
Published paper

Nash, C.A. (1991) *The Age of the Train?* Institute of Transport Studies, University of Leeds. Working Paper 340

Working Paper 340

November 1991

THE AGE OF THE TRAIN?

Inaugural Lecture by Chris Nash
Professor of Transport Economics

Abstract

The lecture will contrast the situation ten years ago (when BR was using the advertising slogan "This is the Age of the Train") with that now. Ten years ago, BR was suffering from a prolonged lack of investment and widespread rail closures were seen as inevitable. Today, BR has enjoyed a decade in which passenger traffic has risen, services improved and investment risen to high levels. Despite the difficulties caused by the recession, plans are being made for a continuing high level of investment in rail and light rail services in the 1990's. The paper will consider whether, in the light of growing environmental concerns and increased rail traffic, this is really the `Age of the Train'. It will draw extensively on research undertaken at Leeds in the last ten years, and will also consider policy changes needed for rail to play its full part in the transport policy of the future.

1. Introduction

My title this evening is "The age of the train?". Some of you will recognise that I have taken this from a BR advertising slogan of some 10 years ago. I think it fair to say that it was not the happiest of choices of slogan. 10 years ago British Rail was suffering from years of low investment, which left most services off the main inter city routes operated by rolling stock dating from the modernisation plan of the 1950's. I think it was Private Eye which published a spoof advertisement on the theme that the age of the train was far too old. Britain had a Prime Minister who took great pride in the fact that she never travelled by train. At the same time, BR was in the throws of a serious financial crisis, which led the government to appoint a committee to investigate its problems. When that committee - led by Sir David Serpell - reported, its conclusions seemed to presage a more devastating set of rail closures by far than was ever envisaged in the Beeching era. The report saw little reason to subsidise rail services, and little hope of avoiding subsidy without massive closures, amounting to up to 86% of the rail network.

Compared with what most of us foresaw at that time, the history of British Rail over the past decade has been a quite amazing one. True, the government has implemented a substantial cut in subsidy, and one of the side effects of this has been a steady rise in the level of rail fares relative to the cost of living. But thoughts that this would lead to a major programme of rail closures have been far from the truth. (Table 1). In fact, we have seen a substantial increase both in the passenger services operated (passenger train miles) and in the number of stations open to the public. Until the current recession, BR was carrying more passenger traffic than at any time since the Beeching closures, and doing so with a greatly reduced level of grant aid compared with ten years ago. Investment was running at record levels. And there are substantial plans for totally new rail routes; to London from the Channel Tunnel, across London and in the form of light rail services in almost every moderate-sized city up and down the country.

The question I want to ask in this lecture, then, is whether this really is the age of the train? I want to examine the part rail transport can play in the transport system of the future, utilising the work that my team at Leeds has done on rail transport over the 16 years I have been here.

Perhaps I should say that for most of that period I occupied a post sponsored by British Rail, and that two posts in the Institute still are. That position gave me a unique possibility to see BR from the inside as well as the outside, and to mix theory with practice. It is a great pleasure that today representatives (and indeed old friends) from BR are in the audience, since I owe a great deal to the opportunities BR managers have given me, and to the enthusiasm and encouragement they have given me over the years. Before proceeding, I must also pay tribute to quality of the work of my colleagues in the Institute, who will recognise much of their own work in what follows.

I shall first consider why there has been such a revival of interest in rail transport in the last few years. Then I shall discuss the market for rail transport of both passengers and freight. Following this, I shall offer a personal view of the appropriate policies to adopt towards railways and how these fit in to transport policy as a whole.

Finally I shall attempt to answer the question I set myself at the outset - is this the age of the train?

2.Why the current interest?

Why then is there so much interest in rail services at the present time. Clearly it is not so much a sudden recognition of the enormous merits of rail transport itself as a growing awareness of the problems posed by other modes of transport. Take for instance road traffic (Table 2). Since I was a schoolboy I have seen the volume of road traffic quadruple. If I live long enough, then according to the official forecasts I will see it double again. Scarcely anyone believes that even the high level of investment currently planned in the inter urban road network will be enough to prevent congestion from significantly worsening, whilst in urban areas no attempt is being made to cater for this growth.

