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Transport and Economic Development

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Introduction

There is generally a close and widely-accepted association between the quality of transport infrastructure and the level of economic development within a particular country or region. In general, transport infrastructure and services are generally superior and more diverse in wealthy districts, countries and regions compared to less developed ones. Modes of transport are better connected, their geographical reach is greater, and fewer places are inaccessible. While such differences can be clearly identified, explaining how they have occurred is a more challenging task, requiring a sophisticated appreciation of “the rich complexity of the transport-development interface” (Leinbach, 1995, p.338). In particular, the question of the direction in which the linkage operates is crucial: “does transport investment promote economic growth or does growth encourage more demand for transport, and thus further investment”? (Banister and Berechman, 2001, p.214). The conventional view is that the relationship is two-way with transport both acting as an important facilitator of economic development and providing an important outlet for capital investment as economies grow (Hoyle and Smith, 1998; Simon, 1996; Vance, 1986). Recent research has emphasised the complexity of the relationship, indicating that the impacts of investment tend to be socially and spatially uneven, favouring some social groups and places over others (Hine, 2008).

This chapter aims to assess the relationship between transport investment and economic geography, examining the dynamic linkages between the two. Our primary concern is with the secondary or additional effects of transport investment in altering economic conditions rather than its direct impact in terms of reduced journey times and increased accessibility *per se* (Banister and Berechman, 2001, p.210; Lakshmanan, 2010). We view the relationship between transport and economic development as a two-way symbiosis; in a circular manner, each influences the other. In general terms, the expansion of economic development in a particular area

will create demand for improved transport provision which will, in turn, support further economic growth. Such linkages are far from automatic, however, depending upon local circumstances and the development of the institutional and political capacity to prioritise appropriate forms of transport investment. And, just as the economic benefits of better transport will be unevenly distributed, so will the negative externalities of transport, such as local air pollution and traffic congestion. In many growing urban regions, processes of demographic- and economic growth have tended to overwhelm the capacity of the existing transport infrastructure, generating significant diseconomies related to congestion and overcrowding. The next section revisits some major theoretical frameworks that have been used to interpret and understand the nexus between transport and economic development. This is followed by a consideration of the relationship between transport and spatial development in developed countries, considering the role of transport in the shift to post-Fordist production systems and assessing the economic effects of investments in transport infrastructure. The second half of the chapter reviews recent research on the importance of transport to the economic performance and competitiveness of cities and urban regions, an issue that has become a major area of concern and enquiry as territorial competition between places has become more intense. A brief conclusion summarises the main points of the chapter.

Theoretical Frameworks

Spatial Analysis

The principle that transport systems have determining effects on patterns of spatial economic organisation has been a key theme of location theory since von Thünen's seminal work in the mid-nineteenth century. Traditional location theory is characterised by a deductive method of analysis, beginning with the assumption of a flat, featureless plain (an isotropic plain) on which economic activity is located. The focus is then on ascertaining the effects of distance on location with transportation

costs viewed as a key expression of distance (Knox and Agnew, 1994, p.66). According to von Thünen's theory of land use, the value of a location is determined by its access to the marketplace, reflecting its geographical position, particularly in relation to major transportation routes. In his groundbreaking work on central places, Christaller also emphasised the spatially differentiating effect of transport infrastructure: "Better transport connections result in a reduction of economic distance, a reduction not only in costs, but also in wasted time and the psychological inhibitions which impede frequent purchase of essential goods on uncomfortable, dangerous and sometimes impassable roads with bad traffic conditions" (Christaller, 1933, p.53). Based on the assumption of economic rationality, central place theory offers an account of the size and distribution of settlements within an urban system. The need for shop owners to select central locations produces a hexagonal network of central places, organised into a distinct hierarchy of lower and higher-order centres (Figure 1).

Whilst location theory generates neat models which real spatial patterns can be measured against, the assumptions upon which they are based are questionable (Massey, 1985). From a transport perspective, the notion that travel costs are equal in every direction is clearly at odds with the simple reality that transport networks and services sculpt landscapes of differential accessibility and land value (Knowles, 2006, p.417). Motorway junctions are highly favoured by commercial property developers, for instance, for whom access trumps noise in manufacturing, wholesale and storage premises. Subway stations generate considerable passing traffic and nearby sites are prized by retailers seeking high volumes of consumer footfall. Concerted investment in new transport infrastructure has been a critical facilitator of urban regeneration in places such as London's Docklands, La Part Dieu in Lyon and Ørestad in Copenhagen (Book et al, 2010; Eddington, 2006b; Knowles, 2012; Thompson, 1995; Vickerman, 1997).

