Economic Development Impacts of Urban Rail Transport

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Abstract

New investments in urban rail transport, both in Europe and North America, have been widely discussed in the transport policy literature, especially in the context of the relative success of individual projects. Recent experience in developed countries has seen something of a revival of urban light rail infrastructure, mainly because of its lower cost relative to full underground metro rail. Among the issues raised are firstly, what are the impacts of new urban rail infrastructure on potential corridors of economic development along the new routes; and secondly, whether the access gains offered by urban rail mean that private sector contributions can partly be used to finance them. This paper reports on further progress on internationally funded comparative research first discussed at previous ERSA Conferences. It reports evidence (based on site visits) on the economic development impacts of new urban light rail. Visits to a number of light rail systems in Britain and France (with other countries planned this year) provide sharp contrasts in the economic development impacts of this form of urban infrastructure, as well as in the transport policy strategies that lie behind the various projects. The Federal Government's financial involvement in urban rail projects in the US has provided yet more contrasting examples from a highly car-oriented economy.

1. Introduction

The question of the kinds of economic impact that occur when a new public transport infrastructure is built is an old one, but recently has developed a new and very practical importance. There are several reasons for wanting to know an answer.

First, building a light rail line or any other rail infrastructure is expensive and large parts of the funding of these investments are undertaken by state institutions, i.e. they use taxpayers' money, so they have to be well justified.

Secondly, some governments want to know whether the investment is successful not only in increasing the number of public transport passengers, but also in terms of wider impact – positive or negative – on the economy of the rail corridors served, or the area as a whole. The positive impacts, if one could measure them, would make it easier to justify existing and additional public transport projects. The negative impacts, if there is good warning (for example on the economy of sub-centres) one could avoid them by changing the alignment or by supportive other measures.

Thirdly, there is the issue of private funding. While there is wide agreement, especially in the large urban areas, that more public transport investment will be necessary in order to enhance mobility, Government funding seems to be scarce everywhere. However if one could prove that there are significant commercial benefits for investors or property owners located along light rail or rail corridors, then it becomes realistic to ask (or require) these stakeholders to make a financial contribution to support the new rail infrastructure.

2. Some Comments from International Experience

Possibly the earliest international study of the urban impact of rail public transport was the British-German comparison by Hall and Hass-Klau (1985). This project focused more specifically on the impact of rail on the economic vitality of the city centre, and finds it hard to come to terms with the problem of a wide range of different factors being mixed in with the impact of the rail line itself.

Another source of over 10 years ago (Fainstein (1991), based on the British-American urban planning context, focuses on the changes in political and deal-making culture that had come by the late 1980s. The chief planner of a Labour authority in central London stresses that it would now willingly trade land it owned in exchange for developer concessions.

> "He went on to describe a deal in which, in return for being allowed to build offices on a two-acre publicly owned site, a developer would also build 50 industrial units and a hostel for the homeless and would contribute to improvements in the underground." (Fainstein, op cit, p. 31, my emphasis)

A number of sources have compared land use and development impacts between rail public transport systems from different countries. Babalik (2000) summarised attainment of land-use and urban development objectives in 8 urban rail systems, 4 American, 1 Canadian, and 3 British. She concluded that the Vancouver Skytrain and San Diego Trolley provided the clearest evidence of success in 3 dimensions:

> (a) stimulation of development in the city centre;
>
> (b) stimulation of development in declining areas;
>
> (c) change in the pattern of urban development.

The systems of St. Louis, Manchester, and Tyne and Wear had shown some success mainly in stimulation of city centre development. The systems of Miami, Sacramento, and Sheffield had (as yet) shown more disappointing land-use and development effects.

Vancouver's SkyTrain was particularly impressive:

> "The most effective system in terms of shaping urban growth is the SkyTrain. The corridor that the SkyTrain runs through became the main development axis of Vancouver with a notably denser urban form after the opening of the SkyTrain. Development densities along the SkyTrain route have changed especially as a result of the rezoning plans of the municipalities. These plans increased the densities at station areas, and encouraged office and retail centres at stations. Some of the SkyTrain stations became the `new town centres' as proposed in the metropolitan development plan." (Babalik, 2000, p. 11)

However, Babalik concluded that with the exception of Vancouver, any revitalising impact on slum areas accessed by the systems was thin.

