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Laurie Baker

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Improving Decision Making for Major Urban Rail Projects

Roger Allport, Halcrow

University College London
26 February 2003

Roger Allport, who is a long-time member of the Group and is now a Director of Halcrow, addressed the February meeting of the Group on a subject which he has been involved in and studied for some considerable time, and for which he is currently undertaking a PhD at Imperial College. Basically his theme was why do so many major urban rail projects fail to live-up to the expectations of their proponents and what can be done in the way the planning process is presently structured and progressed to improve the situation?

The context was a large increase in the development, building and operating such projects in all parts of the world. Given that success was largely measured in terms of financial return, there would inevitably be, in this study, a concentration on the measurement of costs and benefits in monetary terms, but the underlying economics of such projects and the planning approach adopted in designing them should, he thought, be given much greater significance in the future.

First, it was necessary to appreciate the scale of MRT development in urban rail transport systems. The speaker divided the world into six regions -

- Western Europe,
- Central and Eastern Europe,
- North America,
- Latin America,
- Asia (affluent) and
- Asia (other)

For each area, statistics were presented (table 1) on route-kilometres of MRT in 1995 and the corresponding percentage of public transport passenger-kilometres thereby generated in each regional group. It was plain that Western Europe had the great bulk of MRT (2,584 route-kilometres or 2½ times as many route-kilometres as the rest of the world) and Central and Eastern Europe showed the highest percentage of public transport passenger-kilometres (49%). At the other

end of the scale Asia (other) only managed 116 route-kilometres and Latin America generated a mere 12% of its public transport passenger-kilometres by MRT.

Region	Route-kilometres	% of public transport passenger kilometres
Western Europe	2,584	27
Central/Eastern Europe	288	49
North America	176	39
Latin America	148	12
Asia - affluent	468	19
Asia - other	116	24

In spite of the now comparatively high percentage of public transport passenger-kilometres carried by MRT world wide (12-49%), the speaker thought that there remained a large potential for further expansion in MRT. Unfortunately, although great social benefits stemmed from such schemes, financial failure could bankrupt cities.

A major problem in studying these urban rail projects in order to draw some general lessons to be learnt and suggesting remedies for the future was the dispersed nature of accessible sources of information. Data collection and interpretation also presents major difficulties because of different methodologies adopted in different parts of the world, different standards, both in the accounting and technical senses and the problem of different currencies and inflation rates. In the event the speaker used a wide range of sources.

It was instructive to compare the degree to which passenger carryings and costs differed from forecasts for each of the eight major sources consulted (table 2).

Of the four early sources one source (Merewitz) was dated 1973; one source (Skamris/Flyvbjerg) 1996 - who included all the available sources in their research; and the remaining two 1990. Halcrow and Skamris/Flyvbjerg used world-wide examples; Merewitz used Europe and North America and UMTA the USA only. Taking costs first: Merewitz reported an average of more than 50% increase in costs over forecast; Halcrow found there was a range of +50 to +500% for half of the projects examined in developing cities. The smallest range of results (where such was given) came from UMTA (+17 to +156%) and Skamris/Flyvbjerg was the only source to uncover reductions in outturn compared with forecast (a range of -15 to +500%). To pass to passenger

carrying: Merewitz gave no figures; two of the remaining three sources showed a range of negative comparisons with forecast, (-28% to -85% for UMTA; -50% to -90% for Halcrow). Skamris/Flyvbjerg, who included all available sources, show ridership between +30% to -90%. The overall picture is of much optimism in both costs and passenger carryings.

Source			Outturn v Forecast	
1973	Merewitz	Europe/North America	K	average > +50%
1990	Halcrow	Developing world-wide	K	half +50 to +500%
			Pax	half -50 to -90%
1990	UMTA	USA	K	+17 to +156%
			Pax	-28 to -85%
1996	Skamris/Flyvbjerg	World-wide	K	-15 to +500%
			Pax	+30 to -90%

Turning to the four more recent studies (table 3), Halcrow's 1998 and 2000 studies showed no significant improvement in comparisons of outturn v. forecast in either costs or passenger-kilometres generated. Skamris' 2000 PhD thesis analysed all available evidence. Mackett's 1998 study indicated that out of 13 projects studied in the UK and USA, two were successful in terms of the outturn of passenger-kilometres compared with forecast.

Source			Outturn v Forecast	
1998	Halcrow	Private, world-wide	K/Pax	No improvement
1998	Mackett	UK, USA	Pax	2 of 13 successful
2000	Halcrow	Private Asia	K/Pax	No improvement
2000	Skamris	World-wide	K	-46 to +200%
			Pax	-96 to +1%

The principal features of the projects studied and which could be generally applied as a characteristic of this type of public transport project were, on the cost side:

