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COMMENT & ANALYSIS: The cost of burrowing: why do big projects such as Eurotunnel find it so difficult to make the numbers add up?

By Richard Milne, Cathy Newman and Robert Wright
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Commuters on today's overcrowded London Underground may find it hard to believe that there was a time when the system's problem lay in having fewer passengers than expected.

But in the Edwardian era newspapers wrote scathingly about the deserted stations and half-empty trains on the Bakerloo, Piccadilly and Hampstead Tube lines, which opened within a year of each other in 1906 and 1907.

The lines were built through the energy and ingenuity of Charles Yerkes, an American-born financier who laid the foundations of the present network through his company, Underground Electric Railways of London. Mr Yerkes - who served time in jail in the US before coming to London - won investors' backing with hugely optimistic forecasts of likely traffic volumes.

But, according to Christian Wolmar, a writer preparing a history of London's Underground, passenger numbers were at first barely half the levels predicted. Investors in the lines had their shares bought out for about 60 per cent of their original value in 1911.

Aspects of that story will strike a chord with investors in Eurotunnel, the Channel tunnel operator, whose board was this week unseated by a rebellion by angry French private investors. The project has been unable to generate enough revenue to allow the company to service its debts, which now stand at £6.4bn, because traffic forecasts - drawn up by SNCF and the then British Rail, the two countries' state-owned railways - were vastly overoptimistic. Guillaume Pepy, a senior official in SNCF, the French national railway, said last year that the state railways had never believed forecasts they had given Eurotunnel for their likely use of the tunnel. As in the early years of the underground lines backed by Mr Yerkes, traffic through the tunnel has been only about half predicted levels.

Eurotunnel's shares are worth a fraction of their value when they were first sold to the public in Britain and France in 1987. Many observers believe this week's upheavals may have brought closer the day when shareholders lose almost all their investment. That would be the likely outcome if creditor banks were to seize control of the tunnel by installing their own management to secure debt payments.

As the fortunes of investors who supported both Mr Yerkes and Eurotunnel show, many of the problems that plague transport infrastructure investments have barely changed since the industrial revolution.

Bent Flyvbjerg, professor of planning at Denmark's Aalborg University and the author of *Megaprojects and Risk*, published last year, says there remains a clear pattern of underestimating the costs and overestimating the benefits when preparing large infrastructure projects. Such problems are particularly acute in the case of transport projects because so many conditions and assumptions can change in the time between an idea's conception and its completion. And it is not easy to find the right financial structure for projects that must use future revenue streams to pay off huge construction costs over decades.

In a 2003 study of more than 250 rail, bridge, road and tunnel projects in 20 different countries, worth approximately $90bn at 1995 prices, Prof Flyvbjerg and colleagues found that cost overruns occurred virtually across the board: 90 per cent of schemes had higher costs than intended. For rail projects, the average cost escalation was put at 45 per cent, while for bridges and tunnels it was 34 per cent.

On the revenue side, existing providers may compete more vigorously than expected with a new facility - as happened with Eurotunnel, where ferry companies became more competitive and low-cost airlines encroached on the tunnel operator's target market. Meanwhile businesses that use existing facilities - a ferry terminal, for example - may be slow to take advantage of a new opportunity such as a tunnel, since it could involve reorganisation.

Adrian Lyons, chairman of the Railway Forum, an industry think-tank, believes promoters' enthusiasm often makes them believe the most optimistic forecasts for revenues and costs.

Certainly, transport mega-projects seem to attract charismatic figures able to win investors' loyalty. Grateful shareholders arranged a pension for George Hudson, the

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greatest promoter of Britain's 19th-century railway mania, though his empire had already collapsed through fraud.

Some of the same strong feelings were on show at Eurotunnel's annual meeting on Wednesday, where investors spent more than nine hours making impassioned speeches and berating the outgoing board. The rebels' figurehead is Nicolas Miguet, a maverick financier who aspires to run for the French presidency and has past convictions for fraud.

Prof Flyvbjerg believes that in most cases cost-benefit analyses are calculated to make projects look attractive to politicians and private investors.

"If you went back and read the material issued for the flotation of Eurotunnel, you would be shocked," he says. "They wrote that they had carefully estimated what the [risks of construction cost overruns] were. It says the risk is 10 per cent [of estimate]."

Eventual cost overruns were much higher. "Anyone who knows about it would not think the construction cost risk was 10 per cent," Prof Flyvbjerg says. hatever the reasons for miscalculating costs or traffic flows, plenty of other recent projects have suffered. Prof Flyvbjerg points to the "Great Belt" rail tunnel in Denmark, where costs more than doubled during building. Britain's Humber Bridge went 175 per cent over budget and its first year traffic was only a quarter of that forecast (see box below).