The 'new economic geography' (NEG), most closely associated with the work of economist Paul Krugman, seeks to explain the existence of agglomeration advantages and regional disparities, often taking a core-periphery form, within the system of economic equilibrium. One key assumption of the NEG is the 'iceberg' formulation of transport costs (Krugman, 1991), which states that a part of a good on its way from producer to consumer 'melts away' during transportation. This iceberg model is a mere analytical device, which clearly cannot be observed in reality, but which acts as a convenient way of accounting for the friction of distance whilst maintaining the overall properties of economic equilibrium. A key conclusion of the NEG is that reduced transport costs favour a concentration of manufacturing in a small number of centres rather than a more even dispersal across the economic landscape. This supports the earlier findings of the spatial polarisation theorists (e.g. Perroux), as economies of scale and scope, together with market-size effect, ensure that major agglomerations and growth poles gain certain competitive advantages over other locations. At the same time, countervailing forces such as immobile factors of production like land and labour and high rents and wages in central locations set limits on agglomeration and can, under certain conditions, encourage dispersal. Contrary to conventional assumptions regarding the benefits of transport improvements for peripheral regions, the NEG has shown that better and cheaper transport will promote the further concentration of economic activity in favoured locations (Eckey and Kosfeld, 2004): this is the 'two-way street effect, so-called because the construction of a new (or improved) transport route can just as easily suck economic activity into the dominant centre as it can help disperse it.

Critical Theory

As the influence of locational modelling and modernisation theory in human geography waned in the 1970s and 1980s, Marxian political economy became

increasingly prominent. Whilst most of this work neglected the role of transport, Harvey (1982) built on Marx's resonant phrase about transport leading to the 'annihilation of space by time', relating this process to an underlying contradiction between the geographical fixity and motion of capital. Fixity of capital in one place for a sustained period – creating a built environment of factories, offices, houses, transport infrastructures and communication networks – is crucial in enabling production to take place. As economic conditions change, however, these infrastructures can themselves become a barrier to further expansion, growing increasingly obsolete in the face of more attractive investment opportunities elsewhere. In these circumstances, capital is likely to abandon existing centres of production and establish a new 'spatial fix' involving investment in different regions. The deindustrialisation of many established centres of production in the 'rustbelts' of North America and Western Europe since the late 1970s and the growth of new industry in 'sunbelt' regions and the newly-industrialising countries of East Asia can be understood in this light. Thus, while transport networks enable capital to 'annihilate space by time', linking distant sites of production, extraction and consumption, this can only be achieved through the production of fixed and immobile infrastructures which subsequently become vulnerable to devaluation as economic conditions change and other locations present more profitable opportunities for investment (Harvey, 1982, p.379-380).

A key development in human geography and the social sciences from the early 1990s was the cultural 'turn', which emphasises the importance of beliefs, identities and values in shaping social action and behaviour. From a transport perspective, the cultural turn suggests a focus on transport users, examining how their attitudes, identities and values shape transport behaviour, something that has been neglected by the dominant perspectives derived from economics and engineering. One of the key legacies of the cultural 'turn' for transport studies is the increased interest in

travel across the social sciences, giving rise to 'the new mobilities paradigm', based on the notion that heightened mobility has become a defining characteristic of contemporary life (Sheller and Urry, 2006). Whilst 'the new mobilities paradigm' certainly defines a new interdisciplinary research agenda around questions of movement and transport, its exaggerated emphasis on the novelty of mobility risks a blindness to continuities between the past and present, whilst its rather one-sided celebration of the experiences of movement and of fluidity may be better recast in terms of the complex relationships between mobility and fixity, or 'flows' and 'places' (Harvey, 1982; cf. Castells, 1989).