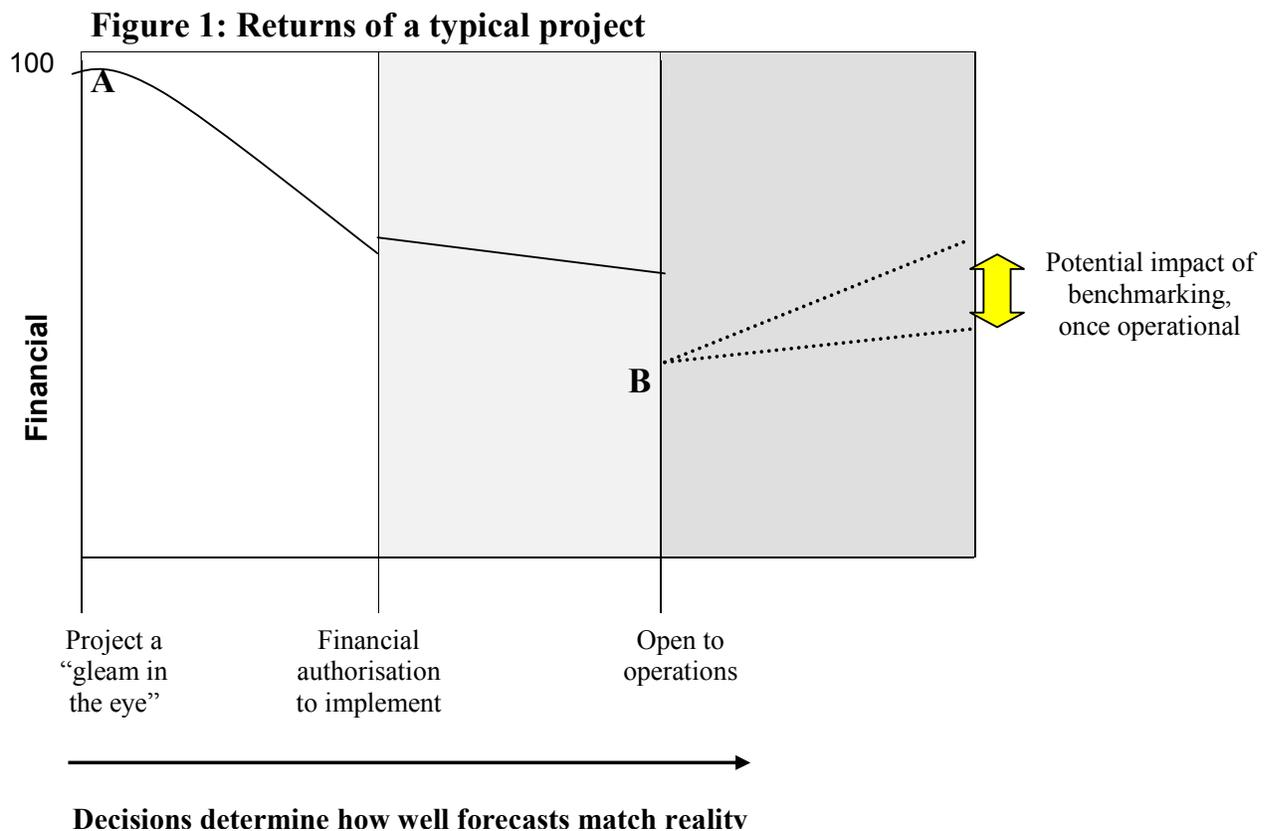
- (1) capital costs were significantly understated - but there seemed to be little discernible difference between public and private 'ownership' performance in this regard (although it was early days for the latter);

- (2) implementation time was underestimated;
- (3) operating costs were understated

But the Skamris results show that outturn costs *could* be lower than forecast.

In the matter of revenue the almost universal shortfall of outturn passenger-kilometres compared with forecast in the projects studied indicates a generally serious picture so far as revenue is concerned.

The returns of a ‘typical’ project, or more importantly, how they changed during the course of the project through the planning, implementation and operations stages, is illustrated in figure 1.



Does it matter? Roger went on to make it clear that it does.

First, there is the opportunity cost: it must not be forgotten that these projects cost a great deal of money, which could be put to alternative use. He quoted \$1 - 3bn for a typical 15km. MRT line. In the South American republic of Columbia

the costs of the Bogota metro Line 1 represented 70% of the government public investment budget. Singapore's NEL line costing \$5bn equals the budget for education and health for one year, or could buy the new Changi terminal, two hospitals, one polytechnic, five light rail (peplemover) lines and upgrade 10% of the city's high-density flats.

More insidious is that, with considerable reliance upon private finance failure in the market, investor confidence is sapped, if not destroyed. The changing needs of a changing market and inadequate strength of influence from *our* profession in appreciating this and the nature of transport infrastructure leads to flawed decision-making. It becomes impossible to answer with a satisfactory degree of confidence as to which is the best option in dealing with a particular urban transport problem. For example, if there are three MRT options A, B and C:

- A is forecast to produce a 'profit' of 50,
- B of 65 and
- C produces 70.

The decision is taken to implement C; but the outturn for C is, say, 20 rather than 70. The question then "*Is C still the best MRT option?*" We do not know, as we have no knowledge of the still speculative outturn of B and C. What is more, beyond the particular problems of comparing these three MRT projects, we do not know if there are other MRT and non-MRT options which are better than either A, B or C.

Causes of poor success

Roger identified seven causes of poor success in forecasting the eventual outturn of MRT projects.

- Decision-making by individuals/organisations
- The framework for project development
- MRT project characteristics
- Transport planners and techniques
- Project development process
- Poor 'clienting'
- Financing regime incentives

Decision-making: Individual decisions are not 'rational' and are subject to several biases. Individuals tend to view problems from 'the inside'. There was a failure to properly recognise and take account of the wide range of uncertainties in projects of this scale. Often there was an escalation of commitment not properly anticipated in the detailed planning process. Clear and consistent

ethical guidelines were absent. It must be recognised that organisations have an instinct to survive therefore analysis, which is contrary to received opinion, is in danger of being suppressed. These are all behavioural traits of individual and organisational behaviour.

The present framework for project development is inappropriate for present-day large projects. The ‘rational comprehensive model’ of the past 200 years pervades everything, but, unfortunately, ignores the political nature of policy/project development of today. It is clear we need a different framework, which reflects the imperatives of combining the following three elements:

- Popular (what the people think)
- Economic (value for money)
- Political (the political agenda/political process).

There are a great number of MRT project characteristics, which make successful development of, and satisfactory outturn from, such projects difficult. There is general enthusiasm for MRT but the cost is huge and the planning and execution of such projects takes many years. Many critical decisions have to be taken. Because of the long-life of assets before replacement becomes necessary, forecasts of operating costs and revenues have to stretch over a long period of time and therefore become increasingly uncertain. Land acquisition and change of use raises its own problems of planning permission, public enquiries and the like. Financing is very uncertain, particularly if, as is usual, it stretches over an extended period with the dangers of fluctuating costs of capital. The huge complexity of many of these projects makes it difficult to successfully forecast the probability of innovation in delivery, procurement and finance. There is, in fact, no standard template of ‘what to do’. It is to be expected that some projects will be considerably riskier than others will.