By contrast, rail transport is seen as holding the prospect of substantial increases in transport capacity at relatively low investment cost to a large extent by increased utilisation of existing routes. Moreover rail is seen as superior in terms of energy efficiency and environmental impact (Table 3). The enormous environmental problems caused by the rapid growth of the transport sector are well known, and range from the local problems of noise and local air pollution through to the contribution to regional and global problems of acid rain and greenhouse gases. To attempt an extensive comparison of the environmental impact of alternative modes would take me too far from my main theme, but it is generally the case that rail, whilst by no means totally without environmental problems, is less damaging than most other forms of mechanised transport. For instance, the slide indicates that cars in congested urban areas and air are both very energy intensive forms of transport, whilst well loaded trains (or even more so buses) are very efficient. Rail systems have many other advantages. For instance, within urban areas, property destruction may be minimised by putting new rail systems on street or underground, depending on the competing demands for land. It is also a great deal safer than road transport, in which some 5000 people a year are killed in Great Britain. Thus expansion of rail traffic rather than road (or air) appears an attractive proposition. But how can rail traffic be expanded and with what effect?

3.Passenger demand

Rail serves a number of different markets, but there are basically three in which it is important - commuting into large cities; inter city business travel; long distance leisure (Table 4). For instance, the table shows that the biggest share of BR traffic is that carried by Network SouthEast, and this is dominated by London commuters. Second largest is the Inter City network, comprising the main routes to London and the North-South routes through Birmingham to the South and South West. Much smaller is the Regional sector, which includes commuter routes into all the other cities, inter urban and cross country and rural services. We at the Institute have undertaken numerous studies of rail demand in these various sectors, using methods ranging from time series analysis of ticket sales data, through in depth studies of the actual choices of rail users to studies in which peoples' reactions to sets of hypothetical alternatives put before them in `stated preference' exercises are

collected and analysed.

Most of these studies suggest that rail traffic is very sensitive to fares and to the level of service offered, as well as to the state of the economy (Table 5). For instance, the table shows some simple results from a study of the Inter City sector, showing that changes in both fares and the level of employment (as an indicator of national prosperity) have a more or less proportionate effect on the level of rail traffic, whilst the improvements in services following from electrification and from the introduction of the high speed diesel train on average raised the level of traffic by some 15%. The main exception to this generalisation is in the case of commuters into London, where rail dominates the market and the alternatives are relatively unattractive. But in general elsewhere travellers do have alternatives available and the market is very competitive. Thus it appears to be relatively easy to produce a big increase in rail traffic, simply by providing the funding for lower fares and better services. That this is so is perhaps readily illustrated by experience in West Yorkshire, where local rail traffic has doubled in the last ten years. But how much of this extra rail traffic is at the expense of more polluting modes?

Not enough is known on this subject, but we can piece together some evidence from our studies of improved local rail services (Table 6). From these it appears that the most significant diversion is usually from other public transport modes. Some trips are indeed diverted from car, but some also are totally new trips which would not have taken place in the absence of the improved public transport. (Admittedly it may be the case that some of these trips would otherwise have been made by car to a totally different destination - in transport jargon they may really be redistributed rather than generated trips). In other words, whilst improved rail services may have a contribution to make to reduce the rate of growth of road traffic, it would be naive to think that by themselves they can do more than scratch the surface of the problem of rising traffic levels. Moreover, if they do take traffic away from congested roads all that will happen is that they will release the road space for traffic to go on growing a year or two more.

A rather similar conclusion is emerging from some work we are currently doing for the European Commission on high speed rail services. For this, we have naturally looked to the experience of France, as being the only country in Europe already having substantial experience of running very high speed trains. What studies there suggest is that, of the extra trips attracted to rail by high speeds, of the order of 50% have diverted from other modes - mainly air, but also car. In other words no less than 50% of extra trips attracted by these trains would otherwise not have been made at all. The benefits of energy savings and environmental improvement from diverting passengers from more damaging modes of transport may be substantially offset by this generation of new trips. In other words, higher quality and lower fares on rail alone will not solve the problem.

4.Freight demand

By contrast with passenger traffic, no resurgence has occurred in rail freight traffic -it has remained in steady decline (fig.1). The sharp drop in 1984 is of course due to the miner's strike, but I think it is true to say that the overall trend is downwards even if traffic levels have been encouraging in the last few years. There is a multiplicity of

reasons for this.