Transport and Spatial Development in Developed Countries

Production Systems and Transport Networks

Industrialisation during the nineteenth and early twentieth centuries gave rise to a distinct pattern of regional sectoral specialisation, involving certain regions becoming specialised in particular industrial sectors. Characteristically, all the main stages of production from resource extraction to final manufacture were carried out within the same region. As indicated by the new economic geography, new transport networks, based on canal systems and particularly railways, were important in facilitating increased concentration and specialisation, liberating factories from dependence on local resources and enabling them to serve larger markets. In shipbuilding, for instance, North East England and West Central Scotland accounted for 94 per cent of the sector's employment in Britain in 1911 (Slaven, 1986, p.133). Similarly, the completion of a continental transport network based on railroads facilitated the growing concentration of industry in the US manufacturing belt in the North East and Mid West, resulting in the increased specialisation of individual cities (Lakshmanan, 2010).

The development of many industrial centres was linked to their position in relation to major transport networks, reflecting the wider tendency for important trading settlements to be located at highly accessible points such as the confluence of rivers, break-of-bulk points along coastlines, the end or mid-point of a rail line, or at the foot of mountain passes. In this way, some major towns owe their very existence to a so-called 'transport function'. The city of Chicago, for instance, owed its explosive growth from the 1840s to its role as the major transportation hub where the Western and Eastern-orientated railroad lines and Great Lake shipping routes converged (Cronon, 1991). This enabled it to become a key agricultural market and processing centre, linking the resources of the vast American interior to the markets of the East coast and Europe. Grain, lumber and meat were channelled, processed and exported through Chicago and the city also operated as the key centre for the distribution of manufactured goods throughout the interior (ibid).

The pattern of regional sectoral specialisation began to break down from the 1920s, replaced by a new Fordist system involving the mass production of consumer durables. The growth of Fordism was closely associated with the emergence of new transport technologies based on the private car and investment in road networks. This facilitated mass consumption, by providing a market for industries such as automobiles and electronics and encouraging an increased spatial separation between home and work through the growth of suburbs, particularly in North America (Walker, 1981). Suburban lifestyles become closely associated with mass consumption, with every household requiring its car, washing machine and lawnmower (Goss, 2005).

By the late 1960s, a new phase of 'neo-Fordism' was apparent as mass production technologies became increasingly routine and standardised. This created a new 'spatial division of labour' as different parts of the production process were carried

out in different regions, reflecting underlying geographical variations in the cost and qualities of labour (Massey, 1984). Companies were concentrating headquarters and research and development functions in core regions where there are large pools of highly educated and skilled workers, whilst routine assembly and production was located increasingly in peripheral regions and places where costs (especially wage rates) are lowest. This dispersal of routine production has also occurred on an international scale through the 'new international division of labour' as Multi-National Corporations (MNCs) based in Western countries have shifted assembly and processing operations to developing countries (Froebel et al., 1980).

International divisions of labour have become increasingly complex and intricate since the 1980s, involving an increased number of actors in different industries. In the semi-conductor industry, for example, Research and Development functions might be based in Silicon Valley in California, skilled production carried out in the Central Belt of Scotland (the so-called 'Silicon Glen'), assembly and testing in the likes of Hong Kong and Singapore and routine assembly in low-cost locations in the Philippines, Malaysia and Indonesia (Knox et al., 2003, p.235-6). Such arrangements are predicated on the existence of advanced transport networks that allow materials to be easily and rapidly moved between factories, although this is rarely considered in accounts of globalisation (Hall et al., 2006). These logistics chains require a large number of intermediate inputs and materials (as well as raw materials and finished goods) to be transported over long distances within global production networks, often controlled by large MNCs.

The increased globalisation of production systems over time has been facilitated by successive revolutions in transport and communications technologies (Leyshon, 1995). The concept of time-space convergence emphasises how "places approach each other in time-space" "as a result of transport innovation[s]" that reduce the

travel time between them (Janelle. 1969: 357). It takes just over one hour to travel between London and Edinburgh by jet aircraft today, for example, compared to eight hours by train in the late nineteenth century and four (highly uncomfortable) days by stage-coach in 1776. The associated concept of time-space compression (Harvey, 1989) emphasises how the development of new technologies has dramatically reduced transport and communication costs, resulting in the 'annihilation of space by time' (Figure 2.4). As Knowles (2006) reminds us, the process of time-space convergence is socially and spatially uneven, occurring primarily between key nodes within the world economy and benefiting wealthy groups such as global business executives and middle-class tourists rather than low-income people. In many respects, the 'shrinking' of space between key centres such as the world cities of London, Paris, New York and Tokyo coincides with a 'widening of space' between economically marginal locations such as sub-Saharan Africa, much of Latin America and the former Soviet Union (Leyshon, 1995).