The financial structure of the generality of MRT projects adds a further set of problems. There is a high initial cost. Although the assets are comparatively long-life, future renewals will represent substantial calls on finance. The high fixed element of annual operating costs combined with fluctuations in farebox revenue makes forecasts of net revenues particularly uncertain.

The *existing* Project Development Process could be divided into three stages - planning, implementation and operations. Each of these could have influence upon the operating surplus. He thought this would be large in the case of planning and implementation but (perhaps surprisingly) modest in the case of operations. Each stage currently had its distinct and restricted role. The planning stage identified the project and looked to its financing. Completing the project to time within budget was the usual focus of the implementation stage. To

operate commercially was the task of the operations stage. Typically, planners and economists undertook the planning stage, engineers implementation and operators the operations. What was needed was change in this process, with much more focus on the commercial operations throughout project development, and correspondingly greater involvement of economists and planners throughout the project development.

It was in the first stage (planning) that the speaker sought the greatest change.

The speaker believed that transport planners' techniques need to be critically examined. There was, perhaps, too much reliance upon generalised models which could be ideal for the situations for which they were first developed, but which can become dangerously inappropriate in the very varied and much altered circumstances often faced. The common belief or conventional wisdom about the environment in which projects are to be developed needs to be constantly examined and updated. Unforeseen problems will arise as projects are developed and implemented. Planners need to have the ability to respond to these appropriately and immediately. Most of all, the presence of uncertainty and risk needs rigorous appraisal and recognition in the evaluations.

Further consideration of the project development process led the speaker to believe that much more could be done at a pre-feasibility stage in preparing the ground and understanding the particular environment in which the project would operate. Furthermore, the implementation stage should not be a 'neutral' process, as this can hinder a more effective response to problems, which arise at this stage.

Roger drew upon London's Jubilee Line Extension as a case study. The planning of the project extended over 50 years! (1944-1999). This was possibly because it was difficult to justify in the ever-changing economic climate and fluctuating attitude to and support for public expenditure. When it did actually happen costs turned out at 67% above forecast, and implementation took 40% longer than planned. There were no procedures to cope with unforeseen events. LT was starved of funds to complete the project and, as a result of the failure to 'ring-fence' funds earmarked for the project, the existing underground railway suffered.

So what is required? The speaker believed that a complete re-invention of the processes for urban rail project development was required. He thought that the present market for public transport gave the opportunity. We were now going through a process of innovation in procurement and delivery. Both private and public clients are experimenting in methods of providing urban transport, but require delivery and predictability. The problem was not limited to urban rail transport as, in the words of the World Council for Sustainable Development,

written in ‘Mobility 2001’, we need to “*Reinvent the process of planning, developing, financing and managing mobility infrastructure*”.

The speaker could identify four practical requirements in addition to political and policy stability in the strategy for the provision of public transport.

- A managed project development *process*
- *Credible* technical support
- An incentivised financing regime
- A code of professional ethics

A fully managed project development process, which gave, inter alia, a template for effective delivery of projects. There needed to be continuity in the process and a substantial focus on implementation. The planning focus needed to be on providing a robust, good, and above all, implementable project. It was important that the project should be supported politically and by the community. This would involve a change of style including involvement by decision-makers and ‘stakeholders’, and certainly a new and larger role for economists.

Improvement in the technical support must give timely, comprehensible, balanced information directed at and suitable for the decision-makers as well as the planners. There needed to be a continuous interface with the decision-makers in the provision of technical data. Above all, it needs to be said once again that credible forecasts are an essential component of technical data. Good, comprehensible and understandable appraisal methods should help to develop consensus.

Enlarging upon the question of credible forecasts the speaker claimed that resource constraints were not sufficiently acknowledged, particularly in the ability of the economy to achieve the implementation of the project in the time promised. The type and content of the forecasts used should be related to the *objective* of the project. There would be an improvement in the credibility of the forecasting process if there were provision for a reality check at some stage(s) of the project’s implementation. The inevitable uncertainties in the forecasts need to be recognised and tackled with more rigour.

To conclude, the speaker claimed that MRT project development is poor and economic financial appraisals are too often misleading. This matters a great deal but the reasons are deep and pervasive. It is clear that radical change is necessary and the changing nature of the market for such projects provides the opportunity. Such radical change should not be too difficult as the identified changes are mostly proven. Unfortunately they are as yet little applied.

Discussion

The large, appreciative audience put a number of questions and comments.

Marie-Ann Wiley: *Has any consideration been given to business models used by other sectors?*

RA: MRT is particularly difficult for the application of business models. There have been some successes, but, generally, the financial outcome has not been satisfactory. What are required are better forecasts.

Robert Cochrane: *Would like to draw attention to some Danish work. Errors in these projects were so great the only sensible conclusion must be the presence of vested interests e.g. the Channel Tunnel*

RA: Did not believe there was a 'conspiracy'. But he agreed with the questioner's further point that there was a need for a 'high level authority' to exercise an overall realistic/critical view of these projects.

Martin Brazil: *He found the address quite optimistic in tone. There was a railway mania and people who present pessimistic forecasts are sacked!*

RA: Did not believe things were that disastrous. There was some improvement going on.

Roland Niblett: *The problem was political pressures, particularly on safety issues, which explains the 'initial cost hike' and the upward movement in operating costs.*

RA: Instead of looking for new ways of doing things, the focus should often be on remembering the tried and tested methods - that work routinely elsewhere - and applying them efficiently.

A visitor from the Bank of America: *Changes are on the way. Pessimism on forecasts of costs and revenues will mean no projects, as there will be no finance.*

RA: Agreed. But the Treasury approach in this country is changing.

