

Can a High Speed Rail Line in the UK help to close the productivity gap between London & the South East and the Regions, and boost Economic Growth?

Note:- the term HSR is used extensively in this report, and denotes High Speed Rail

Literature Review

The effect of transport on the economy has been often commented upon in the "classic" literature. A number of economists have cited it as a factor in expansion of the economy. Rostow's "take off model" (1960) assumes that improvements in transport lead new industries to develop and cause the economy to grow. Kuznetts (1966) adapts the Kondratieff wave theory to the development of transport 'revolutions'. The industrial location branch of economic geography traditionally valued transport costs very highly, leading to the concept of "agglomeration economies" where businesses locate close to each other in order to get spin-off benefits from their suppliers and competitors, and towns which became successful reinforced their dominance over towns around them as they became the centre of regional transport infrastructure - Christaller's central place theory (1933).

Later in the 20th century, however, there have been questions about the true role that transport has on the economy. Many studies carried out during the period 1960-1990 questioned the importance of transport as a driver of the economy and an influence on business decisions (Fogel, 1964; Hart, 1983; Dogson, 1974; Botham, 1983; after Bannister and Berechman, 2000).

HSR is a more recent phenomenon, and the literature on its effects is based on a study period of about 40 years. The earliest line (the Shinkansen) was built in Japan. Sands (1993) found that economic growth was 16-34% higher in areas with a Shinkansen station than areas without. However, he questioned the direction of the relationship – was the economy growing because of the Shinkansen, or was the Shinkansen station there because the economy was growing? In France, academics have reported many different effects stemming from the introduction of TGV services. Sands comments on the different fortunes of Le Creusot and Vendome stations. These are both out of town locations with substantially reduced travel times to Paris. While the economy in Vendome grew considerably, the economically depressed area of Le Creusot was no better off 6 years after the TGV began service.

The literature consistently suggests truth in the adage that transport, including HSR, is a necessary but not sufficient condition for economic activity and development. Other factors must be in place for development to occur. The question I wish to ask therefore is - What are the general prospects for additional economic development to occur in the UK as a result of HSR,

particularly in the regions outside London. Could HSR be a “fourth transport revolution”?

Introduction

This paper takes as its starting point the assumption that there is some sort of case for HSR in terms of cost-benefit analysis. However, current transport appraisal appears not to capture the total economic benefit of an investment (Forster, 2005), and there are even questions whether the traditional “travel time savings approach is still applicable (Metz, 2006). This means that it is important to make some sort of case for wider economic impacts which are not always reflected in the current appraisal process. It seems to be becoming clearer that there is a problem of congestion on the railways. passenger numbers have increased by approximately 40% over a 10 year period, and continue to grow (ATOC, 2005). However, HSR is only one of the potential solutions, the alternatives are not for this paper to discuss. Rather, I will focus on the likely source and spatial distribution of secondary economic impacts of HSR. Specifically, I want to focus on the potential for HSR to contribute to closing the productivity gap between London and the South East, and the three Northern Regions – it is estimated that the country would be £30 billion better off if average output in the North matched that of the South – the “productivity gap” (Northern Way, 2004).

Economic Impacts of Increased Accessibility

Accessibility can be defined as the number of people able to get to a certain location within a given time. Under this measure, most new transport infrastructure will usually increase accessibility, however, this does not mean that it cannot have negative effects. To give an example in the UK, the construction of orbital motorways such as the M25 has increased accessibility of edge of city locations, to the detriment of Central and Inner London, resulting in the relocation of some businesses than can benefit from improved road access, such as logistics, retailing and light industry.