> "In none of the US cities did systems have impacts on declining areas along themselves, although the revitalisation of these areas was often one of the objectives, and justification of building some, such as St Louis Metrolink and the Northern line of Miami Metrorail. ... In Tyne and Wear and Manchester too, there have been no impacts on the declining areas along the systems; nor were there any renewal projects in coordination with the construction of the system." (ibid, p. 10)

There is also a useful example of an international study focusing on urban light rail, set up as a working group by the UITP (Union Internationale des Transports Publiques) in 1995. A survey questionnaire was sent to all operators of light rail systems, and there were 34 responses. Detailed case studies were also carried out for Nantes, Lausanne and San Diego.

The results for the sample responses as a whole showed that 12 of the 34 cities reported that the impact on urban development was an important aspect in the choice of light rail transit (LRT). In terms of sectoral effects:

> "... 6 cities reported an increase in shopping business generated adjacent to LRT lines;
>
> 5 cities reported the development of new shopping areas;
>
> 4 cities reported increased employment." (Hue, 1997 op cit)

There were rather larger numbers of cities reporting `plans for LRT', though detail is not given on quite how far advanced these plans were:

> "... 20 cities reported new residential areas with plans for LRT;
>
> 14 cities reported new employment areas with plans for LRT;
>
> 10 cities reported new shopping areas with plans for LRT." (Hue, ibid).

Specifically for the French city of Nantes between 1985-95, 25% of the new offices, 13% of the new commercial buildings, and 25% of the new residential dwellings were built within a 400 m corridor either side of the light rail line.

In the other two of the detailed case studies (Lausanne and San Diego), it was acknowledged that " ... the construction of the light rail system has given a real impetus to urban development by creating new housing, offices and shops." (Hue, ibid). For Lausanne, Hue gave specific examples of the extension of a commercial centre (Croset) as well as the new commercial building (Provence- Center) close to the light rail station Mallet. Also, new student halls were built near the light rail line in the commune l'Ecublens. For San Diego, the early 1980s saw new restaurant and office developments aroubnd the `international' station of San-Ysidro. There was also the development of a commercial zone close to the station Chula-Vista - Palomar St, and office buildings employing 600 adjacent to the station National City - 24th Street. More recently, San Diego has seen the construction of 500 apartments close to the station Amaya (Hue, ibid).

There was also some more detailed information from Strasbourg. In its central city, 41% of the buildings located along the tram line had undergone a transformation. A renovation of the frontage was found in 27% of buildings, and in 18% there had been a change of use. In the southern section of the line, 30% of the buildings had undergone a modification.

There are also possible longer run impacts, working either through gradual adjustment within the transport sector (such as long-run elasticities being bigger than short-run), or through a positive impact on city image.

> " ... light rail improves the image of the city. 11 cities reported that favourable public perception played an important role in the choice of LRT; 3 cities reported that residents and shopkeepers previously anti-LRT had changed their minds after the opening of the LRT system." (Hue, ibid).

We have referred elsewhere to Cervero's research on the BART system and evaluation of overall density and development impacts of intra-urban rail. He has also contributed to international comparative studies on new towns, planned communities, and commuting patterns (e.g. Cervero,1995). Specifically, he found that Britain's new towns, though balanced and self-contained in terms of commuting flows, are in fact relatively car-dependent. In contrast, the rail-served new towns of Paris and Stockholm are the least self-contained, but the most transit-dependent for external trips:

> "In fact, when Stockholm's and Paris's new towns are compared to Britain's, there appears to be an inverse relationship between self-containment and transit / non-auto commuting." (Cervero, op cit, p. 1159)

By comparison, a discussion of the transport infrastructure / planning relationship in the Netherlands was offered by Priemus (1994), although this is a discussion at regional and national level. One might think that this was a country which prided itself on getting the infrastructure / planning relationship more right than most, but Priemus disagrees:

> " ... we must avoid designing environmental policy so rigidly that the effects are the opposite of those intended. Examples are the ABC locational policy and the compact city policy. ... The compact city policy is not in accordance with the locational preferences of many firms either. They consider possibilities of expansion, accessibility by car and parking space of the greatest importance." (Priemus, op cit, p. 527)

Although there is criticism of `... the poor coordination of infrastructural policy and physical planning' (ibid, p. 528), the tendency for decentralisation from the Randstad to be a principal outcome of the ` ... struggle against the advancing use of the car.' In Priemus' view, the restrictions on highway capacity had encouraged the migration of Randstad businesses to Gelderland, Utrecht and Brabant, and ran the danger of leading to ` ... an inaccessible Randstad.' (ibid, p. 529), especially because of the emphasis placed in infrastructure policy on freight transport.

