-forth routes using only one type of plane, thus keeping maintenance and parts costs down. Passengers had no seating assignments, which made boarding quicker. And quicker boarding meant Southwest was able to keep its planes in the air more of the time, making lots of short hops and getting the most value

out of their limited stock of aircraft.

More than 40 years later, Southwest's formula has earned it two remarkable records: It's the only major airline in the US that has not sought court-supervised restructuring, and it's the only one that's never laid off a worker. "We could have made more money if we'd furloughed people during numerous events over the last 40 years, but we never have," Kelleher told *Fortune* magazine recently.

"We didn't think it was the right thing to do." As other airlines contracted or went out of business in the post-9/11 air travel slump, Southwest actually hired more workers to maintain its reputation for customer service.

Today, the scrappy airline that started with three Boeing 737s has grown into a behemoth with USD 17.1 billion (EUR 13 bn) operating revenue and a net income of USD 421 million (EUR 323 m) in 2012. Southwest and its low-cost epigones, like JetBlue or AirTran, represent more than a third of the U.S. air travel market (in Europe budget airlines own a quarter of the market).

Caught in the middle?

Despite inventing a new category of airline, widely imitated today in Europe and Asia, Southwest has moved closer to some of its "legacy carrier" competitors. Seat reservations, slots at crowded airports in New York and Washington, and even foreign destinations are all part of the plan.

Profits are healthy, but growth has slowed as new budget carriers have broken their own path into the market and legacy carriers have become leaner. At 5.2%, Southwest Airline's operating profit in 2012 was well below that of competitor JetBlue's 8.4 — but also below that of legacy competitors Delta (8.1) and US Airways (6.3).



Andrew Curry covers science, culture and politics for a variety of magazines. He lives in Berlin and Leipzig.

Taxing challenge



Christopher T Martin

Cities around the world experiment with new funding ideas to deliver more sustainable urban mobility

By John Borland

After years of planning, the weeds choking Atlanta's disused BeltLine railway are finally being replaced by bicycle paths and parks. Trams are envisioned that will connect neighborhoods, revitalised industrial zones and the city centre.

The USD 2.8 billion (EUR 2.1 bn) redevelopment project has been lauded for its green-mobility credentials – crucial in a traffic-choked city where 95% of journeys are made by car.

But the question of who pays remains thorny.

Not much to gain?

The financing of the BeltLine project relies on a creative “value capture” model. Development is expected to boost adjoining property values, with related property-tax increases earmarked to fund project bonds, up to an initially projected USD 1.7 billion (EUR 1.3 bn).

But the U.S. property crash has muted expected gains. Moreover, a complementary sales tax meant to fund city transit and road construction was voted down in 2012. The city is now exploring public-private partnership (PPP) options to fill project gaps.

“It has slowed down, but we have a lot of people working on it,” says Tyrone Rachal, managing director of Invest Atlanta, Atlanta's development authority. “I think we'll still see enough surplus in there for BeltLine to be very creative in financing infrastructure.”

Looking elsewhere

This need for creativity in funding urban transport is a familiar story worldwide. Fast-growing cities in the developing world are building transit systems from scratch, while developed-world cities are expanding, renovating, and trying to reduce dependence on cars. According to a recent Arthur D. Little study, annual global spending on urban mobility will rise to a staggering USD 829 billion (EUR 632.6 bn) by 2050, more than four times the 1990 figure.

User charges alone – tickets, tolls and fees – cannot fund these infrastructure requirements. Local government budgets are perpetually stressed, and as Atlanta's unsuccessful measure shows, traditional taxing mechanisms can be of limited reliability. So out of necessity, urban policy makers are looking elsewhere for solutions.

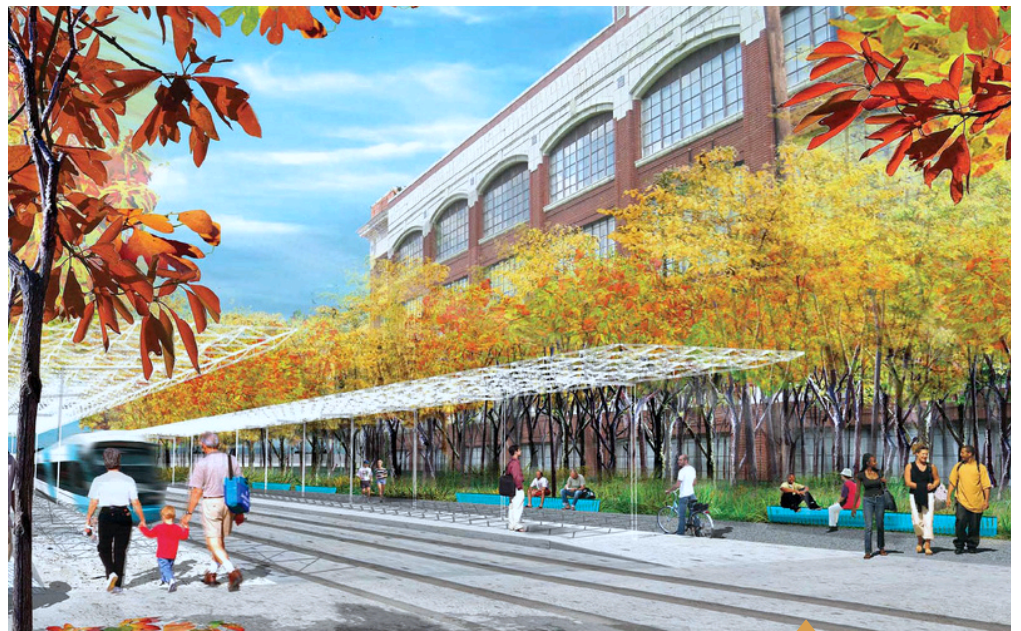
National or supranational grant sources such as National Infrastructure Funds or specific programmes such as the U.S. Department of Transportation's TIGER grants (which awarded funds to 47 projects across the U.S. in 2012) or the EU's CIVITAS Initiative (which supports initiatives for a modal shift towards sustainable urban transport) remain vital here.

Smooth operators

But international financial institutions are also key sources for funding urban transport renewal. The Asian Development Bank's (ADB) approximately USD 3.5 billion (EUR 2.7 bn) annual transport-lending portfolio, for



Construction work for the Atlanta BeltLine



Christopher T Martin

Tramways will link neighborhoods, revitalised industrial zones and downtown Atlanta

example, is increasingly being targeted at innovative public or non-motorised urban transport projects.

But urban policy makers are increasingly turning to private-sector partners. In some cases, this means handing over operation of transit systems or roads to private companies, a practice pioneered in the United Kingdom and now gaining ground elsewhere in the world.