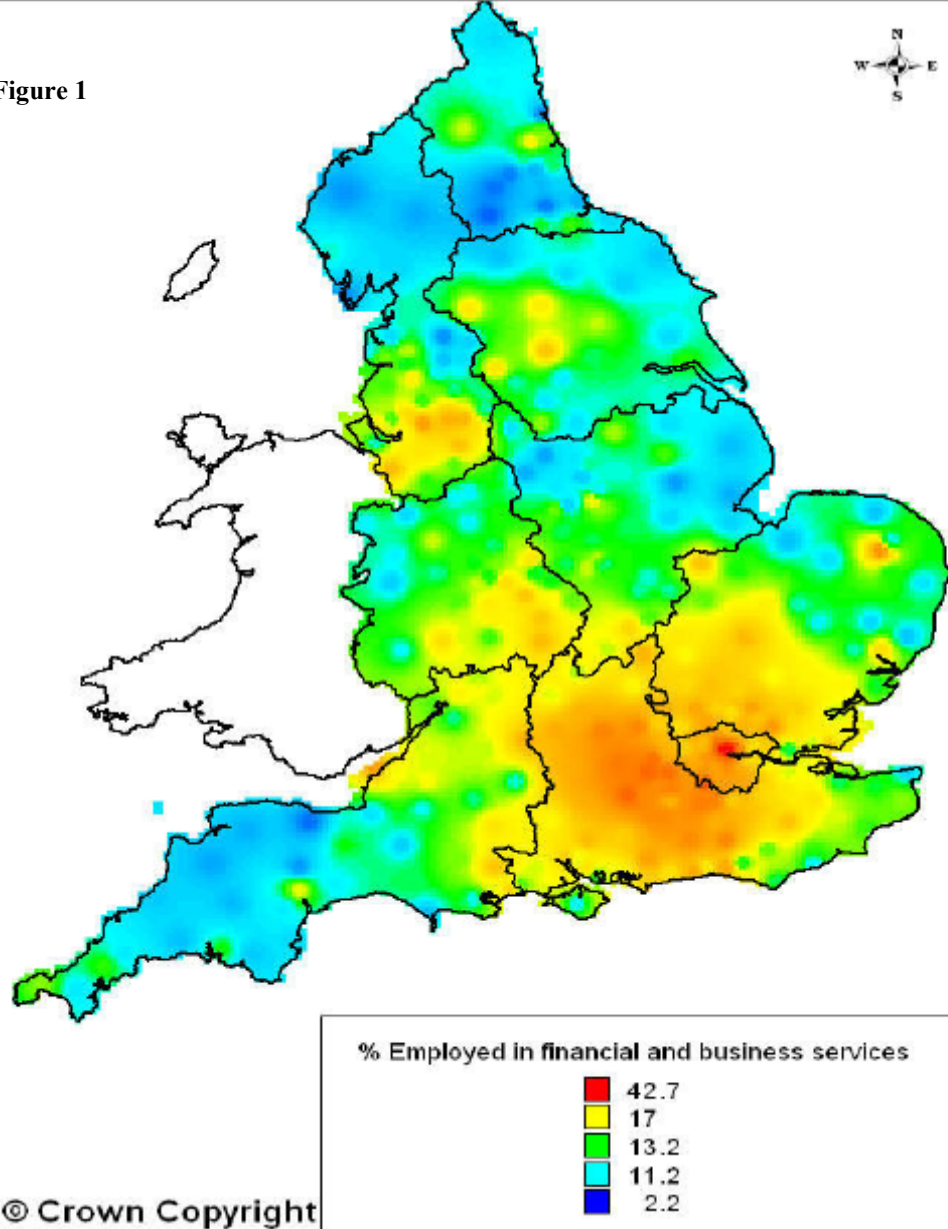
Research by the European Spatial Perspective Observation Network (ESPON) has estimated that regions experiencing upwards of a 40% increase in accessibility to other regions from planned European Trans-European Network (TEN/TINA), including high speed rail projects, can expect a growth in GDP of less than 4% overall (ESPON, 2005). This upper figure of a 4% increase in the economy would only provide around £7billion of the £30 billion Northern Way productivity gap (Northern Way, 2004). This strongly demonstrates the idea that increased accessibility is not a panacea for regional disparities. Furthermore, the largest absolute gains are expected to be in the core of Europe rather than the periphery, questioning the idea that it is possible to discourage overheating of core areas by improving transport infrastructure to the periphery.