Rail freight traffic may be broadly divided into three categories - trainload, wagonload and inter-modal. Trainload consists of complete trains run from a single origin to a single destination, usually consisting of a single commodity and for a single customer. It is obviously an excellent means of transport for bulk commodities travelling in large volumes, where it can offer a good quality of service at a competitive price. Unfortunately, however, the bulk commodities - especially coal and steel - on which this form of transport has traditionally depended have been in decline for many years. The major growth area is in the aggregates market, where the demand for construction materials continues to rise, and the distances these materials have to be brought to increase as well.

By contrast, wagonload traffic consists of individual wagons of differing commodities for different customers travelling between different origins and destinations, which are brought together for the trunk part of the journey. The quality of service suffers from the time taken to assemble and disperse the wagons at each end of the journey, and this is a costly process as well. Consequently, wagonload traffic is only profitable over long distances, where the economies on the trunk haul outweigh the costs of the operations at the two ends. In a small country like Britain, the opportunities for profitable wagonload traffic are limited, and with the withdrawal of the Speedlink service, BR has largely withdrawn from this sort of traffic. Although longer distances on the continent give more scope for wagonload traffic, even there it is in decline.

The one form of rail freight traffic which is growing rapidly in Continental Europe is intermodal. This consists of a variety of technologies whereby a loaded unit (a container, a swapbody or a road trailer) is transferred directly between road and rail. The advantage of this approach is that all the assembly and dispersal of traffic may be done by road, with rail used only for the trunk part of the journey. But again it is only over longer distances that intermodal services can offer sufficient savings on the trunk haul to justify the transfer of traffic to rail. Thus in the case of Britain it is international traffic through the Channel Tunnel that offers the greatest potential for this type of service, and this is one of the subjects on which we have been working.

5.Policies

What seems clear from the above account is the following. Firstly, for appropriate forms of passenger and freight traffic rail can be an efficient and competitive form of transport. (Not all, by a long way, but for certain sectors of the market). Secondly, the volume of rail traffic can be significantly influenced by providing more attractive fares and service level packages. But thirdly, this course of action will only make a modest contribution to solving the problems of road and air traffic growth outlined earlier.

In other words, if we do take the congestion and environmental problems posed by the transport sector seriously, then big policy changes are needed outside the rail sector.

We have to discourage the growth of car and air traffic more directly.
The sort of measures which might be considered are higher prices (especially for motoring in cities and for air travel), widespread traffic calming and parking controls. These measures all sound very negative. But if they are seen in that way, there is a

danger that all that will happen is the further decentralisation of the population away from cities into smaller towns where the use of the car is not so restricted.

I believe that restraint of the use of the car has to be looked at in a different way. If we want to maintain cities as places people actually want to live and work, then we need to create developments in which the attractive environment these controls bring will make them welcome. Such cities would encourage the use of walking and cycling for shorter journeys, and of bus and train for longer journeys. It is here that improved rail and bus services have a vital role to play. Incidentally, although the subject of this lecture is rail transport, I feel I should mention in passing that it is bus transport which perhaps holds the biggest potential for making a quick and relatively low cost contribution to the changes under discussion if it could be freed from the effects of congestion and its quality of service raised in other ways. (I add that because it is an important point, and not simply because I know there is a friend of ours from Yorkshire Rider in the room).

But what about policies within the rail sector? Are the existing arrangements conducive to rail playing its full part in the sort of transport policy outlined above, which undoubtedly would imply potentially a substantial increase in the role of rail transport?

My view is that they are not. British Rail is currently run in the following way. The Inter City passenger sector, along with freight, is required to be fully commercial, with all investments earning an 8% real rate of return. In the case of both Network SouthEast (broadly the London commuter network) and Regional Railways (local and cross country services throughout the rest of the country) there are social obligations. Broadly, these sectors are required to continue to offer a service broadly consistent with that offered in 1988 (which in turn with certain exceptions was required to be consistent with that offered in 1974). They are required to do this within a fixed budget in terms of subsidy, which - as we have already seen - has declined rapidly through the 80's in real terms until the onset of the current recession. In general, investments in these sectors are required to show a commercial rate of return, subject to the need to keep the services running. However, in some cases, a form of social cost-benefit analysis is used, in which social benefits such as reduced congestion and environmental improvement are allowed to count as a reason for grant-aid - this is particularly likely to apply where local authorities or Passenger Transport Authorities are sponsoring the investment.