As cities develop sustainable transport plans, the scope for building partnerships with the private sector, or to set incentives for private-sector solutions to transport problems is expanding. The city of Bremen in Germany, for example, has amended regulations to reduce the number of parking places required per new building if car-sharing stations are provided, thus providing developers with significant financial incentive to engage with private car-sharing operators at little direct municipal cost. The city estimates the cost of each urban parking spot to be between EUR 12 680 and EUR 20 450 (USD 16 600 and 26 800); each car-sharing position can substitute for an average of four parking spots, depending on the location.

The bad and the good

Urban transport experts point to a handful of other specific mechanisms gaining ground worldwide. “We see many governments shifting toward an approach where they raise revenue through the taxation of ‘bads’ and reinvest it in ‘goods’ such as public transport,” says Ko Sakomoto, an ADB transport economist, referring to programs that put a price on congestion or pollution, for example.

Congestion pricing, pioneered by Singapore in 1975, is perhaps the most well-known of these mechanisms. London

raised a net GBP 137 million (EUR 160.4 m) from its congestion charge in 2011/12, to be spent on other transport initiatives. Rome, Milan, Stockholm and Riga have implemented similar programs, and in January 2013, India’s Ministry of Urban Development recommended that Indian cities follow suit.

Also notable is the auctioning of license-plates used in Shanghai in China. Intended to reduce auto traffic, it raises an estimated EUR 490 million (USD 642 m) annually, spent in part on new buses and public transport fuel.

Hoping for a spill-over

Of all the various new tools in the kit of transport planners, “value-capture” plans such as that in Atlanta are drawing the broadest interest worldwide. Tax revenue linked to rising property values, land leases, the granting of development rights and other similar mechanisms have been key elements in funding urban transport packages from Bogotá’s bus system to Copenhagen’s metro.

“With rapid urbanisation in developing countries, we’re seeing a diversity of approaches that may spill-over,” hopes Michael Repogle, managing director of the New York-based Institute of Transportation and Development Policy, a think tank and umbrella for sustainable transport advocacy groups. “We are moving from a first and third world split to a world of shared challenges.”

John Borland has worked at the California Journal and more than seven years at News.com. Since setting up as a freelancer in Berlin, he has written for Wired News, MIT’s Technology Review, and Scientific American online.

Boulevards of Broken Bones

On the world's roads, pedestrians and cyclists are most at risk

By Jess Smee

His daily bicycle ride to his Lower Manhattan office has made Mark Gorton, high-frequency trader and entrepreneur behind music-sharing site LimeWire, all too aware of the perils of New York traffic.

First-hand experience of the overcrowded streets has propelled him to the front line of the urban planning debate where he wants citizens' safety to be prioritised above the automobile. In 1999, Gorton founded OpenPlans, a non-profit organisation that advocates "livable streets".

Gorton is among a growing number of voices from politics, think tanks and international organisations arguing for city planners to re-jig their priorities. "It is time to recover the human living environment that has been destroyed by the mechanisation of the streets," he says.

One-third of victims are pedestrians

Global statistics reveal the extent of that hostility. Every year traffic crashes cut short the lives of 1.3 million people – ten times the death toll of the Hiroshima atomic bomb. Between a quarter and a third of road victims are pedestrians, according to estimates of the

International Transport Forum at the OECD and the World Health Organization (WHO).

Examples of hotspots abound. Take New York's Queens Boulevard, a 12-lane highway which widens to 16 lanes at one point and has a dire safety record. Slicing through a dense residential neighbourhood, locals often cross the busy thoroughfare on their way to school or the shops. With around ten pedestrians dying each year, the highway earned itself the nicknames "boulevard of death" and "boulevard of broken bones".

From 2001 onwards, politicians have deployed a range of measures, including tighter speed limits, longer pedestrian crossing times and better lighting. Signposting was also improved, including stark warnings like: "A pedestrian was killed here. Be alert. Cross with care."

Less cholera, more road deaths

The need for protection for pedestrians and cyclists forms a backdrop for the United Nations' current decade-long campaign to "stabilise and reduce global traffic fatalities by 2020".

Its multi-pronged campaign spans safer roads, safer vehicles, safer road users and faster responses to crashes, building on a broad alliance of governments, international organisations, and NGOs, as well as industry.

A study by Britain's Lancet magazine showed 62% more pedestrians and 51% more cyclists were killed

c. 80%

of road deaths occur in middle income countries

DATA FOCUS

47 km/h

Speed at which a car will hit a pedestrian 15 metres ahead after an emergency break from 50 km/h

0 km/h

Speed at which a car will hit a pedestrian 15 metres ahead after an emergency break from 30 km/h



olaser/istockphoto

in traffic in 2010 than 1992. Over the same period, the death toll from cholera, measles and other diseases dived. If current trends continue, road crashes are set to become the fifth most common cause of death by 2030, warns the WHO.

Action is urgently needed, but planning needs to be carefully thought out. “Just because infrastructure is new, it may not be good,” notes Véronique Feypell, road safety expert at the International Transport Forum. Even in 2013, it may happen that urban planners make basic errors like putting a candy shop on one side of a busy street and a school on the other.

Roads and bike-paths

And creating better road networks in middle income countries – where 8 out of 10 road deaths occur – while desirable, may have ambiguous results. “It can be a paradox,” Feypell says. “Upgrading unpaved roads to 5-star roads means higher speeds, and thus higher associated crash risks.”

Alongside pedestrians, cyclists number among the most vulnerable road users. But risks vary significantly according to where you are pedaling. Cyclists in America, for example, are between three and five times as likely to die on the roads as their German, Swedish or Dutch counterparts. But dangers persist, even in the world's bike-friendly nations.

Germany, where the cycling path network is extensive and people of all ages pedal to work or school, prioritises four wheels above two, say critics. “It's a question of priorities, not just infrastructure”, says Gunnar Fehlau, author of a number of books on cycling. “When snow falls in our towns and cities, roads are cleared quickly but bike paths are often left covered.”

**Cyclist in
New York
car traffic**



Pedestrian crossing

MEP/Flickr.com (CC/NC)

Boulevards of Broken Bones

Minimising impacts

Traffic calming is viewed as a key tool to reduce fatalities. The human body has scant chances of survival when hit by a tonne of fast-moving metal – but if traffic speeds were capped to 30 kilometers in urban areas, road deaths would slump. The physics are clear: A child that runs out into the street

“It's a question of priorities, not just infrastructure”

Gunnar Fehlau

15 metres in front of a car that moves at 50 km/h will be hit at a speed of 47 km/h, even if the driver brakes immediately. If the car only drove at 30 km/h, it would come to a halt after 15 metres, leaving the child untouched.

In the pursuit of safer streets, Scandinavian countries are leading the way. Sweden first introduced a “vision zero” policy in 1997, with the objective to eliminate road crashes as a cause of deaths and severe injuries.

While accepting that crashes will happen, the Swedish strategy focuses on minimising the impact of crashes by slowing traffic, rebuilding intersections, removing trees from alongside roads and building guard rails. It also includes the notion of “shared responsibility” to end the blame game that often colours the relationship between motorists and other road users, like cyclists.