Since the 1980s, the parallel processes of globalisation and localisation have encouraged the rise of a 'new regionalism' in economic geography. This emphasises the increased importance of regions as economic units within a globalised economy, compared to the post-war model of integrated national economies (Storper, 1997). In particular, the success of dynamic growth regions such as the City of London (financial and business services), Silicon Valley (advanced electronics), Southern Germany (vehicles and electronics) and North Eastern Italy (machine tools, textiles) is rooted in the specialised production systems that have flourished there. The new regionalism examines the effects of internal factors and conditions within regions – for example, skills, rates of knowledge transfer and innovation, entrepreneurship and institutions – in helping to promote or hinder economic growth (ibid). Transport systems play an important role in facilitating economic growth within such regions, not least in terms of enabling rapid movement of materials between suppliers and

manufacturers or service providers, according to the dictates of 'just in time' systems. In addition, the devolution of political power from the national level means that regional authorities have gained direct control over transport investment, allowing this to be linked more directly to regional economic needs.

In some cases, high-technology clusters have grown along particular transport arteries with examples including 'Route 128' near Boston and the 'M4 corridor' in Southern England. Good road links allow the rapid supply of both components to manufacturers and service providers and finished products to customers as required, reducing inventory costs. The locational pattern of inward investment is strongly influenced by transport networks with Japanese investment in the automobile industry in the American Mid-West concentrated along the I75 and I65 corridors (Figure 2.5), known as 'kanban' or 'just in time' highways (Hoyle and Smith, 1998, p.35). The distinctive pattern of clustering along the major highways can be explained for the need for close contact and collaboration between manufacturers and suppliers, granting them the flexibility to serve an increasingly diverse and fragmented market by producing a range of niche products, necessitating the rapid supply of particular types and volumes of materials as required.

The Spatial Effects of Transport Investment

It is generally accepted that improved transport systems are beneficial from a national economic perspective: better roads mean faster transport, better exchange of goods and services, the utilisation of comparative cost advantages and thus the enhancement of a highly specialised economy. On the whole – without regarding the external costs of transport – a national economy will benefit from a good transport system. Far more ambiguous, however, are the incremental economic effects of the further provision of transport infrastructure in developed societies, which tend to already have high-capacity transport networks. In general, research suggests that

the scope for substantial impacts on the economy is relatively limited in such cases, compared to earlier stages of development (Banister and Berechman, 2001, p.217; Eddington, 2006b, p.13). This reflects the diminishing benefits of transport investment in developed countries (Box 1). The tendency for additional transport investment to simply induce additional traffic by encouraging people to use their vehicles more is also well understood (Standing Committee on Trunk Road Assessment (SACTRA), 1994).

Box 1. The diminishing impact of transport infrastructure improvement on regional development.

In highly developed countries new transport infrastructure tends to have a diminishing impact on regional development as the economy matures. Reasons for this tendency are:

1. Regional accessibility is already high

In general, industrialised nations already have a well developed transport network, meaning that the level of accessibility is high. Therefore further improvements of the transport infrastructure will result in only minor reductions in travel time and will not open up new areas or markets.

2. Transport costs become less important

Due to economic changes such as the shift towards services, the relative importance of transport-intensive sectors is decreasing. In contrast to traditional activities such as manufacturing or mining, the growing service sector or the so-called 'new economy' does not rely as much on effective transport systems. Thus, transport costs become less important as a location factor, although the quality and efficiency of transport networks may become more important in line with shift to just -in-time production systems, for instance.

3. Proximity is better than speed

Geographical proximity to major economic centres and clusters as a precondition of economic growth can not be fully substituted by new transport facilities – thus peripheral regions tend to remain remote and do not substantially gain from improved accessibility. Indeed, in some cases, further transport improvements may result in externally-located firms penetrating local markets more effectively and in local residents spending more of their income externally.

4. Disparities may be deepened

Finally, an improvement in the connection of peripheral regions with central regions always works in both directions. According to the New Economic Geography, due to agglomeration effects – the advantages derived from the spatial concentration of large number of firms, suppliers, workers and consumers – central regions benefit most from such an improvement whereas peripheral regions are likely to be drained with regard to purchasing power or skilled labour. In particular, transport improvements may facilitate increased migration from peripheral to core regions.