In many ways this is a curious way to run a railway. Why should the level of service offered in 1988 or 1974 be regarded as in any way sacrosanct? In fact, this obligation has been increasingly regarded as an obligation determining the extent of the passenger network, and increasingly service levels have been set at whatever is most profitable regardless of social costs and benefits, as have fares. Thus we have the strange anomaly of a rail system where subsidies are provided to preserve the network, but the resulting network is not run in the way which provides the greatest social benefit from its continued existence.

On the other hand, it may reasonably be argued that the clear commercial objectives embodied in this approach enhance efficiency and performance. We have already seen that this regime has achieved a remarkable turnround in BR's performance in

terms of productivity and required subsidy. How can we reconcile a greater attention to social costs and benefits with a continued improvement in the efficiency with which the railway is run?

There is no doubt that dissatisfaction is often expressed with the services provided by British Rail, and unfavourable comparisons are drawn with rail services in other European countries , such as France and the Netherlands. So how does the situation compare with that elsewhere in Europe? More than 10 years ago, we received one of the most enjoyable commissions of my career when BR asked us to compare their performance with that of other European railways. This involved visiting every country in Western Europe interviewing railway managers and government officials and collecting data. Since the colleague with whom I was undertaking this task likes sunny beaches, whereas my leaning is towards high mountains, we were easily able to divide up the countries to be visited in an amicable way! One of the railway managers involved, who was a steam train enthusiast, wanted to add in India and China, but this was vetoed at a higher level! Perhaps before showing comparisons I should warn of some of the difficulties involved. For instance, if your trunk main line rises to the height of the highest mountain in Britain, and is the scene of a constant battle against ice and snow (as is the case in Norway) then it must be expected that you will have higher costs than in more hospitable territory. There are many such geographical differences which need to be taken into account).

What we found in these comparisons was that even then, BR was making do with much lower subsidies and investment than most European railways, and yet its efficiency was relatively high and its share of the passenger market was not particularly low. More recent comparisons show this to be even more the case. (Table 7) It achieves this of course, by above average productivity and quality of marketing, although I must say that the lower wages paid to railway staff in Britain also help.

Figures for the comparative performance of Western European railways certainly illustrate the dangers of increasing subsidies. It would serve very few interests if BR were to swallow vast subsidies for as little benefit as do the railways of Italy and Belgium, to choose the most notorious examples. On the other hand, there are railways which make very good use of subsidies in providing value for money. Prominent amongst these are the French, with the highest rail market share in Western Europe. But I would also include the Dutch railways, who - despite having the lowest market share in the table, no doubt as a result of the geography which deprives them of the sort of inter city traffic at which rail excels - actually offer a very good service with a high degree of efficiency. In both cases, rail subsidies are provided as part of a clearly defined long term plan for the development of the system; in France, regional authorities are heavily involved in the development of local services.

What I would conclude, then, is that for rail to play its full role in the sort of transport policy I have been outlining would certainly need increased resources, both in the form of investment grants and subsidies. Experience elsewhere indicates that there is a danger that these might leak into higher costs, but that danger is best guarded against by having clearly defined contracts, with targets not just for costs and revenue but also for service quality and traffic carried. In a country the size of Britain, such plans are best laid on a regional basis, with a prominent role played in

their formulation by local authorities.

I have deliberately said nothing about privatisation in this lecture so far. It is such a complicated issue that it would require a lecture of its own, but I will comment briefly given the importance of the issue in the current climate. Broadly, my view is that privatisation is beneficial in those sectors of the economy where it permits a greater degree of competition and freedom of choice without significant loss of economies of scale. I do not believe that to be true of railways, and I am therefore sceptical of the supposed benefits of privatisation. However, if privatisation happens, there is no reason in principle why the above arrangements should not apply equally to a contract between a government authority and a private railway company as to one with British Rail. Indeed, it is conceivable that a form of competition based on competitive tendering to operate local rail services could improve efficiency, perhaps with BR continuing to own the track and local authorities the rolling stock. This approach is being tried in Sweden, and we are watching the results with great interest.