Cultural factors

A number of other governments have adopted this approach, but cultural considerations can loom large. Evidence suggests that achieving safer travel is not a straightforward case of cutting-and-pasting Sweden's success. Factors such as climate and traffic volume are also important. Officials in hot countries, for example, are all too aware that they have scant hope of enforcing heavy helmets on riders of motorised two-wheelers.

In the developing world, where car ownership is rising fast, many warn that casualties are set to soar unless policies are overhauled. So last year, Mark Gorton took his message for human-centric cities to India, where a lack of urban planning merges with a voracious appetite for car ownership. “Each country has its own local issues,” he said. “But the same themes repeat themselves in all cities.”

Jess Smees was a correspondent for Reuters in Frankfurt and Madrid. She currently works as a freelancer based in Berlin.

At the Tipping Point

Scaling up road safety investments is a necessity for low- and middle-income countries

By Jose Luis Irigoyen

When the International Transport Forum's 2013 Summit on "Funding Transport" kicks off in Leipzig in May, two years will have passed since the launch of the United Nations Decade of Action for Road Safety 2011-2020. If met, the ambitious goals of the Decade — to save 5 million lives and avoid 50 million injuries — would represent one of the great public health achievements in the early 21st century.

Currently, around 90% of road crashes occur in low and middle-income countries. With GDP loss per country pegged at between 1 and 3%, the economic and social cost of this epidemic can exceed the amount of overseas aid coming into countries.

Hospital systems are clogged with traffic victims — increasingly, vulnerable road users such as pedestrians, cyclists, and motorcyclists — straining scarce medical resources. Without strong social safety nets to compensate victims or their families, road traffic injuries can thrust aspiring generations into a cycle of poverty.

A generational war

Make no mistake — this is a generational war. The recent Global Road Safety Status Report launched by the World Health Organization (WHO) identified road crashes as the leading cause of death for young people aged 15 to 29.

This development threatens the societal gains achieved through the reduction in communicable diseases that we have seen in many parts of the world. Sub-Saharan Africa still needs donor support to defeat malaria and halt the spread of HIV and water-borne diseases, but other regions face a changing burden. We are at a tipping point: without urgent action, the man-made epidemic of road death and injury may soon prove overwhelming.

Faced with the prospect of rapid motorisation growth, the World Bank has stepped up efforts to help client countries strengthen their capacity to prepare, prioritise and implement cost-effective road safety programs.

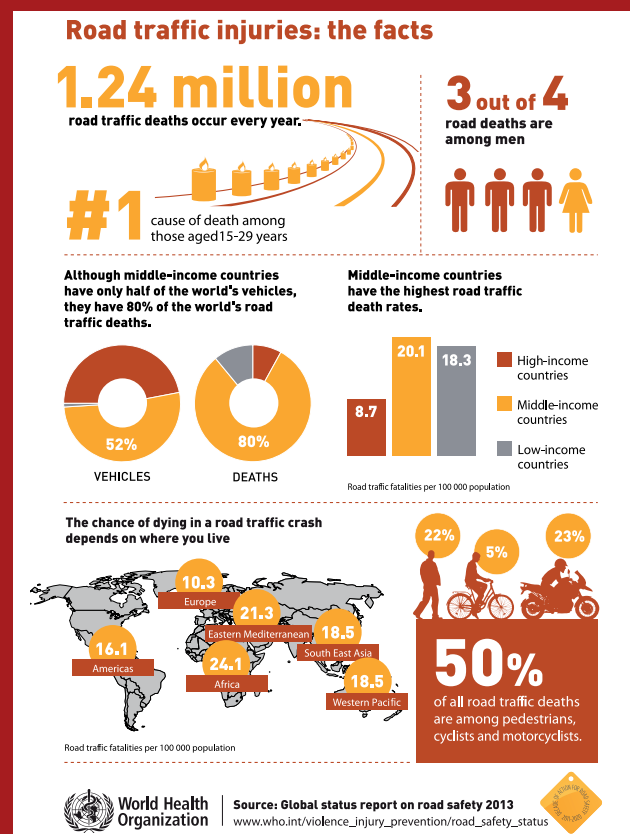
Safe systems

Guided by the 2004 World Bank-WHO World Report on Road Traffic Injury Prevention and the core pillars of the Decade of Action Plan, the central focus has shifted to the Safe System approach where responsibility for reducing risk is shared across a wide swath of actors, and results are achieved in a process that is underpinned by targeted road safety interventions and robust institutions.

Dedicated road safety funding is also instrumental to success. If developing countries are to create long term health outcomes on their roads, they must find sustainable ways to fund enforcement, engineering, public awareness, and other road safety related activities through ring-fenced revenue streams. The success of the Decade of Action may depend on our collective ability to achieve scaled-up investments to protect future generations. Development banks can play a role in setting high road safety standards and leveraging commensurate investments in the countries where they operate.

Underreported costs

The trigger in many cases is a better understanding by government officials of the underreported social costs of serious and fatal traffic injuries. My hope is that an initiative such as the Ibero American Road Safety Observatory (OISEVI), which brings together bilateral and multilateral partners including the International Transport Forum, can serve as a model for awareness raising and action in other parts of the world.



Jose Luis Irigoyen is the Director for Transport, Water, Information and Communication Technology at the World Bank.

Silk Road

Seamless cross-border trade routes demand regional co-operation and an end-to-end view

By Ellen Thalman

Talk of the Great Silk Road invariably evokes images of spice-and-silk-laden camel caravans gliding slowly but steadily across Central Asia towards European markets.

Today, trucks speed down the region's 24 000 kilometres of highway, put in place with the help of development banks to boost economic growth. The modern-day caravans travel incomparably faster, but often speed remains a mirage: modern truckers wait hours or days for paperwork to be completed at borders, often with no toilets or restaurants, or safe places to park their rigs.

Their medieval forebearers on the ancient Great Silk Road disposed of better "soft" infrastructure, with a network of oases, guards and messengers to ensure smooth journeys. If a similar system were re-established, the traditional overland trade route from China to Europe could again become a true arteria of global trade, driving economic growth at both ends and in the landlocked countries in between, where route-side business could bloom.

Global corridors

Investments into cross-border transport infrastructure, be it "hard" or "soft" have to live up to one sole measure in these times of budget strain: will they drive economic growth? Creating new transport corridors, linking logistics networks, and freeing bottlenecks to help move parts and finished goods have become a top priority for governments and investors in that quest.

"We need to identify trade corridors that have global significance," says Jari Kaupila of the International Transport Forum at the OECD. "Where do we need to invest so that the global supply chain benefits as well? What is required is to think of the complexity and this requires coordinated efforts."