Focusing on the secondary effects of transport investment, statistical analyses have indicated that a 1 per cent increase in public investment can generate an increase in GDP of around 0.2 per cent, although such conclusions are subject to a host of important qualifications (Eddington, 2006b, p.9-10). For instance, they do not disentangle transport from public investment more broadly or factor in the wider economic, social and environmental impacts of transport. Most importantly, the ambiguity about cause and effect remains unresolved by such research: do transport improvements generate economic growth or vice versa? As such, the difficulties of establishing any significant correlation between transport investment and regional growth have become increasingly apparent (SACTRA, 1999). In the 1980s in West

Germany, a study found the long-standing assumption that the construction of national roads fostered spatial integration and economic development – upon which a key strand of transport policy had been based – to be untenable (Lutter, 1980). Positive regional economic development was discovered to be discernible only where peripheral, rural labour markets achieved improved internal accessibility and became larger and more independent from core regions due to tangential routing. A further development of radial long-distance road connections, linking large cities and clusters, tends only to intensify the draining effect in rural areas, enabling consumers, for instance, to spend more of their income outside the region (ibid).

In a review of surveys on transport infrastructure and regional economic development in Europe, Linneker (1997) distinguishes between the spheres of consumption and production. Improved accessibility relating to consumption definitely leads to an improvement in welfare for the population, with increased competition resulting in lower prices. For the sphere of production, however, after making allowances for regional disparities, the question remains open, allowing very different answers to be put forward. Here, recent academic discussion has perhaps become too dependent on analyses of large-scale infrastructural projects in growth regions, particularly the impact of the M25 in Greater London and the Channel Tunnel (Vickerman, 1991). Reflecting the essentially enabling role of transport, Linneker (1997, p.60) concludes that “Whether further development towards higher or lower levels of economic development potential are realised ... is determined by a large number of other factors outside the transport sector.”

This point is developed by Banister and Berechman (2001) who identify a series of necessary conditions that must be in place for transport investment to stimulate regional economic development in developed countries. The three key conditions are (a) positive economic externalities, basically meaning a well functioning local

economy, particularly in terms of the links between firms and suppliers and the operation of the labour market; (b) investment factors referring to the availability of funds, the quality of the overall network and the timing of the investment; and (c) a favourable political environment, in terms of other supporting policies and a generally enabling policy framework. All three factors must in place for transport investment to have a positive impact on the regional economy (Figure 2.6). If only one or two of these factors are present at the time of investment, certain effects such as an improvement of accessibility may occur – but no regional growth.

Rather than building new infrastructure to stimulate economic growth, one of the major transport issues requiring attention in developed countries is the reliability of transport networks, (Eddington, 2006a, p.13). This represents the other side of the transport-economic development relationship in terms of the impact of rapid growth on infrastructure, creating problems when networks are unable to cope with increased demand, causing bottlenecks and congestion around key nodes and centres. These problems can constrain economic growth if left unchecked, impeding the movement of goods, information and labour and making an area less attractive to investors. Increased tendencies towards the geographical agglomeration or concentration of production in distinct clusters, coupled with the move to just-in-time supply systems, have compounded this problem.

As a result, enhancing the capacity and efficiency of transport networks through demand management measures has become a key preoccupation for policy-makers. Foremost among these is congestion charging, where the authorities charge users to travel on the roads within a particular area, allowing the funds to be spent on related measures such as public transport improvements. In the UK, for instance, the Eddington Report, commissioned by the Treasury and Department for Transport, recommended that policy should concentrate on enhancing reliability and efficiency.

It identified three strategic priorities for action: congested and growing urban areas, key inter-city corridors and major international gateways such as the leading ports and airports (Eddington, 2006a, p.7), rejecting the notion that the construction of large-scale new infrastructure is required. Congestion charging should form part of a suite of measures utilised to make better use of existing infrastructure and induce intelligent solutions for a sustainable transportation in line with market requirements (Deloitte Research 2003). The political difficulties of introducing such an ostensibly unpopular measure in a country when unrestricted private car travel has come to be regarded as a basic right remain substantial, however. The introduction of congestion charging in Central London by the former mayor, Ken Livingstone, remains exceptional within the UK, following its rejection or abandonment in Edinburgh, Manchester, the West Midlands and the East Midlands, while national government has shied away from road pricing since a 2007 Government petition which attached over 1.8 million signatures from opponents.