HSR would certainly benefit large regional cities that it serves, by improving accessibility to those cities and encouraging firms to locate there. The question is whether it might also cause disbenefits to smaller cities that are disadvantaged by not being on the route of HSR? Might many of these firms that do relocate to cities on the HSR line in fact relocate from other cities in the region itself rather than from the overheated South East region? There are also a number of towns and cities, which currently enjoy a good service to London that may see their relative accessibility from London decrease should HSR be built. Depending on the route chosen, these could include places like Crewe, Doncaster, Stoke-on-Trent and Peterborough, which could have their train services reduced as long distance trains transfer to a HSR line.

To answer the question of whether negative impacts on cities outside the HSR route are possible, we must think about what sort of businesses are likely to be attracted to the time savings of a high speed train service between city centres. This will probably be companies which place a high value on time, with a high level of interaction with other businesses and which are located in city centres, because of agglomeration externalities. Such businesses include professional services, financial and high technology companies. Such businesses can collectively be called "knowledge industries". These businesses are currently predominantly located in the London, the South East of England and the major cities in the regions (see Figure 1).

Figure 1 – Distribution of Financial & Business Services. Source: Arup (2005)

Figure 1



Such knowledge industries are currently relatively poorly represented outside the South East and the big cities in the Midlands and North, so we can assume that the impact on them will be minimal and very few will relocate because their business is not dependent on the provision of high-speed travel.

If all major concentrations of “knowledge industries” (i.e. major cities) are connected on the HSR network, then we can probably assume that the disbenefits to existing cities will be relatively minor, because few firms outside these major centres will find it worthwhile to relocate. Equally, we can assume that there will be some significant gains in accessibility for the cities that have stations on a HSR link. But will these accessibility gains be enough to encourage businesses to relocate to these cities from London & the South East? As stated earlier, the market for high cost, high-speed rail travel is a limited one. Economic activity has become too dispersed to make rail a viable option for most journeys other than city centre to city centre travel and commuting to city centres, and therefore business users are more likely to be the types of businesses referred to above, which value time highly, and tend to cluster in city centres due to agglomeration economies. This limits the

potential market for relocation. This also assumes that transport accessibility is an important consideration for business. Empirical evidence (DfT, 2004) suggests that it is not, however we can assume that for this limited market of "knowledge industries", with strong linkages to their clients and suppliers, good accessibility to other city centres is much more important than for manufacturing-based businesses.

Up until now, we have only considered relocation of existing businesses. This assumes some sort of "zero sum" concept of the effect of accessibility on the economy. However, if there is a congestion bottleneck in the system this may impede economic activity. In this case any increase in capacity may stimulate new economic activity without causing any disbenefit to other areas. It could be argued that the UK transport system is such a case, where congestion is a significant barrier to increased economic activity, and that new infrastructure would cause a net gain to the economy by enabling pent-up demand for travel in the system. Improved accessibility will also have an effect on the general productivity of business, by reducing business costs and improving access to the labour market. These benefits are increasingly being quantified by the DfT (Forster, 2005).

Is high-speed travel relevant to business location and productivity?

There is an argument that advances in information and communication technology will reduce the need to travel in the future (Cairncross 1997). This now appears unlikely - a number of authors have emphasised the importance of face-to-face interaction despite the rapid advance of communication technologies (Moktharian, 1989; Niles, 1994; The Economist, 2000 & 2001), and the most telling indicator is the massive increase in travel, showing no sign of abating, despite such remote communication becoming exponentially easier.

Breheeny (1999) shows that the geography of employment in the UK is very dispersed, and becoming more so with time. Will businesses value better rail accessibility between cities, and is dispersion likely to increase in future? Again, I think the sector that would be likely to make most use of HSR *is* spatially concentrated in a small number of locations in the UK, and would be likely to value travel time improvements between city centres.