Work is under way. The International Road Transport Union (IRU) hopes to start by creating an 800 to 1000 kilometre "model highway" through three Central Asian countries. To assess the challenge of reviving these routes, the IRU sends truck caravans to collect data. The results point to

some factors that cannot be addressed by building better roads alone.

Building alliances

"Nearly 40% of the travel time is spent at borders," says Igor Rounov, IRU President in Moscow. And various "unofficial payments", such as bribes, make up 30% of transport costs.

The IRU says the road would unlock enormous growth potential were the proper soft infrastructure in place. As a result, Rounov is hammering out an agreement between the three countries that would serve as a basis for jointly approaching investors.

Bodies like the IRU can help catalyse complex projects and get investors on board. Yet, with so many different interests at stake and the burden falling unevenly on some partners, it still isn't always easy to find common ground – or eager investors.

Creating catalysts

To better channel the process, countries have formed inter-governmental agencies to identify infrastructure requirements. They deliver joint projections of transport demand and joint forecasts of maintenance costs and bottlenecks.

The Northern Dimension Partnership for Transport and Logistics (NDPTL), for example, was set up in 2009 to coordinate the interests of 11 Northern European countries and help drum up investment. The NDPTL's goal is to improve major transport routes, linking them to the European Union's "TEN-T" scheme of 30 priority transport projects.

"We are acting as a catalyst," says Oddgeir Danielsen, Director of the NDPTL Secretariat in Helsinki, Finland. "Initially we will use our money to help develop projects so they can qualify for financing." His agency regularly prepares technical and feasibility studies as a vital first step to prove the need for railroads, ports, airports or highways.

Spirit



Barrier closing off a road

Credible model

It also helps establish who pays for what. One country might build the infrastructure and then get the revenue, or a public-private-partnership might be set up to operate on both sides of the border, he says. “We need a credible model to obtain financing.”

Who pays and who gets the benefit is of course the main issue for funding such projects. But shareholders and stakeholders must also decide how construction costs will be recovered – for example through tolls or taxes – and agree to bear any environmental impact a project might have alongside its overall economic benefit.

One such project in recent years is the dramatic eight kilometre long Øresund toll bridge, a car and rail bridge linking Denmark’s capital Copenhagen to Malmö in Sweden. Opened in 2000, the bridge has contributed significantly to integrating the two communities and boosting business in the region.

It is jointly owned by both countries through a consortium. After initially low traffic, the consortium now predicts double the traffic projected by 2020 at its outset and says it is on track to pay off debts on time.

End-to-end view

Not least, states need to look at the broader impact of investments, notes Kauppila: “Countries must look at the indicators to show the fluidity and efficiency – how long does it take to get a good from Hong Kong to the end user? “They must focus on their own country, but also take an end-to-end view.”

Only that will make the modern-day caravans glide as seamlessly from Asia to Europe as their precursors.

Ellen Thalman has written for Dow Jones and the Wall Street Journal for over 10 years. She lives as a freelance journalist in Berlin, Germany.

Couldn't car

Has the use of motor vehicles in the developed world peaked? The implications could be huge
By Richard Venturi



David Hitowitz/Flickr.com (CC)

The notion that car use and car ownership have levelled-off and may even be declining in some advanced economies may seem hard to believe for anyone confronted by rush hour traffic in major Western cities.

Yet increasingly there is a consensus among researchers that per capita car travel in rich countries has plateaued. A catchy term has already been coined for the phenomenon: Peak Car.

“The tight link between economic growth and car use appears to be weakening in high income economies in

the OECD,” explains Kurt Van Dender, chief economist at the International Transport Forum (ITF), the transport think tank based at the OECD in Paris.

Sea change?

This would be nothing short of a sea change: data on the West and Japan clearly shows that vehicle ownership and use increased in almost direct proportion to the rise in GDP from the 1970s through the early 2000s.

“Given the central role private vehicles have played in traffic growth for years, the question of whether growth

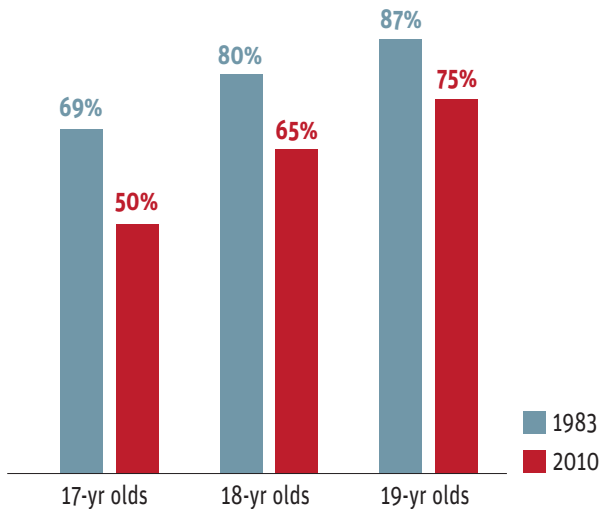
less

in car use is about to stop, has already ground to a halt, is declining or is merely experiencing a short dip, has profound policy consequences,” says Phil Goodwin, Emeritus Professor of Transport Policy at University College London.

To be sure, economic variables such as income and the cost of fuel play a large role. But the plateauing of car use predates the steep rise in the price of oil in 2008 and the onset of the global recession in 2009.

Bye bye wheels!

Share of young Americans holding a driver's licence



Source: Michael Sivak, University of Michigan

Young men with no car

In the U.S., for example, per capita car travel started declining in 2004 and as of 2012 was 6% below its highest historical level, according to a 2012 U.S. study. ITF statistics also show a decline in the UK over roughly the same period, with a levelling-off in Germany, France, Australia, Sweden and Japan.

One major trend in many rich countries is the drop in young people driving. In the US, the percentage of Americans under 50 with a driving licence has fallen substantially since 1983, but most dramatically among the young. Purchases of new cars by 21 to 34-year-old Americans were down to 27% in 2010, from 38% in 1985.

More and more researchers are convinced the reasons behind the shift lie largely in cultural and social factors, as well as local-level policies. For example, many cities have begun to discourage car use by measures such as reducing parking and driving space or enforcing congestion charges.

Digitally connected

The increase in cyber shopping and online socialising compounds the move away from personal vehicles. Researchers at the University of Michigan have found that the percentage of young drivers tends to fall as internet access in their community increases. Add to the mix signs of saturation of car ownership and an ageing population, and it looks as though car travel has peaked and is set to decline in rich countries.

“I’d be surprised if it is a temporary hiatus,” says Adam Millard-Ball, assistant professor at the University of California and author of a key study on passenger transport in 2010 with the late energy expert Lee Schipper. “Our data suggests travel demand is flat across all modes in industrialised countries,” he explains.

A peak in travel demand may also be due to constrained amounts of time to devote to travel. “We’re not building large infrastructure projects on a metropolitan scale. Unless we increase the number of hours we travel a day, we’re not going to travel further. That calculus is less applicable to long-distance travel by high-speed rail and air,” says Millard-Ball.

