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Transport and social exclusion in London

A. Church[a,*], M. Frost[b], K. Sullivan[c]

[a]*Division of Geography, University of Brighton, Lewes Road, Brighton BN2 4GJ, UK*
[b]*School of Geography, Birkbeck College, 7-15 Gresse Street, London W1P 2LL, UK*
[c]*London Transport Planning, Windsor House, Victoria Street, London SW1H 0NW, UK*

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Abstract

Few studies explicitly link transport and social exclusion and yet there is increasing pressure from policy-makers in the UK to do so. We propose a conceptual framework which links the two and examine a selection of indicators which might be used in assessing the outcomes of policies designed to use increased mobility to reduce exclusion. An illustrative example of the use of London Transport's CAPITAL model is demonstrated to assess access to regeneration sites. We conclude that increasing access to activities and services requires combating individuals' constraints at either end of their journey in addition to transport system improvements. © 2000 Published by Elsevier Science Ltd.

1. Introduction and outline of study

The 1998 UK White Paper on Transport states that the Government's goal of providing integrated transport includes, amongst other things, 'integration with our policies for education, health and wealth creation — so that transport helps to make a fairer more inclusive society' Department of Environment, Transport and the Regions, 1998a, p. 9). This is indicative of a governmental concern with the relationship between social exclusion and mobility. However, for the UK at least, this is a relatively new direction in transport policy, and knowledge is limited as to how this integration can be achieved in practice. The growth of social exclusion policy initiatives (Social Exclusion Unit, 1998) has been accompanied by a growing research literature from policy-oriented think tanks (Oppenheim, 1998) and academic organisations (Atkinson and Hills, 1998). Most of these broader research studies are concerned with identifying the causes and nature of social exclusion and address issues such as labour and housing markets and income inequality. Transport is rarely addressed as a central issue.

To date, research on the relations between transport and exclusion in the UK has broadly tended to fall into one of two approaches, which we have termed the 'category approach' and the 'spatial approach'. The category approach focuses on the travel patterns, attitudes and needs of particular social groups, who are perceived to be disadvantaged in relation to the transport system, for example, women (Turner and Grieco, 2000), people without paid employment (Meadows et al., 1988), or older people (Askham and Warnes, 1992). This approach has a number of limitations however. Firstly, particular social groups may not be homogenous in terms of their material affluence, or activity patterns, which will affect transport needs and accessibility preferences. Secondly, the reasons why individuals may be disadvantaged in relation to transport are often multi-dimensional whereas this approach often encourages a focus on a particular dimension of the problem, such as age, which may not fully acknowledge the interaction with other social and economic factors. Thirdly, these studies rarely consider detailed geographical factors, such as the relations between residential location, where the activities that they want to participate in are located, and their need and ability to move between the two.

Where research has been carried out into the spatial dimensions of transport and social exclusion in the United Kingdom it has tended to be concerned with the accessibility problems of people living in rural areas (Nutley and Thomas, 1995), or urban housing estates (Grieco, 1994), particularly the problems caused by poor public transport access to and from these areas. Indeed, the Department of the Environment Transport and the Regions' (DETR) major study during 1999–2000 on social exclusion and transport was concentrated on sixteen of the New Deal for Communities policy areas, which are relatively small sub-areas

* Corresponding author. Tel.: +44-1273-642374; fax: +44-1273-642285.

E-mail address: a.church@bton.ac.uk (A. Church).

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within local authority districts, often based around single estates. These studies do little to provide a wider understanding of the potential strategic role of transport authorities and operators in tackling social exclusion in major cities. This is particularly true in London, with its unique and complex morphology, socio-economic character, mix of housing tenure, and its relatively dense public transport network. There have been studies of travel behaviour in London (London Research Centre and Department of Transport, 1994) and in other large cities often facilitated by the growth of Geographical Information Systems and related accessibility packages. Nevertheless, understanding the complex spatial relations between transport and social exclusion in London requires an analysis that goes well beyond an examination of accessibility patterns or localised case studies of transport issues. For London as a whole there have been no attempts either to measure spatially the connections between social exclusion and transport, or to identify and categorise the factors that may limit accessibility.