Nigel Harris: *Commented that 'risks' are often 'outside' the industry. A parallel can be drawn with power and water contracts as these, too, employ GDP as a 'driver'. Transport is very competitive and risk becomes divided between exogenous and endogenous factors.*

RA: So far as the endogenous risk is concerned an engineering re-evaluation at

a late stage of the process could, as an example, reduce costs by 20%. [Note: the speaker was not sure how this point was put at the time]

At this point the chairman closed the meeting. He thanked Roger Allport for an interesting and important address and the response in questions and comment from those present showed how appreciative they were of its content and general message. Members and others present thanked the speaker in the usual way.

Report by Don Box

Multi-modal studies and the 10 Year Plan

Geoff Copley, Director, FaberMaunsell

University College London
25 June 2003

Geoff Copley of FaberMaunsell spoke briefly on the Multi-modal studies and more extensively on progress under the 10-Year Plan.

Multi-modal studies

Geoff outlined the origins of the Multi-modal studies in the Integrated Transport White Paper of July 1998 and A New Deal for Trunk Roads in England in July 1999. Of 22 studies, eight now had a decision by the Secretary of State; nine had been approved by Regional Planning Bodies and are awaiting decision. A further two had been approved by the Study Steering Group and are now with the Regional Planning Body. Three are still to report.

As the studies began to report, SRA pointed out that the study areas were not aligned to the rail network. The Transport Select Committee noted that the studies suffered from a lack of Government clarity on Road User Charging and guidance on affordability, and there was a lack of information on the effect of congestion on the economy. CfIT had similar views and was concerned that Regional Planning Guidance and Regional Spatial Strategies emerged only in parallel with Multi-modal studies, rather than coming first. Given the total expenditure recommendations to date set out below, CfIT also wanted some sign of expenditure commitment post-2011, the risk being that the early road-based work would be done and the public transport work continues to slip.

Expenditure mix	Public Transport	Highway	Freight
Total	65%	34%	1%
To 2011	50%	49%	1%
2011 to 2021	72%	26%	2%
2021 onwards	85%	15%	0%

Finally, achieving anything might be difficult without properly integrated cross-mode implementation groups.

The Government responded, inter alia, that:

- Decisions on Road User Charging were not necessary for road schemes - *but this was not helpful to highway engineers trying to work out what to design for.*
- Study teams had been given guidance on levels of expenditure - *but this failed to take account of the difficulty of interpreting that “guidance” at the local/regional level.*
- The impact of congestion on the economy was not a research priority.

10-Year Plan

The 10-Year Plan, published in July 2000, was the delivery mechanism for the Integrated Transport White Paper¹. It identified around £180 million of expenditure, roughly a third each on railways, highways and local transport. But some of this money was assumed to come from the private sector, and it now seems less likely that private sector money will be attracted.

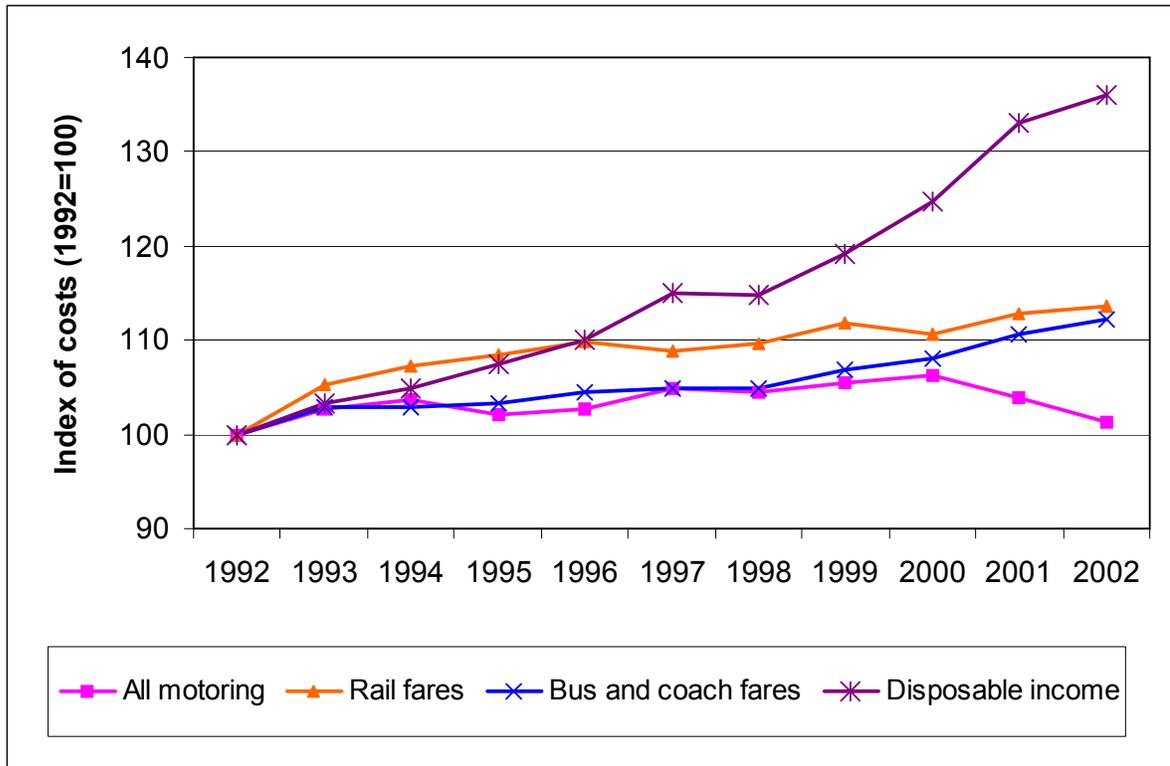
The context for the Integrated White Paper and the 10-Year Plan was long term trends to higher car ownership, longer trip lengths, and land use dispersion leading to car-dependency. The Multi-modal studies confirmed these findings with their data indicating many long trips not destined for major centres and therefore not ideally suited to public transport. Among the apparent reasons were:

- People opting for “rural” rather than urban environments, taking advantage of cheaper housing and a hidden cross-subsidy in the provision of services
- Reduced job security and more working women, reducing the feasibility and benefits of relocating to be near the work of a single breadwinner
- Greater influence of factors such as location of schooling
- Decline in inner city manufacturing in favour of light industry and services, often located in peripheral business parks. Whilst there has been a more recent counter-trend to service jobs moving back into public-transport accessible city centres, contributing to urban regeneration, this has some way to go to overcome the longer term trend of dispersion
- Falling real costs of motoring
- A generally good motorway and trunk road network

Geoff produced charts of the falling costs of motoring relative to public transport from (figure 1) and rising road traffic from 1992 to 2002 (Figure 2).