The question of how far travel time savings encourage relocation and raise economic output could be more of an issue. Already being on a train can be almost as productive as being in the office, with the possibility of video conference calls and mobile broadband internet. There have even been suggestions that travel time on rail is so productive that the benefits from travel time savings should be reduced (Local Transport Today, 2006). Would the introduction of a HSR link really cause a mass relocation out of the South East when businesses can already relocate to the other regions and their

employees can be productive on 2 ½ hour journey from Leeds or take a plane from Glasgow and be in London reasonably quickly? Whether or not companies can be persuaded to move probably depends on the scale of any proposed intervention and the geographical configuration. While the effect of HSR at 300km/h from London may be marginal, particularly to nearby and more distant cities (HSR's effect is greatest in the range 200km – 800km (Steer Davies Gleave, 2004)), because rail/air links are generally already good. However, a faster speed from Manchester to Newcastle, for example, where rail links are currently poor, would be a massive step change in accessibility, and could have a much greater effect than a radial network from London. This would encourage greater collaboration between these two cities, and could mean that the more functionally diverse cities in the North (such as Manchester) become service centres for *most* goods and services as an alternative to London. Table 1 below shows how all major cities in England are within 3 hours of London, yet the journey to a closer provincial city is often almost as long as or longer than the journey to London. This discourages a polycentric pattern of business location, especially for "knowledge industries", which tend to rely more on travel by rail due to their typical location in city centres.

Table 1 – Approximate current times by intercity rail services

	Man	Bir	Liv	Leeds	New	Edin	Glas
London	2h 15	1h 30	2h 15	2h 30	3h 10	4h 45	5h
Manchester	-	1h 35	1h	1h	2h 40	3h 30	3h 30
Birmingham		-	1h 45	2h	3h 25	4h 35	4h 25
Liverpool			-	2h	3h 40	4h	3h 45
Leeds				-	1h 40	3h 15	4h 15
Newcastle					-	1h 30	2h 30
Edinburgh						-	1h
Glasgow							-

Previous research on economic impacts of High Speed Rail in the UK

Empirical research has been carried out on the effect of the only HSR investment in the UK (up to the opening of the CTRL in 2003), the Channel Tunnel (Hay, Meredith & Vickerman, 2004). This concluded that there was no discernible effect on the Eurotunnel/Eurostar corridor (i.e. Dover & Ashford) in terms of business expansion, relocation, or inward investment. However, during the period before this study there were limited services (around 6 per day) and trains travelled along slow conventional tracks.

It will be interesting to see any effects after the Channel Tunnel Rail Link is completed from London to Dover, although there has been the opportunity for pre-emptive development along this route for some period of time. The

National Audit Office (2005) published a report flagging up the almost 300% overestimate for Eurostar passenger numbers by the DfT. They also said that the DfT was effectively relying on wider economic benefits for half the benefits just to get an even cost benefit ratio, in the case of the worst-case passenger estimate. We won't know for a few years how the final figures will stack up, but does the NAO have a point that we are currently putting too much faith in regeneration benefits, which until recently have been relatively unquantified?

The influence of London

London is central to the economy and transportation system of the UK. It also has, as indicated in Figure 1 before, a large proportion of the "knowledge industries" likely to use a HSR link, partly because of the huge agglomeration economies for these businesses present in Central London. The effect of HSR would be to effectively stretch these agglomeration economies by enabling close contact with markets and suppliers in London even from a long way outside the city itself. This would enable companies to move away from London to take advantage of lower costs, but still retain links to their markets and suppliers in London. However, care must be taken in placing too much emphasis on one factor for company relocation. Research demonstrates that it is only one of many factors that companies take into account, and that factors such as the quality of the local labour market and local quality of life may be far more important (DfT, 2004).