A research literature that seeks to link up the 'category' and 'spatial' approach is concerned with the skill/spatial mismatch in urban areas in the USA which has analysed the effect of distance from suburban labour markets, especially on youth and non-white workers (Ihlanfeldt, 1993; Preston et al., 1998). Fieldhouse and Gould (1998) have also noted that in the UK context spatial accessibility factors may influence the local labour market performance of certain ethnic minority workers. Nevertheless, the American urban structure is rather different to that of the UK due to the nature of the public transport provision, labour market regulation, the suburbanisation of employment and the residential patterns of different ethnic groups (Kwan 1999). London, however, may also be distinct within the UK urban system due to its size, urban structure and ethnic mix.

The differences and connections between the 'category' and 'spatial' approaches are not simply theoretical issues. They lie at the heart of questions over how transport resources are used to tackle social exclusion and to what extent resources should be allocated to benefit particular social groups, or to specific geographical areas. Currently, national level labour market policies have targeted the transport barriers to work for particular labour market groups. For example, in May 2000 the government announced it was extending the Travel to Interview Scheme to allow unemployed people on the New Deal programme to travel more easily to job interviews and pre-job training (Department for Education and Employment, 2000). Alongside this category approach that affects all of a particular social group throughout London, there are also a number of initiatives designed to increase accessibility in areas where this is a high concentration of socially excluded households. These include Single Regeneration Budget schemes, such as the Peckham Partnership, which has as one of its key aims the improvement of bus links between deprived estates and underground stations.

Policies for social exclusion and transport in London are always likely to combine category and spatial approaches but in a situation of limited resources there are significant decisions to be made as to which categories of individuals and which spatial locations should be the targets of policy. London Transport has an on-going research programme to investigate the travel needs of particular sectors of society, for example, women, mobility impaired people, and young people, and of course, wider market research studies are segmented to understand variations in attitudes and behaviour between different social groups. Until recently, however, London Transport had not undertaken any specific research to understand the travel needs of people living in areas with high levels of poverty and social exclusion, and in particular the level of accessibility that is provided by existing public transport services to and within these areas. It was therefore decided to commission a two-stage study.

The first stage which has been completed (Church and Frost, 1999) included a review of current practice and research, the development of a conceptual framework for understanding the interaction between transport and social exclusion, and the identification of indicators that have been used to assess the effectiveness of transport policy options in combating social exclusion. This research is summarised later in the paper. The conceptual framework developed in the first stage is now being used to guide a second stage of empirical analysis. Stage two is designed to obtain a clearer understanding of the factors other than poor public transport accessibility that may constrain the mobility of people living in these areas, and the importance of improved public transport access in tackling poverty and social exclusion relative to other policy measures. A key element of this second stage of analysis will be the use London Transport's accessibility calculator CAPITAL to examine accessibility between locations in London experiencing high levels of social exclusion and the key activities that people living in these areas may wish to access. Some initial results from this on-going second stage are presented in this paper. Before going on to describe the study in greater detail, the next section of this paper provides a brief discussion of some of the problems in defining and measuring social exclusion, and the importance of these problems to transport researchers and policy makers.

2. Defining and measuring social exclusion in London

There is no single agreed definition of the terms 'social exclusion' and 'poverty' in the London context, and these terms are often used interchangeably. This lack of consistency is often reflected in the way in which poverty and social exclusion are measured. In his recent study for the London Research Centre, Folwell (1999, p.12) goes so far as to argue that "some of the most often used measures of deprivation are guilty of this to such an extent that it is no longer clear what they are measuring, or if they are measuring anything at all useful".