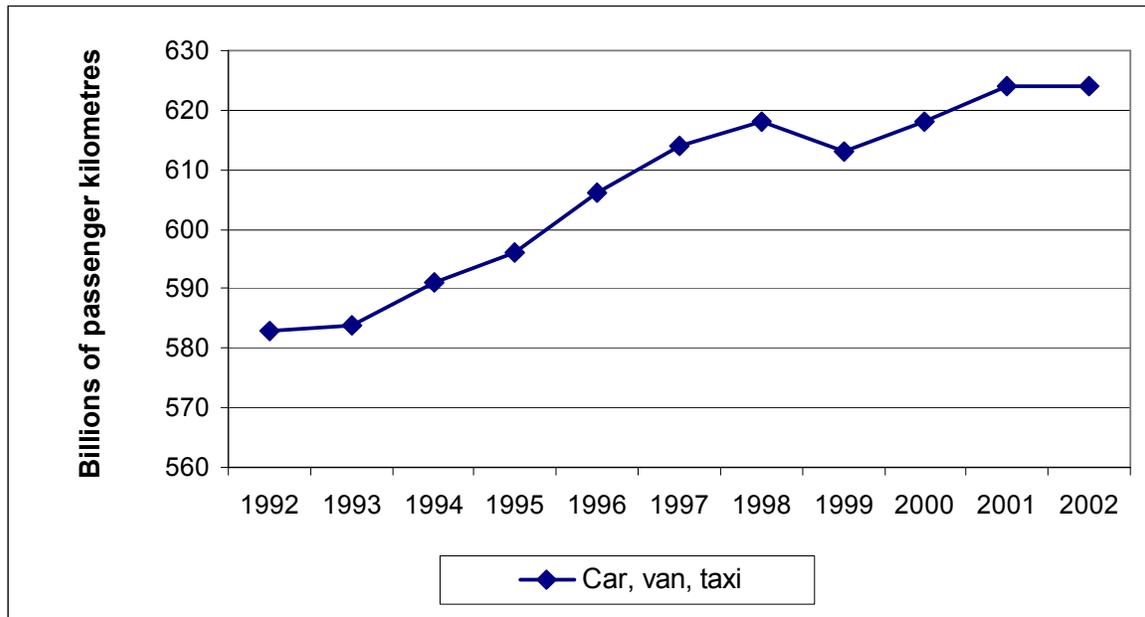
¹ A New Deal for Transport: Better for Everyone, Cm 3950 July 1998

Figure 1: Cost of motoring compared to public transport



Source: Department for Transport, Trend 2.3: Changes in the real cost of transport and in income

Figure 2: Private vehicle passenger kilometres

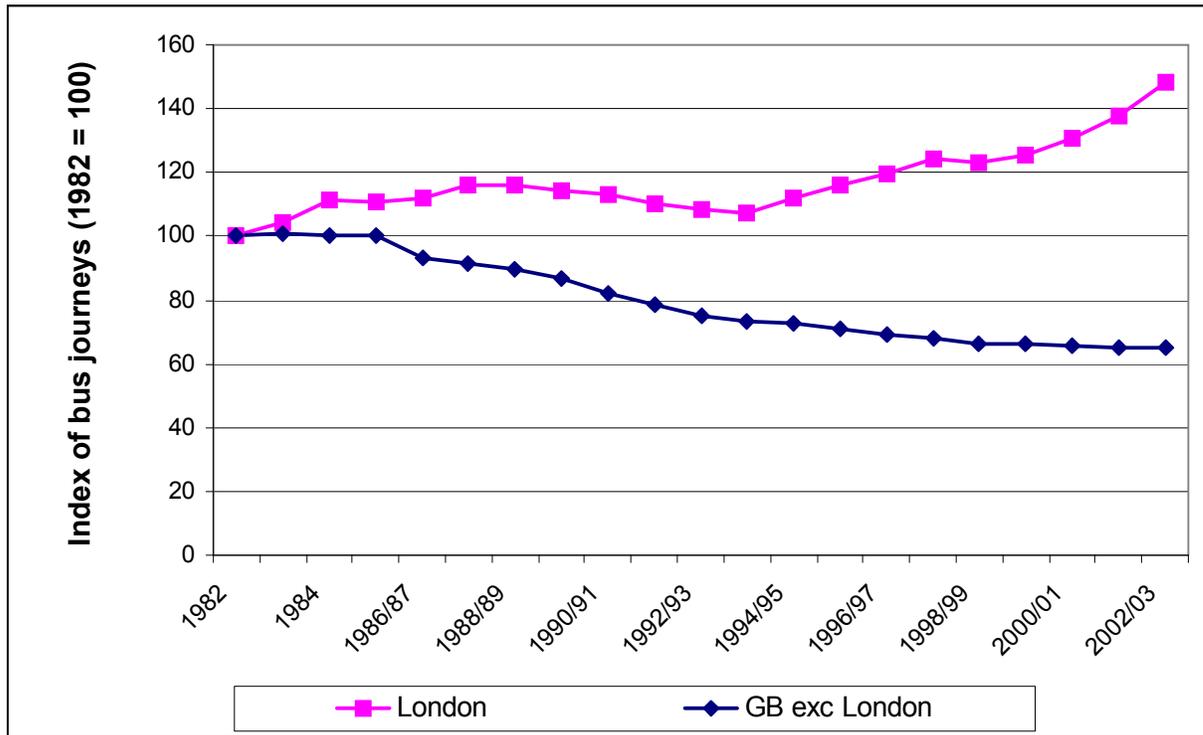


Source: Department for Transport, Trend 2.1a: Passenger travel by mode: car and other modes

These were followed with charts over the period 1980 to 2001 of “traffic intensity” or traffic per unit of GDP. For HGVs, this has been in steady decline as the economy has moved to lighter, higher value, goods and services. For cars, it appeared to peak in 1992 and appears to be still falling, despite the end of the fuel duty escalator, suggesting that increasing car use is not a precondition of future economic growth. However, there is a concern with both these measures of intensity of the degree to which the apparent changing relationship is more than coincidence, and whether it can be maintained in the longer term.