6.Conclusions

It is time for me to try to answer the question I posed for myself at the start of this lecture "Is this the age of the train?". There seems to be quite a lot of evidence for thinking it is. For instance, I recently took part in a survey for the Department of Industry on the investment plans of Western European railways (Table 8). It appeared from that survey that there were plans to spend some 138-163 billion pounds on rail investment by the year 2000; with a heavy concentration on the three areas of high speed systems, urban systems and (to a much lesser extent) inter-modal freight.

Yet there are counter indications. One is the way in which the placing of orders for new rail investment has virtually ceased over the last year in the face of the difficulties posed by the recession. Another is the continued fear that privatisation may be carried out in a way which is totally disruptive of efficient rail operations.

Perhaps the most important question concerns policy outside of the rail sector. As we have seen, improvements in the quality of rail services may be welcome, but by themselves they will play only a modest part in solving the transport problem as a whole. The biggest question for the future of rail services is whether the sort of changes indicated will be implemented in the transport sector as a whole. If they are, then there is no doubt that we can continue to look forward to an enhanced role for rail as part of a balanced transport policy.

Table 1 BR Performance		
	1979	1989/90
Total Grant (£m 1989/90 prices)		627
Passenger Miles (m)	1100	
Passenger Train Miles (m)		20706
Passenger Stations	19000	225
Freight Tonnes (m)		
	196	2483
	2365	143.3
	169.3	
Source:BR Annual Reports and Accounts		

Table 2 Road Traffic Growth (Index 1988 = 100)	
1958	25
1968	50
1978	68
1988	100
2025	Forecast:Low 183 High 242
Source:DTp (1989) National Road Traffic Forecasts	

Table 3 Petroleum Use by Transport Mode (Litres/000 Passenger km)		
	Current	Potential Fully Loaded
Commuting Car	9.2	3.0
Off Peak Car	4.2	2.4
Commuting Bus	1.4	0.5
Off Peak Bus	2.8	0.5
Express Coach	0.9	0.7
Aircraft	9.0	5.8
DMU Train	5.4	1.2
High Speed Train	2.0	1.0

Source:Earth Resources Research (1989)
Atmospheric Emissions from the Use of Transport in the UK. Vol.1 (World Wide Fund for Nature, Godalming)

Table 4 British Rail Passenger Traffic (1990 billion passenger km, % in brackets)		
InterCity	13.1	(38)
Network South East	15.3	(45)
Regional	5.7	(17)
TOTAL	34.1	(100)
Source: DTp (1991) Transport Statistics Great Britain		

Table 5 Factors Affecting InterCity Rail Traffic
FARESA 1% rise reduces traffic by 1% EMPLOYMENTA 1% rise raises traffic by 1% QUALITY OF SERVICE IMPROVEMENTSRaised traffic by around 15%
Source:A.S. Fowkes, C.A. Nash and A.E. Whiteing (1985) Understanding Trends in InterCity Rail Traffic in Great Britain (Transportation Planning and Technology)

Table 6 Source of Increased Traffic for New or Improved Rail Services (%)				
	Birmingham (Cross City)	Glasgow (Argyle)	Liverpool (Link & Loop)	West Yorks 6 New Stations
Bus	50	70	46	64
Car	15	15	20	18
Ferry	0	0	10	0
New Traffic	35	15	24	17
Source: ITS Studies				

Table 7
European Railway Comparisons (1988)

	% of costs covered by subsidy	Passenger market share (%)
Britain	17	7.4
Belgium	56	7.5
Denmark	37	7.0
France	28	9.6
Germany (Federal Republic)	29	6.5
Italy	66	7.3
Netherlands	47	5.7
Spain	50	8.6

Source:T. Oum and C. Yu (1991)
An International Comparison of Economic Efficiency of Passenger Railway Systems. Paper presented at the 2nd International Conference on Privatisation and Deregulation in Passenger Transportation. Tampere, Finland

Table 8
Rail Investment Plans in Western Europe 1989-2000
(£ billion, 1989 prices)

National Rail Systems	118-137
Urban Rail Systems	20-26
TOTAL	138-163

Source:Kennedy Henderson (1990)
West European Railway Component Industry Market Study
(Department of Trade and Industry, London)