Another study of relevance to light rail, although its main focus was on high-speed intercity rail was summarised by Van den Berg and Pol (1998). The authors stress that new high-speed train stations can bestow an `aura of modernity' and attract new economic activities that are `sensitive to status'. But in addition to this:

> " ... in most of the [HST] cities investigated substantial investment in secondary transport systems is needed. The HST tends to be a powerful catalyst for the construction of new urban public transport systems. ... Investment in secondary transport networks is often essential to the revitalisation of the cities, and hence of supraregional importance." (Van den Berg et al, op cit, p. 492)

3. Earlier studies and difficulties

The topic I am talking about here is not new. There have been plenty of studies on this issue, especially in the United States and in Britain. There is a long tradition of work both in economic history, and urban geography, that relates economic development to transport facilities, using historical techniques. In most cases certain common difficulties have been found. If a study is carried out too soon after the rail or light rail line opened, the effects, if there were any, are at an early stage and likely to be small. If the study is carried out later, however, many other things will certainly also have changed. At all stages, the question arises of how to separate impacts, that are due to public transport investment, from other influences? In many cases it is impossible to isolate factors from each other, and anybody carrying out empirical research has to live with this inconsistency.

We have identified and reviewed 32 impact studies, of which 17 were from the United States, and we will give more detailed assessment of their methods and conclusions in a later report. Taking an overall view, the tenor of most reports was that overall improved rail access could not `make things happen' by itself, but that it had its strongest effects when backed up by a powerful strategic plan and measures that complemented the access gain. The local economic climate also needed to be strong. Relatively minor access gains could not overcome the adverse effects of dereliction and local economic depression.

Our own earlier work, which the current research extends, was a study supported by the Volvo Foundations and others called *Future of Urban Transport: Learning from Success and Weakness*. We found that cities that had traditional (ie European continental) light rail systems did best in increasing the number of public transport passengers. This success was most marked in cities, which pursued the car restraint policies, together with good public transport integration including wide-ranging integrated ticketing. This research was based on 24 light rail cities around the world, for which we had good background information. The current study chooses 12 of these cities, which had recently invested in new light rail, for more focused examination of economic impacts.

4. Difference in Planning

Although recent investment in light rail systems is seen as an international movement, in fact there are distinct differences in the approach which has been taken to plan their alignment. This is seen especially when comparing France and the UK (shared also by the United States and Canada). Countries with long established tram systems do not fit in either pattern because they only built line extensions or the odd new line.

The philosophy in France has until recently been to design new tram alignments to connect the city centre with high density, low income, housing estates at the edge of town, and also to specific types of major attractors such as universities, hospitals and large school and health complexes. Many of these locations have a large, even overwhelming, proportion of people who are captive to public transport or inclined to use it intensively. The result has often been a radical and rapid increase in the level of accessibility offered to large numbers of people most likely to make use of it. The new trams were quickly crowded, and had in many cases more passengers than was predicted. This was a very common pattern for first lines in most, though not all, French cities.

Naturally, the speedy proof of success made these systems popular, but it must be admitted that there is a disadvantage when considering wider economic effects: the alignments chosen are already 'full' and there is little unused space on which new economic activities can take place.

In contrast to France the alignments in the UK, the USA and Canada are often planned to use previous rail or tram corridors, now disused, which provide great cost savings in land acquisition and (sometimes) preparatory work. As is happens, these alignments often pass through old industrial areas, which are in need of redevelopment, or they run through open land (like the new line in Tyne and Wear) which could usefully be developed but often there is an inadequate economic drive to do so.

Furthermore, the sections, which run through housing areas normally have lower population densities than in France. Although nearly all new light rail lines do run through the city centre (Birmingham does not yet but will do in future) there is a lack of population at the edge of the city centre and often car parking provision is too generous in the city centre itself. The result of such different planning is lower passenger numbers in the UK and USA than when a new tram line opens in France. An additional factor in relation to the UK specifically is the manner of deregulation of bus services outside London, which encourages competition between bus and the new rail lines, and the lower level of subsidy that causes fares to be higher than in France or Germany. In the USA there are further problems of the very high cultural and policy priority given to the private car and the low image of public transport.

All these factors combine to depress the usage of the new lines in the UK and US. The great (potential) advantage of the British and US alignments is that space for new economic development is available. This does not guarantee it takes place: if overall the

economy is weak, and/or there are no other incentives for developers to locate along light rail or rail corridors, and/or other policies fail to challenge car use, then new development is likely to continue happening along roads or at road junctions, as for the last 20 years.