What about the BRICS?

The final verdict is not yet in. If passenger travel in the developed world has indeed peaked for vehicles, rail and air, this could have major consequences for the environment. As Millard-Ball and Schipper write, it could mean absolute levels of emissions in 10 to 20 years will be lower than today.

That said, the question looms: how long will it take passenger travel to peak in major developing economies such as China, India or Indonesia?

Richard Venturi is a freelance journalist based in Paris. He doesn't own a car.

The Tsunami Test

Faced with ever more extreme weather conditions, transport infrastructure needs to become more resilient

By Louise Barnett

When hurricane-force winds battered America's East Coast in 2012, they triggered a seawater surge that engulfed swathes of New York. Deep, murky pools submerged some subway entrances whilst sandbags were desperately piled high to protect others. The devastation wreaked by super storm Sandy on the Big Apple's 108-year-old subway system was the most disastrous it had ever seen.

Yet it was just the latest example in recent memory of extreme weather bringing transport networks to their knees.

35 000 km

Length of roads and rail in Australia at risk from flooding and coastal erosion in case of a 1.1 metre rise in the sea level

DATA FOCUS

Destructive potential

Iceland's volcanic ash cloud of 2010, Thailand's devastating mega flood of 2011, and Japan's deadly tsunami and earthquake the same year all showed mother nature's destructive potential.

The economic impact of such meteorological disasters is profound. Thailand and Japan suffered severe supply chain disruption, which in turn cut or reduced the flow of goods both within Asia and further afield.

But will transport systems around the world suffer even more extreme weather events because of climate change?

Designed for the past

"The amount of CO2 that has built up in the atmosphere is such that we can expect the momentum for some level of climate change to be unstoppable", explains Philippe Crist, expert on emissions and climate change at the International Transport Forum (ITF). That momentum looks set to unleash not just more rainfall, flooding and rising sea levels, but also more extreme heat in some areas.

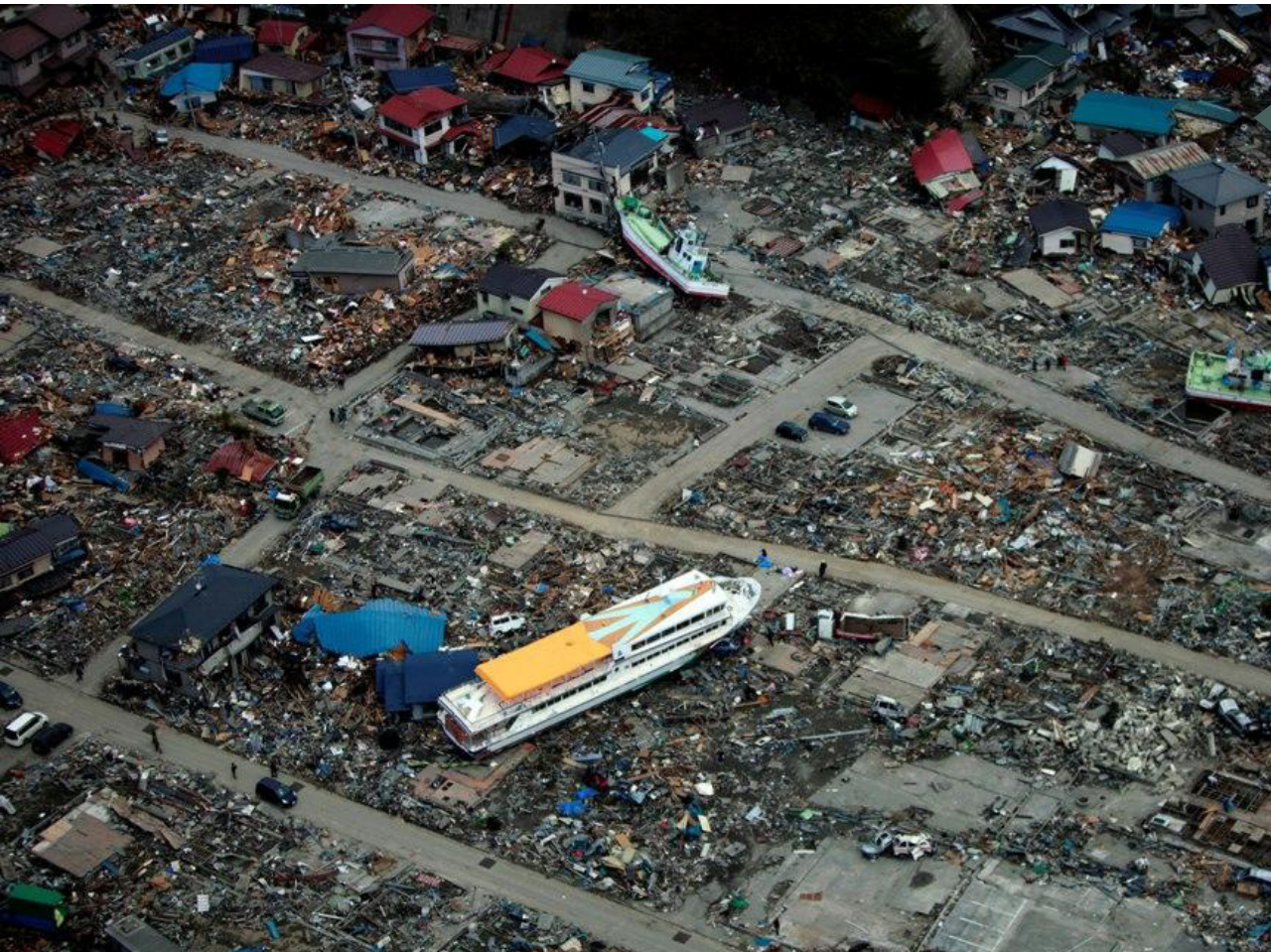
Each of these changes will be problematic for transport infrastructure, according to the ITF's Working Group on Infrastructure Adaptation to Extreme Weather and Climate Change that Crist co-ordinates, simply because they were designed only to withstand local weather conditions based on past experience.

Curse of topography

"Planning has to be put in place to ensure that when these more frequent types of extreme weather events occur, our systems are not challenged by it," warns Crist.

Vulnerability of roads, railways, aviation and shipping to more extreme weather conditions will vary from country to country, depending on climate and topography – which can turn out to be a curse as conditions change.

For example, the US Environmental Protection Agency warns that some of America's busiest airports are in



Tsunami aftermath

Official U.S. Navy Imagery/Flickr.com (CC)

low-lying coastal areas, making them particularly vulnerable. And Britain’s Office of Rail Regulation recently called for the rail network to be made more resilient after torrential December rains triggered floods that shut down entire lines.