Fundamentals of the urban transport debate

The remainder of the chapter reviews the contemporary debate on the contribution of transport to urban economic development, since it is in cities, especially since the agenda of 'urban competitiveness' became widespread in the 1990s, where the debate about the role and value of transport in economic development has been most vibrant. This is in large part because as globalization has developed, there has been an increasing realization that transport is a critical determinant of both the performance of the urban economy, and the attractiveness of the city as a place to live, work and consume.

Transport and the production of cities

It is difficult to understate the extent to which transport has determined the shape of today's cities: look out of the window in any city in the world and what you will see if

determined by the transport technologies available to the generation developing the city at any point in time. The links between transport and urban economic development, made most visible by settlement structure and the form of the built environment, reach far into the deepest layers of the urban economic, environmental and social systems, and can be usefully explored by applying the classic analytical dichotomy on the *raison d'être* of the city: it is both a *space* of production and exchange – that is the territory across which economic systems extend – and also a *place* of complex social interaction and cultural development (Hanson and Giuliano, 2004).

Focus on one or other of these perspectives has traditionally implied a quite different set of objectives and priorities for the development and management of the urban transport system. For much of the twentieth century, increasing the supply of physical mobility, first by the 'tracked' modes of the tram and railway but later and more profoundly by the revolution brought about by the mass adoption of the private car, was seen as a critical determinant of economic development potential. For several decades, the transport policy task of the state in most developed countries around the world was therefore defined as that of providing as much physical mobility as possible in the urban system so that industrial production, manufacturing and later the service sector could function as efficiently as possible through 'the compression of time-space' noted above (see also Glaeser, 2004, Laird et al, 2005).

In the contemporary urban economy, which for most developed world cities is substantially based on tertiary sector activity, these macro-policy concerns are translated into investment priorities aimed at maximizing the capacity of urban road and rail networks, often through quite large investments such as the development of extensive metro or light rail networks, and/or urban expressways. The choice of particular modes notwithstanding, the policy objective of such investments is to

supply sufficient mobility so that key functional markets, such as the housing and labour markets, operate as efficiently as possible (Krugman, 1991; 2011) since, in the simplest terms, transport “links people to jobs; delivers products to markets; underpins supply chains and logistics networks; and is the lifeblood of domestic and international trade” (Eddington, 2006a: 11). Thus, if a major inward investor setting up business in a new city location can draw on the wider possible labour pool in order to maximize the skills base of its operation due to the enhancement of the transport network, then this should lead to positive economic returns.

Equally, the perceived importance of mitigating key transport ‘problems’ of under-supply of mobility, such as traffic congestion – the cost of which in terms of the lost productivity caused by people and goods being delayed in transit runs to a significant proportion of Gross Domestic Product if orthodox transport economics is to be believed – is such that many of the most politically bold transport policies of recent years have been based on attempting to more accurately price the value of the time spent travelling so that people and firms restructure their economic decisions accordingly. The introduction of congestion charging in London in an attempt to minimize delays and improve the capacity of the road network is one important example of this approach in practice: its superficial rationale, to encourage the diversion of car trips to other modes, is only part of its strategic intent: the charge was also designed to improve travel conditions for the high value businesses and wealthy commuters in central London prepared to pay significant sums to escape the delays caused by traffic congestion, but also to encourage low value economic activities to move out of central London altogether.

The alternative normative view of the purpose of urban transport, that is to facilitate the city’s role as the crucible of social and cultural creativity, has an equal pedigree, much of it emerging from Jane Jacobs’ (1961) seminal book *Death and Life of Great*

American Cities. Although not ostensibly a transport text, *Death and Life* did powerfully and succinctly explain how a vicious circle of socio-economic decline could emerge if long-developed local systems and structures were disrupted by radical shifts in transport provision. Jacobs was, of course, writing about some of the negative impacts of the rise to dominance of the private car in meeting our mobility demands, specifically how the loss of pedestrian activity in local neighbourhoods can undermine the local economy, community interaction, social networks and public life more generally (see also Hass-Klau, 1993; Logan and Molotch, 2007). But it was not until decades later, when the problems caused by the degradation of the natural and human environment due to unrestricted growth in the use of the car had entered the political mainstream, that transport development was formally re-articulated towards wider policy objectives such as contribution to the economic diversity, cultural and social inclusivity of the city (Haywood and Hebbert, 2008; Shaftoe, 2008).