Bus usage (see Figure 3) has been declining over the long term and, whilst London has grown its bus patronage over the last 10 years, there seems little prospect of turning this round outside London, despite the excellent achievements in a few areas. The DfT has now combined the bus patronage target with that for light rail (which at the moment accounts for only 3% of all local transport), which is currently behind its target for a 100% increase over the 10-Year Plan period. Furthermore, there are concerns over whether London can continue to grow bus patronage, given the high costs, relatively low fares, and the other pressures on the Mayor’s transport budget.

Figure 3: Index of Local Bus Journeys from 1982



Source: Department for Transport, Trend 3.1a: Local bus journeys by area 1982-2002/03

Geoff summarised where we were relative to the 10-Year Plan.

- On track with bus accessibility, rural accessibility, accidents (but these increasingly affect pedestrians and children) and air quality (but this is better than in 1990 but worse than in 2000)
- Unclear on local public transport patronage
- Not on track on road congestion, rail patronage, rail freight, cycling (which has grown only in London and on the strategic road network) and bus reliability (although average bus age is down to around 8.2 years: target is 8)

Geoff also commented on four aspects of integration:

- Social exclusion, where the local transport planning process will require authorities to assess the accessibility implications of their Local Transport Plans, and provide for the socially excluded.
- Urban regeneration, where the apparent progress is unlikely to be providing the degree of travel reduction that might be envisaged, and where inner-city communities of the near future are unlikely to provide the mix of age and

social mix that will lead to long term sustainability (i.e. the needs for good schooling has a strong influence on the location of families).

- Behaviour change (there is little in the 10-Year Plan that will influence this aspect of the integrated transport agenda set out in the Integrated Transport White Paper).
- Small-scale schemes, which may be better value than mega-projects, appear to lose out in appraisal mechanisms and because of the concentration on capital, as opposed to revenue measures).

Integration between Government departments is poor, partly due to the ‘break-up’ of DETR, but also because Health, Education and Social Services do not take account of the travel and transport implications of their decisions. However, it has also been argued that the “break-up” of DETR did not cause as much harm as was feared because the elements of DETR were never as integrated as was desirable.

Local congestion charging appears to work well in London (and Durham, where it has been so successful in discouraging traffic that it has failed to meet revenue targets) but other local authorities have cooled due to factors including changes in political control in May 2003 (Bristol and York lost “pro-charging” councils). There also appears to be a lack of proven benefits from the small schemes that are politically achievable. Geoff felt that a stronger lead was needed from the centre. The same would apply to area wide road user charging, which would have to be a national scheme. Despite being recommended by the Multi-modal studies, CfIT, the RAC Foundation and the ITC, it has now only reached the point where the Secretary of State accepts it **may** be needed, after 2011. In essence the problem remains one of political nerve, which may only be achievable if cross-party support can be negotiated (but therein lies the difficulty).

Overall, Geoff concluded that this was probably the key problem. While we are on the right track with the roads programme, the SRA trying to sort out rail against difficult odds, London doing well and some local authorities progressing, there is no willingness in central Government to support, adopt or impose “difficult” policies. The Government needed to take the lead on a range of items including:

- Confirming a commitment to integrated transport
- Clarifying road traffic reduction policies
- Investigating thoroughly national road user charging
- Persuading other parties, and the public, that road user charging was needed
- Leading work on behavioural change
- Joining up Government thinking and co-ordinating agencies

- Funding the long term programme

Discussion

Andrew Evans (University College London) *wondered what would be required to overcome or reverse some of the adverse trends.* Geoff agreed that there was nothing specific in the plan to address this, and that this lack of commitment to bring about behavioural change was a significant failing of the current plan.

John Crawford (Freelance railway consultant) *thought that the bus and rail network was out of date and did not go where people wanted to go, and worried that charges would depress the economy.* Geoff “half agreed” on the first point, but pointed out that the Multi-modal studies had suggested that dispersion of land use was a factor, leading to small volumes of movement between a large number of origins and destinations, difficult to serve by public transport. On the second point, charging could be made neutral and the evidence suggested that it need not prevent economic activity.

Dick Dunmore (Steer Davies Gleave) *noted that while queuing is a resource cost and always represents economic value destroyed, charging is only a transfer payment. Just because people are willing to queue does not mean that society should not intervene to reduce the cost to the economy of doing so.*

Robin Whittaker *noted that 19th Century Belgium deliberately encouraged long distance commuter traffic as a tool of economic policy, with a 4-level hierarchy of rail travel. Could some sort of “network” ticket help? He noted that all traffic on and off Canvey Island, where he lives, is now by road.* Geoff felt that the encouragement of long-distance commuter traffic was not a good policy in a congested network, that much depended on the policies adopted to set the costs of private and public transport, but that these would need to be consistent with, and geared to, an overall objective.

John Cartledge (London Transport Users Committee) *observed that politicians might perceive the proffered solutions as worse than the problems and wondered what whether the motives of the Multi-modal studies were to find solutions or merely to delay decisions.*

Robert Johnson (University of Westminster) *wondered whether the whole 10-Year Plan was being deferred ad infinitum.* Geoff agreed that it might become the 15 or 20-Year Plan, although this might be partly because schemes were found to be, or became, too expensive. Big cost rail schemes might slip while awaiting funds but only a few “reverse Beeching” re-openings were likely to give any great benefit.