Wake-up call

David Higgins, chief executive of Network Rail that runs Britain’s railways, said the Victorian network had neither been designed nor built to withstand such extreme weather. “This has been a wake up call for the whole industry, which we ignore at our peril,” he warns.

Meanwhile, rising sea levels caused by melting polar ice caps will bring their own set of hazards to transport infrastructure. The Australian government’s 2011 report *Climate Change Risks to Coastal Buildings and Infrastructure* estimates that a 1.1 metre sea level rise would put up to 35 000 kilometres of its roads and rail at risk from flooding and coastal erosion.

Unsurprisingly, port areas worldwide will be hard hit by rising sea levels and storm surges. Government-commissioned research in Norway, home to Europe’s longest coastline, warns that some of its harbours and waters could be rendered inaccessible. At the same time, new waterways may open up in the Arctic where ice looks set to melt.

Thawing permafrost

Elsewhere, more extreme heat will result in buckled roads, rail tracks and airport runways. Different asphalt is already being used in Washington, D.C. to make pavements there less prone to softening during long hot spells.

“This has been a wake-up call”

**David Higgins, CEO of Network Rail,
about 2012 flooding of infrastructure in the UK**

And milder winters will be problematic in northern countries where more annual freeze-thaw cycles will damage roads and pavements. Thawing permafrost will create an unstable base for the roads and airstrips built on it, such as Alaska’s highways and the runway in Svalbard, Norway.

So what can be done to safeguard transport infrastructure against the potential hazards of more extreme weather?

In search of resilience

Japan responded to the 2011 disaster with a huge push to safeguard its infrastructure. This included making ports

The Tsunami Test

more tsunami-resilient via remote-controlled sluices, new breakwaters and additional monitoring stations.

In London, the Tube's drainage is being improved to make its outdoor tracks better able to withstand downpours and flooding. Its outdoor stations are also being weather-proofed as part of rolling refurbishments.

Richard Jones, head of network operations and control at London Underground, says steps to protect the 150-year-old network include keeping assets in good condition, ensuring drains are clear, and making staff aware of weather-related weak points: "In terms of protecting ourselves against adverse weather, it is really about doing the simple things well."

Tackling vulnerabilities

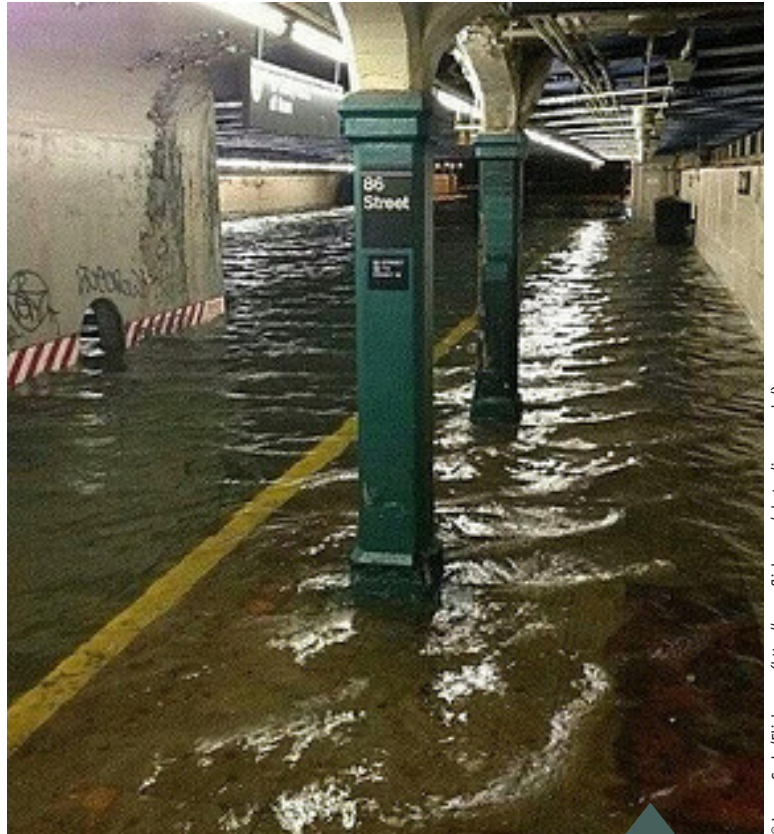
More broadly, the ITF Working Group on Climate Change has outlined a three-pronged approach to safeguarding against extreme weather. The three elements are detailed inventories and good maintenance of existing infrastructure; more weather-proof designs for new assets; and allowing some parts of transport networks to fail if necessary.

Butch Wlaschin, director of the U.S. Federal Highway Administration's Office of Asset Management, says his department was already encouraging U.S. state governments to make inventories of their roads, bridges, lights, signage and tunnels.

The aim of the inventories is to help local transport authorities decide which parts of the network are critically important - for example because they serve large towns or cities, major freight corridors or hospitals. Once critical infrastructure is identified as such, any vulnerability can then be systematically analysed and tackled. "The concept of risk is key. Is the road critical?" says Wlaschin. "If it is critical, then what types of climate change is it most vulnerable to?"

Optimise the outlay

Weather-proofing could involve re-location, such as the roads in America's Pacific North West that are being



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Water in New York subway station after 2012 Hurricane Sandy

moved inland away from the ocean. Or new structures may be built more simply and at low cost to make them easily replaceable in wake of weather damage. Another option is simply to remove vulnerable infrastructure if an alternative is already available.

But it seems that for most local transport authorities, doing nothing about the threat of more extreme weather is simply not an option. "They need to maintain quality of life, economic vitality and global competitiveness by ensuring that goods and services can get where they need to be," Wlaschin points out.

Crist echoed the need for transport planners to make informed choices about the risks posed by extreme weather: "The challenge right now is to try to optimise the outlay for new infrastructure and for refurbishing and maintaining existing infrastructure against these in some ways unknowable risks. The system has to be much more resilient."

Louise Barnett is a former news reporter and consumer correspondent for the Press Association and consumer editor of Britain's Daily Express national daily newspaper. A Cambridge University graduate, she is now a freelance journalist in Berlin.

Measure for measure

Global freight logistics is making big advances in measuring performance, but common standards are still missing

By Ali Qassim

It could have come straight out of the latest James Bond movie. A radio frequency identification (RFID) tag is attached to a container which is carrying an electronics component from its supplier in mainland China to Chinese Taipei.

The installers of the tag will now be able to monitor every step of the component's journey, as it joins other components to become a bigger electronics product until it gets airfreighted to Chicago in the U.S., from where it will be finally trucked to Kansas.

Except the installers are not fictional spies. They are officials of Chinese Taipei's Ministry of Transportation and Communication who are using RFIDs to track containers' logistics status en route in real time.

Measure and monitor

"With today's ever increasing global trade and high demand for just-in-time deliveries, the role of transport logistics supply chains is crucial," says Jari Kauppila, who heads the International Transport Forum's (ITF) statistics unit. "That is why for policy makers, it is so important to be able to measure these logistics."