Urban Competitiveness

The emergence of a substantial literature addressing the seemingly simple – but in fact fiendishly complex – question of what factors make some urban economies perform better than others in the early 1990s led to the development of a new economic development policy paradigm based on the notion of ‘urban competitiveness’. At its most straightforward, the concept of urban competitiveness attempts to distil a range of theoretical developments in the New Economic Geography and elsewhere to the core proposition that maximising the scale and quality of several complementary urban ‘asset sets’ – in most of which transport is a critical component – is the key to growth and prosperity (Begg et al 2002; Lever, 1999). These ‘asset sets’ are the bundles of ‘physical’, ‘human’ and ‘soft’ resources ranging from land and property, critical infrastructures such as ports, airports and the energy supply grid, to the skills base, the legal, fiscal and regulatory environment, and quality of life factors such as the vibrancy of the creative industries.

The attractiveness of the competitiveness paradigm to many policy makers was that it rather elegantly brought together the two notions of the role of transport outlined above, which had often been in apparent conflict with one another in a practical policy sense (see Cahill, 2010). This is because, on the one hand, to improve competitiveness, transport had to operate as both a device to achieve greater direct economic returns through improving market efficiency, but it also had to minimize the negative externalities of this mobility (pollution, noise, severance and so on) so as to play a positive role in generating sufficient 'quality of place' so that inward investors, visitors and especially the highly mobile knowledge workers on which high value, innovative sectors of the economy depend, would choose to locate in the city (Banister and Berechman, 2000; Kaufman et al, 2008; Lawless & Gore, 1999; Porter and Ketels, 2004).

The emergence of the competitiveness paradigm at the time when the negative impacts of car dependence were becoming a political hot topic, just as the economy emerged from the early 1990s recession and so more resources became available for public investment in new infrastructure, combined in many cities to produce a new policy approach based on the significant expansion of high capacity public transport networks. With more resources at their disposal, and the (probably self-fulfilling) belief that the race to secure economic competitiveness was gathering pace, cities around the world embarked on ambitious development projects such as new light rail (e.g. San Diego, Manchester, Strasbourg) or full underground metros (e.g. Copenhagen, Warsaw, Taipei). At the same time, the importance of quality of life ideas for the rhetoric of city competitiveness focused new attention on the consumer experience of travelling around the city, and so considerable efforts were made to achieve the so-called 'seamless journey' through better physical integration between modes (i.e. through the construction of better bus/rail interchanges), through the

applications of new technology to innovations such as smart ticketing, and between transport and other areas of public policy such as planning and the improvement of the public realm (Hull 2005; Williams, 2005) and public health (Lopez and Hynes, 2006; Ming Wen and Rissel, 2008). Such increasing complexity in the task of improving transport infrastructure and services for economic gain reflects the “changing connections and inter–relations between social, political and cultural factors” (Painter, 1995: 276), which in turn often require more complex and flexible systems of governance if policy implementation is to be effective. At the city scale, those places that have most successfully transformed their transport systems in line with the model of the seamless journey and thus offer a mobility system that genuinely improves quality of life tend to have powerful special-purpose institutions and networks of transport governance (Marsden and May, 2006), plus strong political leaders able to mobilise their mandates to introduce important innovations such as congestion charging and/or re-invigorating the urban realm: the radical greening and road space reduction of key radial roads in Paris (since copied in New York), and London’s globally-significant Congestion Charge scheme perhaps the best examples.

What economic development role for transport in future?

Writing in the second half of 2012, the future for urban transport looks highly uncertain for many cities around the globe. In those countries most immediately and profoundly hit by the financial crisis, shortage of funds has led to the cancellation of many planned development projects, with additional financial difficulties apparent for existing networks given the fall-off in demand. In other places, however, the desire to keep the economy going through Keynesian intervention has been very good for transport, at least in the short term. although the oft-heard government mantra that transport investment is automatically good for the economy in terms of increasing growth is not especially well served by the evidence, as we have seen above.