This seems like a purely positive situation from the point of view of regional economies, but there is another issue – transport links can enable investment into lower cost peripheral locations, but perversely they also can lead to a reinforcement of the economic power of the core. This is known as "the two-way road issue" (Goodwin, 2006). For instance, a global company which has its UK headquarters in London is usually obliged to have regional sales or marketing offices to serve territories which are too far from head office to service. At the very least, it might be expected to have a subsidiary in Glasgow or Edinburgh. If HSR were implemented, the company may decide that it can make savings by eliminating or downsizing its satellite offices because travel times are so much reduced that it can be serviced from London. Effectively, London becomes a central place for both the UK and Europe because it is at the centre of the UK HSR network, and linked into the European HSR network and European markets. Of course, London always was in this position, but HSR only serves to reinforce this dominance. Vickerman (1998) has pointed out that high-speed rail infrastructure generally serves to emphasise the economic divisions already present in a territory, because the highest accessibility gains from such investment occur in areas of already high accessibility. Atkins (2003) reported that the greatest increase in economic output should HSR be built, would be in London. Notwithstanding this, in the case of the French TGV, Paris being a good comparator to London because it

has a great deal of primacy in the French urban system, Sands (1993) found that in reality Parisian companies had not displaced firms from Lyon, and that very little relocation from Lyon to Paris had occurred. This could be due to a stronger regional identity in France or other cultural factors.

High speed rail expanding labour markets and linking economies together

An argument frequently touted for HSR is that it would create economic 'super regions' which would be worth more than the sum of their parts and could compete more effectively in an increasingly globalised world than the current situation of small, fragmented cities competing with each other. This is a concept that has been developed by the Department for Local Government and Communities in "Inter-Regional Growth Strategies" including "The Northern Way". Again, this is encouraged by the European Union, which has embraced the concept of "polycentricity" through the European Spatial Development Perspective (European Commission, 1999). It is clear that the UK regions are based far more on historical and geographical factors than any economic dimension – North Wales and South Wales, to give an example, have very little economic structure in common (ODPM, 2006). This may indicate that the most dynamic economic axes, linking people, goods and information, are not necessarily within the region, but between regions. To give an example of where this already happens, there are two express trains per hour from Manchester to Liverpool, 1 hour away in the same region, whereas there are 4 trains per hour from Manchester to Leeds, 1 hour away and in a different region. The recent focus on "city regions" (ODPM, 2006) has demonstrated that economic links are much more complicated than rigid regional boundaries can allow. Regional policy has usually focused on improving links within the region & to London, but recent research (Faber Maunsell & Ecotec, 2004) has illustrated the value of improving inter-regional connections, whilst recognising the value of retaining good links to London, as a world-class functional centre. Although HSR will have the greatest effects on connectivity between the places it directly connects, there is some scope for linkages to other nearby towns to share these benefits, providing they are well connected to the network.

The logical step from this idea is that certain city regions become so inextricably linked that they effectively form part of a single polycentric urban region. Their economies, labour markets, can effectively function as one city. Candidates for such integration might Glasgow – Edinburgh, where there is some momentum behind the idea of improved links with the appointment of a "Collaboration Director" in July 2006 (Glasgow City Council, 2006) and Manchester – Leeds. HSR would be likely to provide a massive boost to this concept, indeed, for some important city-pairs, it is the only way that it can function effectively, if we assume that proximity in terms of time is an important part of integration.

The UK has always possessed industrial clusters, but since de-industrialisation these have declined to become less significant. However, some businesses in these industrial districts have managed to adapt to new market conditions and embrace technology and have survived. There is still a great deal of industrial knowledge in skills and business relationships in many industrial clusters in the UK. Furthermore, new "knowledge" clusters have emerged, based around universities and research laboratories. The Work Foundation (2006) has listed one of the prerequisites for an "ideopolis" – the successful, technological post-industrial city – as being "diverse specialisation". This may sound like an oxymoron, but it is the idea that successful cities should have a broad economic base, yet at the same time have nationally or internationally renowned strengths in particular industrial sectors. High-speed rail ought to be able to contribute significantly to this goal, by expanding the labour market for cities and increasing their reach, so that they become less regional centres for all goods and services, and more national centres for a few key industrial and knowledge sectors.