To avoid this situation, it is important to distinguish between the term 'poverty' which implies an absolute or relative access to material welfare, and social exclusion, a broader concept which usually implies that some people or households are not just poor, but that they have additionally lost the ability to both literally and metaphorically connect with many of the jobs, services, and facilities that they need to participate fully in society. A number of discussions of social exclusion have stressed that individuals do not usually find themselves in this situation by choice. Burchardt et al. (1999, p. 227) emphasise this point in their use of one particular definition of social exclusion, "a British individual is socially excluded if: (a) he/she is geographically resident in the UK but (b) for reasons beyond his or her control, he/she cannot participate in the normal activities of UK citizens; and (c) he/she would like to so participate". Thus, for Burchardt et al. (1999) tackling exclusion requires promoting citizenship and enabling individuals to have access to public policy making arenas. From this perspective tackling the transport dimension of social exclusion would also involve ensuring appropriate levels of public consultation and involvement in transport policy arenas. Social exclusion is also a dynamic state and individuals can regularly move in and out of this situation (Atkinson and Hills, 1998). The detachment that typifies social exclusion is often part of a reinforcing process that makes people poorer and diminishes their chances of ever reversing the spiral of decreasing participation in 'main stream' society.

Estimates by the London Research Centre (1996) indicate that (depending upon which measure is used) between 1.7 and 2.2 million Londoners live in poverty or on the margins of poverty, and this represent between 1 in 3 and 1 in 4 Londoners. Measures of material welfare such as car ownership, or household expenditure have been used to examine the link between poverty and mobility (see, for example Howarth et al., 1998). However, within the London context at least, we would argue that for three main reasons the relationship between material affluence and mobility is not always a simple one. First, expenditure on travel is not always a reliable indicator of how much mobility is being 'bought'. A person living in Central London with its dense and diverse land use patterns can probably carry out his or her daily travel activities for a lower monetary cost than someone living in Outer London where development densities are much lower and services and facilities more scattered. Second, expenditure on travel is also dependent upon the age structure of the groups considered. Older people or very young people may show a lower propensity to travel for a variety of reasons that are not directly linked to absence of opportunity (Department of Environment, Transport and the Regions, 1998b). Finally, while there is clear evidence that poorer households in London are less likely to own a car, the lack of a car does not always imply that a household is poor, car ownership is relatively low in some of the wealthier parts of Central London where parking is scarce and the public transport network is very dense (Focas, 1998).

However, if measuring poverty with its focus on material concerns is complex, measuring social exclusion with its emphasis on social participation and citizenship is more so. Conventionally, the measurement of social exclusion tends to rely on indicators of multiple deprivation, for example, within the UK the most widely used measure of social exclusion is the Department of the Environment, Transport, and the Regions 'Index of Local Deprivation'.[1] For transport researchers the use of this type of indicator whilst valuable is not without its problems. These indicators tend to hide some key aspects of social and economic stress that limit social participation and citizenship, including critically lack of provision of public transport, or amongst women in particular fear of crime (Department of Environment, Transport and the Regions, 2000). The indicators do not normally incorporate measures of the mobility or travel behaviour of residents — where such measures have been used they are generally included as proxies for something else, for example, car ownership as a proxy for poverty. Conversely, they may include dimensions of exclusion for which there is no transport-related solution, for example, poor housing conditions. Composite indicators of deprivation also tend to be based on a conceptual view of the interrelationships between the different combined individual measures. Folwell (1999), however, suggests that this can be problematic. He claims that the key dimensions of social exclusion in London are, exclusion from the labour market, exclusion from adequate housing, and age related exclusion, but argues that "none of these characteristics have anything to do with one another" (Folwell, 1999, p. 27). For example, the geographical distributions of areas of London with low levels of economic participation, high levels of older age groups, and high levels of housing stress do not always overlap. As we show later in the paper the combined used of the Index of Local Deprivation with measures of accessibility is a useful approach for examining social exclusion and transport issues but clearly interpretations of the results produced using such methods must recognise these conceptual difficulties.