While France was proud of its TGV Nord high-speed rail line to the Channel Tunnel - when Britain's efforts to construct a similar link were long delayed (see story below) - traffic was only a quarter of the forecast level in its first year of operation, while costs overran by 25 per cent.

Robert Bain, associate infrastructure analyst at Standard & Poor's, the credit rating agency, blames such problems partly on governments' insistence on awarding contracts to the lowest bidders. He says there should be better quality screening of bids before costs are considered. "Rewarding the lowest-cost bidder in isolation [from other factors] seems to be a rather dangerous strategy," he says. "It leads to the submission of frankly unsupportable bids and it's these unsupportable bids that lead to trouble later."

Nevertheless observers believe the lessons of some of the debacles are being slowly learnt. Across the developed world there is a shift away from purely public or purely private financing and towards public/private partnerships. Ideally, the state takes on long-term risks with which the private sector has traditionally dealt poorly, while the private sector brings its financial disciplines to the building and operating of projects.

Mr Bain says schemes conceived as public/private partnerships also benefit from having more sets of advisers scrutinising them - although David Begg, chairman of the UK's Commission for Integrated Transport, points out that such additional scrutiny has added further to the costs of projects.

Greater use of computer modelling of projects may also help avoid some of the problems of overspending and revenue forecasting common in the past. Mr Lyons says such technology is allowing projects to be designed much more quickly and with greater understanding of geological challenges. One thing Eurotunnel is considered to have got right is its pre-construction geological surveys, which were considered to have set new standards at the time. Prof Flyvbjerg, however, says frequent optimistic claims for the benefits of new technnology in controlling costs often fail to be borne out.

In the end, though, megaprojects of the type to tantalise small investors may still need the drive and ambition of figures such as Charles Yerkes. He raised £16m for his London Underground projects - an enormous sum in the Edwardian era.

"He found the money and got the lines built with amazing speed," says Mr Wolmar. "If he hadn't done that, they might never have got built."

Yerkes died in 1906 and did not see any of his London routes start operating, let alone thronging with the numbers of passengers who still use the ageing lines today. The investors who this week maintained their faith in Eurotunnel will hope their expectations are met more rapidly.

Pride, pragmatism and the slow train through Kent

"A national embarrassment" was how one British MP described it. "Not the way things are done in France," sniffed a French official.

For nearly a decade, the rail links in the UK and France leading to the Channel Tunnel were more emblematic of the differences between the two countries than of the ties that bind them.

From cruising through the Picardy countryside at 186 miles per hour, Eurostar trains had to slow dramatically on leaving the tunnel at Folkestone and were often forced to follow a commuter train into London.

It was not until two years after the tunnel opened in 1994 - and 10 years after the treaty of Canterbury that allowed the tunnel to be built - that the British parliament at last approved the construction of the high-speed link from London to Folkestone.

The first leg opened last September; the second part, into London, is due for completion in 2007.

The irony that the troubles at Eurotunnel - one of the most obvious symbols of Anglo-French co-operation - came to a head in the week that the Queen was in France to celebrate 100 years of the Entente Cordiale was not lost on observers.

The Channel Tunnel project also underlines how the two countries tend to view infrastructure projects differently.

"The French like to do things big. The government doesn't really worry about the bill until afterwards," says one leading industrialist in France. "The British are much more price-conscious and don't like getting the state involved at all if possible."

In France this has meant support for grands projets such as the Bibliothèque François Mitterrand and the Stade de France. Projects often seemed to be decided by politicians with one eye on their own legacy.

The British approach to infrastructure projects is by contrast much more pragmatic, with Margaret Thatcher famously declaring when she was prime minister that Eurotunnel would not receive a penny from the public purse. That the French were badgered by Baroness Thatcher into accepting that there could be no public financing of Eurotunnel is a cause of considerable discontent today.

Tony Blair has followed by favouring private finance initiatives in investments where previously the state would have intervened.

But the British record with transport projects - particularly in rail - is not a glowing success.

The Crossrail project to link east and west London has gained little momentum amid bickering over how much the government and private sectors should contribute to the project.

The upgrade of the west coast main line, meanwhile, is substantially over budget and behind schedule and some of the improvements promised may never be realised.

Critics of the government say it should copy some of the French esprit and take over the funding of big transport infrastructure projects itself.

Gwyneth Dunwoody, the Labour chairman of the Commons transport select committee, says: "My committee has said that, although there are difficulties and it is a slower process, ultimately it is in the interests of the economy for governments to plan the transport infrastructure overall and to supply the cash and the support systems."

Others point to the economic development in London's Docklands as a consequence of the Jubilee Line extension to make the case for improved transport links.

Even in the case of Eurotunnel itself - at the time of its construction the biggest private sector infrastructure project Europe had seen - Richard Shirrefs, the former chief executive, has decried the lack of public funding. Mr Shirrefs calls it the "original sin".

Richard Milne and Cathy Newman

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