Over the medium term, as the policy imperative moves from providing stimulus and avoiding unemployment to the – in some cases herculean – task of reducing debt levels and ongoing public expenditure requirements, the extent to which transport investment will be prioritised is uncertain. Given their capital intensity, transport projects can be easy political targets for cancellation at moments of economic crisis just as easily as they can be brought forward to try and stimulate growth. There is also uncertainty on the revenue side: although some public transport services are at risk as demand falls for commuting and leisure travel, others are benefiting from the combination of recession and continued high oil prices, with some early evidence that this is prompting some households to reduce their driving, and even their number of cars (Goodwin, 2011).

The nightmare scenario for many cities is that if the economy continues to shrink significantly, then both fares income to public transport operators, plus the overall tax revenues available to finance the public support needed to cover the costs of transport service subsidy, fall. Faced with such a revenue squeeze, a vicious circle can be created in which public transport declines, making it harder for newly unemployed people (who often do not have access to a car) to find alternative jobs, further depressing economy recovery. Over time, spatial differentiation effects (re)assert themselves, with public transport in more disadvantaged areas becoming (increasingly) residualised as private operators can no longer afford to operate services commercially and the state is increasingly unable to intervene given the general financial pressures upon it. The end result is the kind of impact on socio-economic disadvantage across space and between places that Jane Jacobs wrote about more than half a century ago.

In the longer term, the key policy question is how the imperative to reduce carbon emissions, plus other strategic uncertainties, such as the price of oil, security of energy supply and the development of new energy technologies, will impact on transport and its role in promoting economic development. At present, this debate is dominated by arguments over which of the alternative pathways to meet governments' targets for carbon reduction might most be most successful (see, for example, Anable and Shaw, 2007). The implications for transport and its development contribution are important: many environment-led policy prescriptions envisage some really quite swift and sharp reductions in the amount of mobility we consume, which whilst perhaps entirely laudable and justifiable in environmental (and social) terms, would nonetheless probably generate some difficult economic dislocations in the short to medium term given the extent which current patterns (and costs) of mobility are built into important socio-economic practices such as logistics chains, commuting and household location choices.

Beyond this, the critical debate is about how the transport – economic development relationship will play out over the decades to come. Central here is the rhetorical (and normative) battle between proponents of 'conventional' notions of economic development and growth, which firmly places climate change and decarbonisation of transport as a challenge for technological development to overcome in order to stimulate the next wave of technical innovation, versus those who see the scale of the environmental crisis as a compelling reason to pose more fundamental questions about how society organises itself, and hence how transport facilitates socio-economic interaction. For those who might be termed the 'technologists', the so-called 'greening' of the car, i.e. the widespread adoption of electric vehicles, is the critical innovation process, since it will (arguably) 'solve' many of the environmental problems of the contemporary car-based "mobility regime" (Geels et al, 2011). But for the opposing 'deep green' camp, the prospect of the wholesale substitution of the

internal combustion engine for the electric motor offers little more than a dystopia of green congestion, in which the economic and social problems of highly polarised mobility and deeply unequal access to employment, educational and other opportunities are further entrenched.

Rather than 'just' greening the car therefore, many voices on the environmentalist side see the coming together of the climate change challenge with the great recession as an unparalleled opportunity to achieve a large-scale reorganisation of the transport system, so that a new model of socio-economic development fundamentally less reliant on physical mobility is achieved. But to manage such a transition would require the re-engineering of most of the contemporary economy, requiring firms and individuals to alter their established patterns of activity in the most profound manner. Whether this is actually possible in democratic societies is not at all certain: politicians (probably rightly) shy away from implementing genuinely radical policies in all but the moments of the most grave crises, judging that the impacts of such actions on people's lifestyles and (perceptions of) individual liberty as incompatible with the notion of a free society.

Although all of the above might suggest that transport's status as a 'wicked problem' is well deserved, the importance of quality of life to the urban competitiveness paradigm means that there are also substantial incentives to achieve this kind of change. The level of resources available for the largest public transport projects might turn out to be more limited in many cities in future than before. Many of the classic 'alternative' transport policies that emerged following the 'environmental turn' in the early 1990s in fact owed their existence to recession and lack of investment resources. But the prescription that motorised mobility and vehicles should be prioritised less, and 'active travel' and people on the move prioritised more, remains a compelling proposition. If the notion of 'peak car' – for whatever reason, be it

climate change, oil prices or the technological revolution that means people would rather spend their time interacting with their smartphone than their automobile – turns out to be correct, then those cities that focus most on the ease of getting around without a car could turn out to be the winners in the decades to come.

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