Ed Humphreys (Arup Transport Planning) *thought that transport was defeating Great Britain but not other democracies. Weren't the costs of inaction huge?* Geoff said that ITS Leeds work a few years ago had shown that congestion is the major negative externality. Limited and well-meaning schemes designed to minimise internal transport were not working: Peter Headicar had studied integrated development in Bicester and found that where the town had been designed to be 'self-sufficient', such that travel should be reduced, in reality a large proportion of the population commuted out to somewhere else.

Jill Beardwood *asked why not put the fuel duty escalator back.* Geoff's view was that, even if it was depressing demand, as Glaister appeared to have demonstrated it was a blunt instrument and probably not the best approach to reducing congestion on the most critical parts of the network.

Report by Dick Dunmore, Steer Davies Gleave

Pricing Runway Use in the Peak and Off-peak

David Starkie, Economics-Plus Ltd / RPI Oxford

University College London
17th December 2003

David Starkie commenced by describing the historical background to current attempts to provide a rational pricing structure for the use of airport facilities. In the early days of civil aviation, “aerodromes” and frequently airlines were within the public sector and were regarded as strategic assets with defence implications. Pricing was not an issue.

In the United Kingdom, prior to the 1939-45 War, the majority of civil airports were municipally owned. War requisitioning followed by post war nationalisation led to some being transferred to Central Government authorities (CAA, BAA²) until the 1980s, when commercialisation and privatisation policies were introduced with the 1986 Airports Act.

This led to the regulation of overall charges at the larger airports, generally by permitting cost recovery using an RPI –X formula to constrain total revenues. Similar policies were followed elsewhere outside the UK. But the structure and efficiency of the charges were largely ignored. They retained their traditional roots and were adapted and extended in a pragmatic manner.

Charges for runway use were conventionally made for landings only. They were guided by concepts of “fairness” (which appears to be loosely related to ability to pay) and “proportionality” (i.e. increasing with aircraft weight), albeit with some economic rationale.

Over time, other charges have been added, including passenger service charges (PSC) on departing passengers, charges for local navigation facilities and fuel levies. For example, by the late 1960s Heathrow had landing and navigation charges but no PSC; John F Kennedy had landing and PSC but no navigation charge.

The mix varies by country. Further developments include air bridge charges, security charges, aircraft parking charges and differential tariffs for short haul and/or domestic services. To these are now being added environmental charges

² Civil Aviation Authority and British Airports Authority

based on noise (common in Europe) and exhaust emissions (e.g. Switzerland and Sweden).

Competition between airports, driven by the liberalisation of air services and the growth of low cost airlines, has led to the introduction of negotiated contracts with individual airlines (e.g. Ryanair) and new route discounts.

Despite peak demand being the main driver for investment and growing peak hour congestion at hub airports, time of day charging is still uncommon. Seasonally varying charges are in use at tourist airports (including Stansted), early morning surcharges are sometimes used (e.g. Brussels) and AM/PM differentials are used at Heathrow, Gatwick and Manchester.

One reason is that the airlines are fiercely opposed to peak pricing, even though they themselves have adopted very dynamic pricing policies. For example, as a result of sudden demand by fans after the announcement of a football fixture, a ticket from Glasgow to Amsterdam, which cost £60.98 at 11am rose to £360.08 at 3pm.

Heathrow introduced peak surcharges in the mid-1970s for runway movements, arriving passengers and aircraft parking, on the basis that the approach was sensible but without any supporting analysis. In 1981, airlines led by PanAm and TWA litigated claiming excessive and discriminatory charges. The litigation was dropped in 1983 when the US and UK Governments agreed that cost reflective peak charges were sometimes appropriate. However, the UK Government lost a subsequent arbitration case, on the basis that it had failed to investigate whether the Heathrow charges were cost related and the 1984 studies had suggested they were not. In the late 1990s peak passenger charges were phased out but parking peak charges were maintained.

Marginal Cost Analysis

The speaker then turned to the analysis of marginal costs for runway use. There are two approaches:

- Short run marginal cost pricing for existing congested facilities and
- Long run marginal cost pricing based on adding incremental capacity.

A few studies have been carried out (at Heathrow, Gatwick and Wellington). Only Dublin has adopted tariffs based on marginal cost pricing and only for off-peak runway charges.

David Starkie described the development of the Dublin charges, which are based on the short run marginal costs of runway maintenance and repair. Total

annualised costs are calculated and allocated on the basis of the ACN (Aircraft Classification Number) for each aircraft type. This is calculated from the aircraft weight, landing gear design and tyre pressure and is related to pavement damage by a fourth power relationship. He demonstrated how it gives a significantly lower charge as compared with conventional MTOW charges for large modern wide-bodied aircraft with sophisticated landing gear such as the Boeing 777.

He emphasised that charges of this nature are the minimum floor needed to give appropriate price signals to aircraft operators and designers, thereby encouraging the use of cost-effective technology.

Conclusion

The speaker concluded that airport landing charges reflect a complex pattern of evolution rather than being based on efficient short or long-term marginal cost pricing. There is a good case for moving towards analytically based marginal cost pricing in the peak and off peak. Such a move is likely to be resisted by airlines, although it may prove to be in their longer-term interests as congestion increases.

Discussion

Tony Lucking (*Aston University*) asked to what extent charges were made to cover environmental costs and the costs of late operation by airlines. The speaker confirmed that at present, emission charges are rare but noise related charges are common in Europe and are likely to be made mandatory by new legislation. He was not aware of any charges for the effects of late operation.