A further problem in defining and measuring poverty and social exclusion is the very 'fine grained' nature of exclusion within large cities. The key policy statement defining the UK Government's position on exclusion (Social Exclusion Unit, 1998) identified individual housing estates or

[1] Until 1998 at the local authority (District) scale the current Index of Local Deprivation contains a wide range of indicators covering unemployment, income support, health, education, environment, crime and housing but none that relate directly to mobility, accessibility or the travel behaviour of residents. At the ward and enumeration district levels the range of constituent indicators is smaller and is based wholly on data available from the 1991 Census. The indicators relate to unemployment, overcrowding, lack of basic amenities, the number of children in low earning households, with an education indicator added at ward level only, but also include a measure of car ownership. This is expressed as the proportion of households with no car. The Index is currently being revived and a new index for 1999 should be available in 2000.

parts of estates based on analysis of Census data at the Enumeration District level as its key spatial scale for quantitative analysis.[2] Even this relatively small scale approach can be questioned on the basis of the internal heterogeneity of some Enumeration Districts, and the often arbitrary nature of boundaries, for example, a boundary between two Enumeration Districts may cut a large social housing estate in half. In addition, many of the indicators at this scale are based on the 1991 Population Census figures raising inevitable concerns about the degree to which economic or social change or subsequent policy efforts may have influenced local conditions.

Five key conclusions emerge from this analysis. The first is that a significant proportion of London's population experiences poverty. Secondly, links between poverty and social exclusion in London are complex, and often poorly understood. Thirdly, this complexity is reflected in the lack of a single definition and measurement of social exclusion, and it is necessary to be fully aware of which dimensions of social exclusion are included and, equally importantly, excluded from any measurement, particularly where these have a bearing on mobility issues. Our fourth conclusion is that the inter-relationship between these dimensions is not always clear. Finally, if data on poverty and exclusion is represented spatially, the unit of spatial measurement used will influence the geographical distribution that is observed, and detailed local knowledge is therefore required to interpret this data, particularly if there are concerns about its 'age'. Many of these concerns have been addressed in the recent project commissioned by the DETR to revise the Index of Local Deprivation and to produce new indicators for 1999. The proposed new Index was subject to much debate and by mid-2000 had not been finalised (Guardian, 2000). Nevertheless, the material provided during the consultation exercise on the new Index is used later in the paper to consider the implications for examining the relations between accessibility and social exclusion.

3. A conceptual framework for social exclusion and transport

Stage one of the on-going London Transport study of social exclusion and transport had two main objectives. The first was to identify and categorise the factors that may reduce or remove the ability of people living in disadvantaged areas to access key activities, and from this, to develop a conceptual framework for understanding the relationship between transport and social exclusion. The second was to review the transport-related indicators that have been used to assess the effectiveness of strategies to combat social exclusion (Church and Frost, 1999).

The concern with the spatial dimensions of transport and social exclusion led to a three-fold categorisation of the inter-related processes that determine an individual's ability to access the activities that they need to participate in mainstream society. The first set of processes were those related to the nature of time–space organisation in households, the interaction between household members and other individuals (e.g. friends and relatives) and the manner in which time–space budgets influence the ability to travel and travel choices. The second set of processes influencing individual mobility were the nature of the transport system in terms of cost, network coverage and service patterns, personal security and public space. The final set of processes related to the nature of the time–space organisation of the activities that people are seeking to access.

In essence these three sets of processes can be seen as a set of permissive or limiting structures at either end of any journey which are linked by the transport network. The extent to which these processes influence an individual's mobility will depend on both their material circumstances, their position within the household, and their personal and cultural characteristics, for example, their gender, age, ethnic origin, physical and intellectual abilities, sexuality and beliefs. Thus, these three sets of processes clearly subsume a wide range of more specific factors that determine an individual's ability to access activities that facilitate participation. Existing research literature suggests it is possible to group the more particular factors that may limit the mobility of socially excluded people into seven main categories:

3.1. Physical exclusion

Physical barriers related to the nature of the transport system and the built environment inhibit accessibility and certain groups of people are excluded from using the transport system because of physical and psychological difficulties. These physical barriers have wide ranging effects on many groups of people including small children, older people, people with impaired mobility or hearing, visually impaired people, people who don't speak English, and people with learning difficulties (Imrie, 1996).