Economic benefits arising from an increase in total network capacity

Until now we have neglected a major argument for the regeneration benefits of HSR. One of the key benefits could be the increase in capacity on the conventional rail network. HSR would mean a large number of inter-city trains would transfer from using existing conventional lines. It might be assumed, for example, that most rail services from London to Manchester except a few services serving intermediate cities would use HSR, taking off many of the trains on this route. Furthermore, the increase in capacity would be disproportionate to the number of trains removed from the network because mixed traffic railways (i.e. lines with both fast and slow trains) are much less efficient to run, because of the mixture of traffic. The conventional network could be left to cater for slower stopping trains and freight trains. This would benefit regional economies in a number of ways. Local & commuter rail services could be strengthened, allowing a larger number of people into the centres of city regions, as major regional cities are increasingly relying on this mode of transport as employment density increases, congestion increases and parking land is taken for development (PTEG/JMP Consulting, 2004). This would increase the labour catchment of city regions, and encourage relocation of businesses.

It would also allow more freight services on the network. This may persuade companies in manufacturing sectors of the economy that their goods can be reliably moved from the regions on the rail network, should they move out of the South East for cost reasons. This will all add up to an improvement in the environment for inward investment into the regions, but in itself will probably be an insufficient incentive for companies to move. These factors are probably more relevant to maintaining present economic growth rates by

enabling more people to get into jobs in major cities and move freight rather than any fundamental shift of the status quo. However, any additional capacity in regional cities will be important to enable the growth in employment in central zones of major cities to continue. This is especially important in view of the future focus on rail investment in London due to the Olympics in 2012, as well as schemes such as Crossrail and Thameslink 2000, which will be favoured by appraisal procedures because existing congestion is so bad.

The DfT (2005) suggests that effects on the labour market such as people currently being excluded from the labour market being able to take up jobs, and people moving into more productive jobs as a result of a reduction in the commuting time/cost, is a *major* effect of transport investment. It was estimated to be equivalent to 240% of the value of business travel time savings for the Crossrail project. While enabling people currently excluded from the labour market to take up jobs is unlikely in the case of a high fare HSR system, there are likely to be substantial benefits from increasing participation in higher-value activities, clustered in city centres, whether this is by enabling more long-distance commuting, or by reducing congestion on local rail networks so that people are encouraged to come into the city to work.

Conclusion

It appears that there is potential for HSR to contribute towards improving the UK's economy as a whole. What is clear from this analysis is how difficult this benefit will be to quantify, with so many possible effects, both positive and negative. It is also uncertain how far these benefits will be captured in current appraisal processes. There are other effects that need to be quantified, in particular the way that HSR could produce a shift in the location and clustering of "knowledge industries" and their contribution to the overall economy. Since this sector is one of the most dynamic in the UK there is an opportunity to grow the economy overall by encouraging this type of activity. There will be substantial agglomeration benefits from reducing journey times between major cities and encouraging physical concentration in city centres. The effects on the labour market will also be substantial, enabling businesses to access a far wider pool of labour, and encouraging people to take up jobs in higher value economic activities in city centres. This is particularly the case if capacity on the local rail network is released. HSR may also alter the structure of the economy by allowing more specialisation in cities, and helping certain cities and city-pairs to integrate into the new knowledge economy.

However, it seems unlikely that HSR will cause a fundamental change in the regional distribution of wealth even if the country as a whole may benefit. Much evidence points to the fact that transport investment between core and periphery generally reinforces the dominance of core regions. This does not mean that the regions outside the South East will lose economically, more

that their growth is unlikely to be as large as London's at least in absolute terms. Relatively, they may close the gap slightly, and contribute to a slight spatial adjustment from the overheated South East to the Midlands and North.

Notwithstanding this, the benefit to regional equity, if not overall economic performance, would seem to depend on what particular configuration is chosen for HSR. A trunk system, where as many city pairs are connected as possible by the same line, would seem to be preferable in terms of closing the productivity gap to a hub and spoke system, where London is the centre of the network, and several lines branch out to different places. The option that would probably do most for reducing regional disparity would be to link regional cities together without connecting them to London. However, this may result in a lower total economic benefit to the country. To maximise wider economic benefit, stations in city centres should be expanded *on a large scale* to accommodate additional capacity to make improved local rail services available or be new stations close to the city core. It should be truly high-speed, and produce a step-change in journey times to make a good case for relocation rather than a marginal one. The HSR also needs to build on effective governance for linking cities together, and creating larger city-regions that can compete more effectively in the European urban system.