Chris Castles (*Independent*) suggested that airlines may be resisting peak charges because they see them as transferring the economic rent created by the differential between dynamic pricing and peak pricing from the airlines to the airport operator. The smaller airlines opposed differentials between aircraft types since they tended to increase charges for the smaller aircraft. He also mentioned that the original Luton charges for Easyjet were well below long run marginal cost and had to be re-negotiated to allow airport expansion. Since the physical expansion of airports related to peak requirements, efficient peak charges based on LRMC were needed to fund expansion.

David Starkie said the last point was very important. The CAA has been pressuring Manchester to adopt differential peak and off peak charges but the Competition Commission has been dragging its heels on this issue.

Regarding economic rents, he took the point but was not convinced that this was the case at Heathrow because any peak/off-peak differentials take place in the context of an overall revenue cap so that airlines in aggregate do not pay more. However, where airports were not regulated in this way and there is congestion, then airlines could lose out from peak pricing. Whether they do so also depends upon reactions to peak pricing and whether this reduces the need to expand capacity (which airlines have to pay for in the longer term).

Dick Dunmore (*SDG*) said that the landing charges needed to permit cost recovery depended on the overall revenue, which itself depended on whether single or double till accounting was adopted. In addition, should airport charges also take account of external benefits (e.g. expansion of tourism, etc)?

The speaker said that speaking as an economist, he saw the short run marginal cost of maintenance and repair as being an absolute floor needed to provide the right price signals needed to drive efficient choice of aircraft type and (in the longer run) aircraft design development. Whilst externalities were important in considering new airport development, benefits prayed in aid for supporting the expansion of existing airports already form part of the cash flow justifying expansion and therefore to include them again would lead to double counting.

Marie-Anne Wiley (*Antspire*) raised the issue of ensuring efficient slot allocation, particularly in the peaks. David Starkie said that in general, intervention in imperfect markets should be restricted to situations of gross market failure. Economic instruments were to be preferred. In principle, peak hour pricing, charging market-clearing prices, would resolve the slot allocation issue.

But this was not the only means of ensuring short run efficient use of existing facilities. A secondary market in tradable slots could in principle also do so. He did not however advise auction-based solutions.

David van Rest (*Independent*) returned to the question of single or double till regulation. The speaker said that the Competition Commission had come down against the dual till accounting. In addition, the Regulator has now removed BAA's ability to cross-subsidise Stansted development by leveraging Heathrow. As a result, future regulation of total returns at airports is likely to be based on single till accounting at individual airports.

Fred Harrison (*Land Research Trust*) said that airlines appear to be leveraging peak hour slots by trading them as assets. He also asked how cost based systems could lead to market clearing prices. David Starkie said that cost based systems do not necessarily lead to market clearing prices unless

opportunity costs are also included; they provide a floor. Prices can be raised to market clearing prices in the peak and offset by reductions in other charges.

Buying and selling slots without an exchange currently contravenes EU regulations, but there is a grey market in peak slots at Heathrow due to a loophole in the EU Directive.

The Chairman, Prof. Roger Mackett then drew questions to a close and proposed a vote of thanks to David Starkie for a most interesting account of the history and current developments in airport charging mechanisms. A very topical issue following the publication of the Government's White Paper on the future of air transport in the United Kingdom³.

Report by Robert A. Cochrane

³ The White Paper, "The Future of Air Transport", was published on 16th December. It can be downloaded from <http://www.dft.gov.uk/aviation/whitepaper/main/index.htm>

TEG NEWS

NOTICE OF ANNUAL GENERAL MEETING OF THE TRANSPORT ECONOMISTS' GROUP

The Annual General Meeting will be held at 5pm on Wednesday 24th March 2004 in the Chadwick Building of University College London, Gower Street WC1. Enter by the main gates in Gower Street and turn right where the entrance to the Chadwick Building will be found. Signs will be posted directing you to the room.

The agenda is:

- 1 Apologies for absence
- 2 Chairman's report for 2003
- 3 Treasurer's report and Annual Accounts of TEG for year ending 31st December 2003
- 4 Election of Committee
- 5 Appointment of auditors
- 6 Any other business

The Group encourages members to attend the AGM and to nominate people to the Committee for 2004. If anyone wishes to nominate a member or to be elected please contact the Secretary, Dick Dunmore by email:- dick.dunmore@sdgworld.net

Current Readings in Transport Economics (CRTE)

CRTE is a free quarterly email alerting service provided by Elsevier. A typical issue lists 30 or so newly published articles related to transport economics gleaned from Elsevier journals as diverse as *Ecological Indicators* and *Journal of Sound and Vibration*. *CRTE* also lists relevant conferences and forthcoming Elsevier books. To sign up to receive *CRTE*, visit the Journals section of Elsevier's Transport Connect website: www.transportconnect.net

TEG Website
<p>The Group is continuing to develop its website for members. Members should be able to obtain the latest on the programme of talks and other information about the group at.</p> <p style="text-align: center;">http://www.transecongroup.org.uk</p> <p>The committee would welcome comments on improvements to the website and any offers of help in further development.</p>

Recent Reports

Notice of the following reports has been received:

Interim review of track access charges - cost submission. Network Rail plan to cut expenditure is available from:

www.networkrail.co.uk/companyinformation/regdocuments/interim_review.htm

Everyone's railway - the wider case for rail. An SRA document outlining the wider contribution of rail to society, including economy and the environment is available at:

www.sra.gov.uk/publications/everyones_railway/everyones_railway.pdf

Scottish Transport Appraisal Guidance. The final document is available at:

www.scotland.gov.uk/library5/transport/stags.pdf

Crossrail business case. Summary report is available at:

www.crossrail.co.uk/pages/businesscasesummarylaunched.html

Report on Aviation's External Costs. Is available at

www.cfit.gov.uk/reports/index.htm

The ***London Travel Report 2003*** brings together statistics relating to travel in London, covering all the major transport modes and is available at:

www.transportforlondon.gov.uk/tfl/reports_library_stats.shtml

TEG Committee for 2003/4

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Roger Mackett

VICE CHAIR

Don Box

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