3.2. Geographical exclusion

Whilst there have been no systematic attempts to identify a formal relationship between exclusion and inaccessibility, studies both in Britain (Campbell, 1993) and in the rest of Europe (Bartley, 1998) have cited peripherality, poor transport provision and resulting inaccessibility as factors which contribute to urban social exclusion and deprivation. It has been argued that inaccessibility may not always have negative impacts. In the case of Athens, spatial isolation has led some local communities to develop strong local informal networks that are beneficial to community cohesion (Vrychea and Golemis, 1998). Similarly, Grieco (1994) has noted that in the context of east London that more isolated communities have local labour market information

[2] An Enumeration District is the smallest spatial unit for which census of population data is available. In London, these contain (on average) around 180 households.

networks and that regeneration and new transport initiatives can open up these areas to labour market competition that is problematic for local residents. We would argue, however, that such situations are increasingly rare in London where complex economic and social conditions mean that most individuals are unlikely to be able to carry out all their activities within their immediate local area.

3.3. Exclusion from facilities

Residents in areas with high levels of social exclusion often lack access to good shopping, financial, leisure, health and education facilities because of time and income constraints in the use of transport services and the flight of some of these facilities from problem areas (Leyshon and Thrift, 1995; Countryside Agency, 2000).

Land use trends such as the growing popularity of out of centre facilities and supermarkets can make it difficult for people without a car to access these facilities. In some situations this has combined with the 'flight' of supermarkets from poorer areas to create 'food deserts' i.e. areas where local residents do not have access to cheap and nutritious food. A survey of unpopular local authority estates in the UK (Power and Tunstall, 1995) found that none had a supermarket or range of shops whilst no more than five out of a sample of twenty had a Post Office, a clinic, a launderette or a chemist.

Changes in the way in which public facilities such as hospitals, and schools provide their services, has also increased the difficulties that people may have in physically accessing these services, for example, research by Thornthwaite (1996) indicates that since the Education Act 1980 introduced greater parental choice of schools, the average distance that children travel to school, and their propensity to use motorised modes have both increased. Alterations in the way that private and public facilities are provided and organised can produce efficiencies for the service provider, and opportunities and choice for the consumer. These changes, however, can often mean that the monetary and temporal costs of travel are increased for the potential user. These costs are likely to be particularly onerous for poorer people and people without access to a car, and where costs cannot be met may result in reduced opportunity and choice. While recent Government policies to discourage out of centre development are an important means of tackling such problems, in many instances changes to the way in which public services are provided are required to ensure that they are fully 'accessible' to all their potential users.

3.4. Economic exclusion

Income and transport network constraints on accessing labour market information can limit the geographical extent of job search and on work travel patterns. It is increasingly accepted that, while many of the factors limiting the capacity of unemployed people to identify vacancies and secure employment stem from their lack of social networks connecting them to employed people and to deep-seated prejudices on the part of employers, problems of physical access and travel costs (both monetary and temporal costs) remain (Bottomley et al., 1997). In the recently completed evaluation of the Job Finders Grant (Dickinson and Broome, 1998) nearly 30% of those who received a grant and obtained a job used the grant to pay their travel costs.

In other studies unemployed people were interviewed to find out how long a journey (measured in time) they would accept if offered work (Meadows et al., 1988). The responses often suggest that job seekers would be prepared to travel long distances in order to secure work. The practical problem is that these intentions do not match the actual lengths of work journeys revealed by Census Workplace data (Green, 1995). In general, actual work journeys are much shorter, particularly for manual employees. In part this disparity may arise from over-optimistic claims by interviewees, but additional powerful factors arise from the nature of labour market processes.