The countries of the Asia-Pacific Economic Cooperation (APEC) are in many ways "ahead of the game" in their efforts to measure logistics through technology such as RFIDs, notes Kauppila. APEC has set itself the target to improve supply chain performance by 10% by 2015 based on 2010 figures, and for that purpose is using advanced performance measurement techniques.

Canada, a vast country whose economy also depends hugely on trade, has also been developing its own tools and databases. The Economic Analysis and Research Branch of Transport Canada is closely monitoring the efficiency of its transport system in moving freight from Hong Kong to Vancouver through its inland corridors to Halifax and then on to Europe.

Sharing information

The Canadians have broken down supply chains into different modes of transport. And rather than focusing on speed, they have put more emphasis on predictability of delivery. Increasingly the thinking is that by improving reliability many other aspects of transport such as efficiency, safety and speed can also be improved.

Although Canadian and U.S. ports are in many ways competing for trade, they are also collaborating with each other. The Canadian approach to measuring logistics is thus being followed closely by the Bureau of Transportation Statistics at the U.S. Department of Transportation (DoT): in the final analysis, shared information helps trade, as APEC's 21 member countries have learnt in trying to improve inter-APEC logistics routes.

But while freight is a truly global trade, different countries and regions still currently use very different ways of measuring logistics. All have drawbacks: self-reporting surveys can lead to double counting, statistics-based studies usually rely on data that covers national activities only.

Better benchmarking

The World Bank has developed the Logistics Performance Index (LPI) which measures the logistics "friendliness" of 155 countries based on a worldwide survey of operators on the ground like global freight forwarders and express carriers.

The ITF's Kauppila calls for the development of "more comparable methods to use for benchmarking." But whatever way countries choose to measure logistics, he says, "the most important thing is that it helps them identify problems and to correct these."

Ali Qassim lives in London, from where he writes on UK government regulatory matters for a U.S. daily publication. He previously covered economics, trade and politics for English-language publications from Latin America and Spain.

Of Hubs and Hyper-Ports

More than 80% of world trade is by ship. Ports need to adapt to keep goods flowing.

By Jason Walsh

If trade is the lifeblood of the world economy, shipping is its veins, delivering an unimaginable cornucopia of goods across the globe at ever-lower cost, higher speed and in greater volumes.

In fact, modern industrial society – and even post-industrial society - is unimaginable without the flows of material from opposite ends of the world: 80 to 90% of world trade flows go by ship. "The whole globalisation moment is built on maritime shipping", says Olaf Merk of the OECD's Port Cities programme.

But trade winds have been unreliable of late, with much of the world economy still mired in slump, if not in full-blown recession. And when the world economy coughs, the cargo industry catches a cold: in 2009 global container trade volumes fell for the first time in the 60-year history of containerisation—a truly historic event that no-one in the industry wants to see repeated.

Hubs and hyper-ports

"The outlook over the last year has been difficult for shipping. It's very volatile and dependent on the GDP and external trade of a country", says the OECD's Merk.

"One question right now is: Do we have too many ships? Rates are low and the profits are not high."

The answer, at least as far as cargo shipping lines and port authorities are concerned, is a new model: larger ships servicing hub ports. Hub ports are hyper-ports: larger, deeper and able to handle a higher volume of both ships and containers, with highly integrated onward distribution by road, rail and sea.

Increasing tonnage on ships, particularly those travelling from Asia to Europe, is hoped to increase efficiency, lower costs and stimulate growth in trade. Maersk, the world's biggest container ship operator, is about to launch a new line of ships that can carry a staggering 18 000 containers each — and the generation to follow may see this increase to 22 000 containers per vessel.

Ready for growth

Data collected by the United Nations Conference on Trade and Development (UNCTAD) figures indicate that containerised cargo accounted for 56% of all dry cargoes transported in 2010. They also show that containerised cargo is the fastest-growing segment of maritime trade, expanding at an average rate of 8.2% over the last 20 years.

"The key to understanding international trade is that goods need to be relatively expensive in order for it to be worth moving around the world", explains James Heartfield, development researcher at London's Queen

338%

Growth of port of Shanghai, China, between 2001-10 (container traffic)

DATA FOCUS

22 000

Number of containers carried by next generation of vessels (15 000 for present generation)



© Oktay Ortaçoglu / iStockphoto

Mary University. "As the cost of shipping declined, the marginal advantage declined with it." Lowering shipping costs, then, is a way of expanding trade, but the strategy is not without risk: bigger ships and port upgrades are expensive, and if the volume of tonnage doesn't follow, then losses surely will.

But demand on the Asia to Europe routes is forecast to grow by 3 to 5% this year and by 5% on the Asia-Africa and Asia-Latin America routes. Søren Toft, head of network planning at Maersk, says his company is ready for growth. In June 2013, Maersk's first Triple-E class ship will come into operation: at 400 meters long, 59 metres wide, with a draught of 14.5 metres and capacity for 18 000 twenty-foot containers, Toft expects a staggering 25% increase in efficiency over current vessels.

Container handling to quadruple

But will increases in efficiency from larger vessels not be eaten up by falling rates, as super-freighters add more capacity to a market that is just moving out of a period of slack? The effects of the crisis can still be felt, but the long term outlook is buoyant. In its 2012 report on "Strategic Transport Infrastructure Needs to 2030", the OECD estimates that the port handling of containers could quadruple in the next 15 years or so.

And in this development, larger ships are only one part of the picture. Support services will need to be upgraded to handle the higher volume of containers. Work is well underway: the Panama Canal is being widened to support larger ships, and ports are being expanded worldwide.

“The whole globalisation moment is built on maritime shipping.”

Olaf Merk, OECD Port Cities programme

APM Terminals, a terminal operator and subsidiary of Denmark's A. P. Møller-Maersk Group, which runs 69 sea ports worldwide, has 14 ports under expansion and a further seven being built from scratch. "Basically hub ports mirror all the major trade lines", says Thomas Boyd of APM Terminals. Therefore, the significant investment required to support the larger ships – such as new cranes that can reach across a ship



Main global Shipping Routes

Source: The Royal Society/Gastner

Shipping journeys in 2007 ● <10 ● 100 ● 500 ● 1000 ● 5000

Of hubs and hyper-ports

carrying 22 rows of containers – currently makes sense in major, developed markets.

Cascade of requirements

Increased volume creates a cascading effect: bigger ships mean new cranes; new cranes mean quays have to be strengthened for more weight. The capacity of the feeder network has to be increased. And then there has to be dredging and deepening of berths and access channels to allow the bigger ships to reach their destination in the first place.

All of this is time consuming and costly work, and for it to have any value other aspects of port management have to fall into place. "The most important effect of hub ports is that we have to increase productivity. Bigger ships should not mean longer stays in port," says Boyd. "All the shipping lines are scaling-up to larger ships and the margins are razor-thin, so this is vital for the future."