References

- Arup (2005) *Regional Futures – England's Regions in 2030*
- Atkins (2003) *High Speed Line Study – Summary Report*
- ATOC (2005) *Ten Year European Rail Growth Trends*
- Bannister, D and Berechman, J (2000) *Transport Investment and Economic Development*
- Breheny, M (1999) *The People, Where will they Work?* Town & Country Planning Association
- Cairncross, F (1997) *The Death of Distance*
- Christaller, W (1933) *Die Zentralen Orte in Suddeutschland* [Central Places in Southern Germany]
- DfT (2004) *The Importance of Transport in Business Location Decisions*
- DfT (2005) *Transport, Wider Economic Benefits, and Impacts on GDP*
- European Commission (1999) *European Spatial Development Perspective*
- Faber Maunsell & Ecotec (2004) *Surface Infrastructure of National Economic Importance (SINEI)*
- The Economist (2000) *American Society and the Net – New economy, New Geography* Nov 9th
- The Economist (2001) *Geography and the Net* Aug 9th
- ESPON (2005) *Territorial Impact of EU Transport and TEN Policies* Research Project 2.1.1
- Forster, A (2005) "Can new appraisal methods capture linkages between transport and the economy" in *Local Transport Today* 21st July p.4
- Glasgow City Council (2006) "Lawyer appointed to lead Glasgow-Edinburgh

- City Collaboration" at
<http://www.glasgow.gov.uk/en/News/CityCollaborationDirector.htm>
 Page accessed on 22/10/06
- Goodwin, P (2006) "Grappling with the two-way road problem" in *Local Transport Today* Issue 440, 6th April
- Hart, T (1993) "Transport Investment and Disadvantaged Regions: UK and European Policies since the 1950s" in *Urban Studies* Vol. 30 No. 2 pp. 417-436
- Hay, Meredith and Vickerman (2004) *The Impact of the Channel Tunnel on Kent and relationships with Nord-Pas de Calais* Centre for European, Regional and Transport Economics at the University of Kent
- Kuznets, S (1966) *Modern Economic Growth*
- Local Transport Today (2006) "Study finds train travel more productive than car" 19th October p. 5
- Metz, D (2006) "It's time to look again at travel behaviour model" in *Local Transport Today* 19th May p.26
- Molktharian, P (1990) "A Typology of Relationships between Telecommunications and Transportation" in *Transportation Research A* Vol 24A No.3 pp.231-242
- National Audit Office (2005) *Progress on the Channel Tunnel Rail Link* Report HC 77 Session 2005-2006
- Niles, J (1994) *Beyond Telecommuting: A New Paradigm for the effect of Telecommunications on Travel* at
<http://www.lbl.gov/ICSD/Niles/index.html>
 Page accessed on 22/10/06
- Northern Way (2004) *Growth Strategy*
- ODPM (2006) *A Framework for City Regions. Working Paper 4. The role of City Regions in regional economic development policy*
- PTEG / JMP Consulting (2004) *Rail in the City Regions*
- Rostow, W (1960) *The Stages of Economic Growth*
- Sands, B (1993) "The Development Effects of High-Speed Rail Stations and Implications for California" in *Built Environment* Vol. 19 No 3/4
- Steer Davies Gleave (2004) *High Speed Rail: International Comparisons*
- Vickerman, R (1998) "Transport Provision and Regional Development in Europe – Towards a Framework for Appraisal" in *Transport Policy and the Environment* ed. Bannister
- Vickerman, R Spiekermann, K and Wegener, M (1999) "Accessibility and Economic Development in Europe in *Regional Studies* Vol. 33.1 pp 1-15
- The Work Foundation (2006) *Ideopolis – Knowledge City Regions*