5. Impact of tram and pedestrianisation in the city centre

In France normally each new tram construction is combined with an extension of the pedestrianised area. Thus a division is not possible between the economic effects of pedestrianisation and the effects of a new tram line. However we have known for a long time that when city centre pedestrianisation is implemented the number of pedestrians normally increases considerably.

Let's look at the example of Strasbourg where we obtained very good data on pedestrian counts at 11 places in the city centre. On a Saturday in February 1992 (before the tram was opened) 88,000 people were counted. This increased to 146,000 in October 1995, about 1 year after Line A had been running through the city centre. This means we can see in three years an increase of nearly 90% more pedestrians. Now certainly not all of them bought something but the size of the change is so large that it is very likely to have had an effect on retailing turnover. We also have figures for the opening of the second Line B, and we see a further increase here from 146,000 to 163,000 pedestrians in 1997. The increase in pedestrians is not so strong when comparing a weekday, though even then 34% more pedestrians are counted after the tram opened in 1995. Some of the most prominent effects were seen in the pedestrian counts next to the most important tram interchange. In 1992 there were 28,000 people counted. In 1995 this number increased by 57% and grew by another 11,000 when Line B opened.

In the following years, the number of pedestrians declined from its high point, though still remaining higher than before the line opened – in October 2002 there are still 46% (41,000) pedestrians more on Saturday than in 1992. It is not clear why the decline occurred – one suggestion is that there was a temporary 'novelty' effect. A possibly important factor is that during the last couple of years Strasbourg has been suffering from the German recession. Many Germans liked to come to Strasbourg to do their shopping and breath a bit of French atmosphere: these visits have reduced significantly.

Research in Strasbourg and other towns suggests that it is mainly the smaller retailing shops which gain from public transport passengers, suggesting that there are structural changes as well as quantitative ones. In Strasbourg we have not only pedestrian counts, but also other research that showed changes in shop prices, owning and renting.

After Line A (1994) opened rent and property prices went up. According to an interview we had with the Director of the Chamber of Commerce in April 2003, rents and property prices have increased even further and are now so high that it is impossible for small shops to pay such rents and only large chain stores are able to pay such prices (Salsac 8.4.03). We see here an unintended impact as a result of pedestrianisation and tram access – if the effect is too successful, resulting changes in the property market may drive

out some of the more traditional shops in a city centre, and make way for chain stores. If not countered, the city centre will become visually more boring and lose its unique character.

A different example of this is seen in the nature of the goods sold. For instance, one of the streets in the city centre used to be the main street where bus passengers would interchange with the tram. This changed in 1997. Buses disappeared and the street became the main interchange between 2 new tram lines (Line A and Line B) losing also all the car traffic. With that the type of shop changed from an average retailing type shop, to very high class shops such as Hermes, Bally, Gucci, Cartier.

A different economic effect of the new light rail line is seen in Saarbrucken. The line runs in the city centre, but parallel to the main pedestrianised shopping streets, and it is not seen very positively by representatives of the retailing organization. This is supported in part by a survey confined to large department stores, showing that no more customers are coming by public transport after the light rail line opened. This is an important but puzzling finding, as the number of public transport passengers increased with the new light rail line from daily 25,000 passengers in 1997 to 45,000 in 2002, and it is possible that they are choosing to do their shopping in other stores than those located – perhaps the smaller shops as seen in Strasbourg. However overall the impression was that retailing in the town centre of Saarbrucken has improved with the new public transport mode but we have no proof of that.

6. Impact on office prices in the city centre and in areas with direct tram access

Results in Strasbourg in 1998, showed that some offices moved out of the city centre to the outskirts of the urban area because of lack of expansion and difficulties in reaching the city centre by car. However in most of these cases accessibility to tram stations becomes a decisive location criteria.

By 1998 prices for offices in Strasbourg were 10-15% higher compared to other cities of similar size - indeed, Strasbourg's prices were close to those in Paris. According to our interviews with the Director of the Chamber of Commerce this increase has continued up to today (Salsac 8.4.03).

We found similar interesting results in Freiburg, which showed that offices in an industrial area that has direct tram access have the same rent than offices located at the city centre fringe. However rent at the periphery with very good road access was nearly 30% (Euro 2.30) per sqm lower (Periphery: Euro 6.20, industrial area: Euro 8.50 and city centre: Euro 9 in February. 2003).

We received information that allowed us a comparison of two office blocks in Freiburg which were built at the same time and have the same quality. The offices that have tram access have 15-20% higher rents than the office block which has no tram access, even though it is closer to the city centre.