Maersk Line announced on March 11 that it will stop using the Panama Canal to transport goods from Asia to the East Coast of the United States, as the canal was unable to handle its new larger vessels. Trade will instead flow in the opposite direction, through the Suez Canal, the Mediterranean and across the Atlantic.

Critical mass

Will the growth of hub ports spell trouble for smaller port operations? "Essentially all ports are seeking to upgrade," says APM's Boyd. "We will see enough of these larger ships in 2014 to create critical mass. Then each port will have to prove how well they can handle the inbound containers."

China in particular has already built advanced hyper-ports. Its two largest ports, Shanghai and Shenzhen, have grown by 338% and 296% between 2001 and 2010 alone, according to the International Association of Ports and Harbours. But in other emerging markets, ports along the coastlines of Latin America, India and Africa are keen to join the club.

"It's a bit of a race to create hub ports in certain locations," says Boyd. Even Peru, perhaps more famous for the Andes mountains than for its ports, has just launched a USD 800 million project to build a 20-meter deep port under a "build, operate and transfer" (BOT) PPP scheme that aims to attract shipping for the entire west coast of South America.

Jason Walsh is the Ireland correspondent of The Christian Science Monitor. He has also contributed to The Irish Times, The Guardian, The Independent, The Sunday Times, The Washington Times, and USA Today, among others.

Lifting the Limit

The widened Panama Canal could change trade routes - By David Crossland

Since the Panama Canal was first opened in 1914, its capacity has been limited by two sets of locks, one at each end, with a width of 33.5 metres and a length of 305 metres. The locks are needed to raise ships a full 26 metres so that they can traverse the canal between the Pacific and Atlantic and spare ships the voyage around Cape Horn.

At present, Panamax vessels – the largest class of ships that can use the canal - are limited in capacity to around 5 000 20-foot containers (TEU) or 500 000 barrels of crude oil and refined products. But that is too small by far for the new generations of container ships which range up to 18 000 TEU.

Hitting capacity

And as it approaches its 100th anniversary, the Panama Canal is also hitting its capacity limits. Last year, a record 332 million tonnes of cargo moved through the waterway, just 20 million tonnes short of its capacity. It has to be widened – or risk losing its market share of around 5% of world trade.

The USD 5.25 billion (EUR 4 bn) expansion approved by a referendum in 2006 will add a new set of locks and deepen the canal, allowing ships almost three times the size of the current maximum to pass through. Vessels will be able to be 25%, 50% wider and have a draft 25% deeper. Once the expansion is completed, the canal will be able to handle container ships carrying up to 12 600 TEUs and oil tankers carrying over 1 million barrels.

The European Investment Bank contributed credit totalling USD 500 million (EUR 382 m) towards the expansion; other development banks involved are the Japan Bank for International Cooperation, Inter-American Development Bank, International Finance Corporation and the Andean Development Corporation. The consortium building the locks is led by companies from Spain, Italy, Belgium and Panama.

Where will trade flow?

The economic boost to Panama is obvious – with greater volumes passing through the locks, revenues will increase. Not least, some 27 000 jobs have been created by the expansion project since September 2007.

But the widening is also likely to have a major impact on trade flows, especially on the routes between the U.S. East Coast and Asia, which account for most of the canal's business. For shipping lines that move cargo from Asia to

the U.S., the widened canal might make it cheaper to sail straight through to East Coast ports. The common route now is to unload at West Coast ports such as Long Beach and Los Angeles, to then move the goods to destinations in the U.S. by road or rail.

"To go from being able to service 4 500 TEU ships to 13 000 in one hit is a seismic shift in ship size," notes David Charlesworth, senior advisor at Drewry, a London-based specialist shipping consultancy: "There are very serious economies of scale to be had by deploying larger ships. There's no doubt that the overall cost of the all-water routing from Asia to the U.S. East Coast will fall."

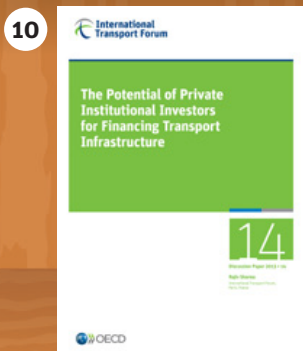
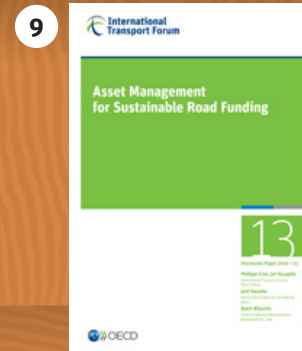
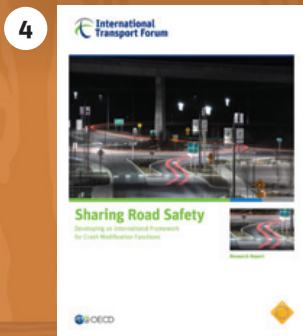
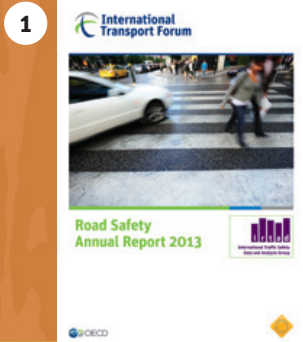
Big enough?

The widened canal could also reclaim U.S.-bound trade from Asia that is passing through the Suez Canal, which currently has no size restrictions on ships. Ports along the U.S. East Coast like New York, Baltimore, Norfolk and Miami have been racing to be ready to handle larger ships from 2015, dredging their channels, buying bigger cranes and refitting their docks.

The Port Authority of New York and New Jersey (PANYNJ) is planning to raise Bayonne Bridge, which connects New Jersey with Staten Island, to allow larger container ships to pass underneath. "The expansion will impact more than just shipping companies: retail supply chains, manufacturers and commodity traders will each feel the effects of new access to eastern ports," says Colliers International, a real estate services group, in an analysis published in 2012.

"Growth in East and Gulf Coast port traffic will be fuelled by new manufacturing operations from Airbus (Mobile), Boeing (Charleston) and Caterpillar (Athens, Georgia), and a new commitment from Disney to exclusively use the port of Jacksonville for all imports bound for the Magic Kingdom," note the property experts. Panama Canal Administrator Jorge L. Quijano thinks the canal expansion would also offer "great potential" for U.S. exports of shale gas to markets in the Pacific.

But will the new Panama Canal be big enough? Its expansion cannot possibly keep up with the growth of freight ships. The biggest container ships currently under construction will not be able to pass through even the newly expanded Panama Canal.



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1

IRTAD: Road Safety Annual Report 2013

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ITF, Paris, May 2013
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2

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OECD, Paris, August 2012
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Also available in French

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