7. Change of the character of an area

Another remarkable issue is that the accessibility to a tram station (tram line) may change the character of an industrial area. Such an area becomes more attractive for the tertiary sector, leisure and cultural activities. When one activity start to locate there, others follow, yet after a short while it is not clear whether new activities locate there because of existing ones or because of the tram access (possibly both). We found two identical examples of such changes in an area in Freiburg and in Strasbourg. However when studying the German town of Saarbrucken which has plenty of old industrial areas and is suffering from the present German recession the new light rail access does nothing to attract offices there. In addition Saarbrucken has a large road network and congestion is a word nearly unknown to them.

8. Who is the winner ? City Centre versus Neighbourhood Centres?

In all cities/ transport regions where a new tram or other rail infrastructure is being built there is the issue of who wins and who loses from this new accessibility. Mostly retailers in the large city centres seem to gain but small towns along the tram line are worried that they will lose trade. This worry is the same in the UK, France and Germany.

Interesting is the example of Neudorf in Strasbourg where because of protest from the traders the alignment had to be changed, bypassing the town centre. The traders proved that 30% of their turnover was made by passing car traffic, which they would lose if cars were displaced from the area by the new tram line (Salsac 8.4.03). However it may well be that the traders will regret this decision, as was the case in the small town of Schiltigheim which protested successfully years ago against a tram stop and they are today annoyed that they have missed the chance of a direct tram access. Other cases where this fear was unfounded include the small French town of Saargemund and the subcentres along the new light rail line in the Saarbrucken region.

9. Passenger gains an indirect indicator of economic success

Some of the newly built light rail lines have managed to increase the overall number of public transport passengers considerably. For instance in Montpellier the increase in public transport usage was over 50% between 1997 and 2001. Similar impressive gains were found in Strasbourg in France (over 40% between 1992 to 1999) and Freiburg in Germany. Despite these successes one has to be aware that the modal split of public transport even in these cities is today typically between 15-25% for all trips.

The next issue is to consider whether these extra trips are a good signal of economic activity. We know from previous research that according to circumstances on average 10-25% of these new public transport passengers gained used to go by car. In some cities

this percentage is even higher. Normally a relatively small percentage of new passengers previously walked or cycled. The highest percentage comes from people who are simply making more public transport trips, often changing from bus to tram. A high percentage of these additional trips are to the town centre and many of them are shopping trips. So at first sight one would expect that there will be a relationship between increases in public transport use achieved in this way, and the retail turnover of a town centre.

The quality of transport itself is unlikely to persuade people to spend more of their income on shopping: it would be usual to assume that the primary effect is to shift the location of the shopping in a region, rather than the total quantity. However, there could be important secondary effects. If more is spent in the city centre well served by public transport, and less in out of town centers for which cars are necessary, then there could be a proportion of higher income families who decide to own only one car instead of two, releasing a large amount of income to be spent.[1]

10. Conclusion

This paper has reported the first tentative results of a new study of the effects of light rail investment on the economic health of an urban area. So far, we have results showing that the number of shoppers attracted to a town centre can be increased, sometimes substantially, and there is higher growth in property prices or rents of offices along light rail corridors in comparison to elsewhere.

There are differential effects on large and small shops, also cheap and expensive ones. In most cities retailing turnover increases in the city centers, but the resulting increases in property prices and rents can have a negative effect on the pattern of shops, driving the old established shops out of the most expensive city centre streets.

The effects seem to vary in different towns, for reasons that are not yet fully explained, but the general pattern is what you would expect to see a contrasts between rich growing areas, and poor depressed ones. Some of the side effects may not be desired, and in this case remedial measures are important. An important difference has emerged between a 'French model' of light rail investment connecting areas, which produce good passenger figures but with less chance of new development, and a 'British model' connecting less developed areas which do not produce such good passenger figures but could assist

[1] For instance in Nantes 45-62% of all public transport trips were to the city centre in 1987. A high percentage must have been shopping trips. We know from Strasbourg that between 1988 and 1997 shopping trips to the city centre by all modes increased by 13%. But most of the shopping trips (60%) are carried out by people who are already in the city centre.

development, in principle if not always in practice. However it is important to notice that in those French cities which have now already tram lines, new tram lines are planned in a different way. The French seemed to establish their first tram lines in such a way that they get quick high patronage growth and only in the second phase do they build lines or extend existing ones which allow more potential for economic growth and /or urban renewal as in the case of Montpellier.

Another new finding is the change of old industrial areas with tram access to areas of tertiary activities, especially offices. This aspect is important for land use planning but again may only work in an upswing economy.

Further work continues on other impacts, including changes in the housing market but the picture is too complicated yet and will be reported in a later paper.

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