3.5. Time-based exclusion

The difficulties of organising commitments to allow adequate time for travel given network constraints effects many individuals, particularly carers. Notions of time poverty affecting high and low income groups in different ways are rather simplistic (Boulin, 1993). A growing body of evidence suggests that carers in social groups prone to social exclusion are particularly constrained by time in mobility decisions. A study by the Policy Study Institute (Bryson et al., 1997) of lone mothers used a range of indicators to examine the nature of multiple deprivation and hardship facing lone mothers. The problems of arranging childcare were often linked to the need to travel. A more detailed local case study of women in dual adult households in a deprived area of Sheffield (Smith, 1997) indicated that decisions to participate in the labour market were influenced by the interaction between household structure, supporting social networks, and the nature of jobs including their location.

3.6. Fear-based exclusion

In the 1980s the Home Office Standing Conference Report on the Fear of Crime examined the nature of 'fear' in public and private spaces and revealed the complex range of attitudes towards public spaces ranging from complacency, through concern and awareness, fear and worry, to fear expressed as terror (Home Office, 1989). More recent research (Department of Environment, Transport and the Regions, 2000) indicates how the nature of individual 'fear' in public spaces varies markedly according to social characteristics, especially gender, and strongly influences how public spaces and transport facilities are used.

3.7. Space exclusion

Contemporary security and space management strategies often discourage certain socially excluded individuals from using public and quasi-public transport spaces. The design, surveillance and management of public spaces can increase accessibility to vulnerable people by reducing 'fear' (Oc and Tiesdell, 1997). Equally, as studies of the Paris Metro illustrate, certain types of surveillance and management of public transport spaces can weaken any sense of ownership amongst excluded groups, especially the young (RATP, 1995).

Only a small selection of the seven factors listed above can be tackled by modifications to the nature and availability of public transport services. For example, existing evidence for London (Meadows et al., 1988) suggests the nature and success of job search is influenced by individual access to transport but improvements in public transport may have only a very marginal impact on job search compared to adjustments in labour demand and supply, the acquisition of new skills or adjustments to unemployment benefits. The mobility of lone parents may be far more influenced by childcare provision, levels of welfare benefits and informal support networks (Smith, 1997).

Furthermore, these seven factors are clearly interrelated. For example, a loss of local facilities, geographical exclusion, will generate a need for travel to alternative facilities which may in turn require a problematic reorganisation of household commitments leading to time-based exclusion. This creates further problems in terms of policy choices of whether to direct resources to targeting particular factors, such as fear-based exclusion, that maybe very important for certain groups and individuals experiencing social exclusion or alternatively to develop a wide ranging initiative that seeks to address a large range of these factors. Nevertheless, by separating out these seven factors it is possible not only to consider the policy choices for initiatives seeking to tackle the transport dimension of social exclusion but also to explore, as we do later in the paper, the ways in which differing indicators relate to certain of these different factors.

Clearly, these issues are important to transport policy makers because of the need to understand the role and value of transport investment relative to other policy measures in solving the problems of areas with high levels of poverty and social exclusion. To put this simply, improving transport links between areas with high levels of social exclusion and key activities is useless if these activities are irrelevant to the people who live there. Furthermore, marginal improvements to already high levels of physical accessibility may make little difference to residents whose principal barriers to movement may be related to time, cost and constraints on their ability to utilise opportunities beyond their immediate localities. For example, many unemployed Londoners live in Inner London, and despite the fact that public transport links between Inner and Central London are generally good, they are unable to access the employment opportunities offered in Central London because they do not have the skills to participate in its highly specialised labour market. Conversely, these same people may not have the ability to access jobs in Inner or Outer London that are appropriate to their skills due to the fact that orbital public transport links between these areas are relatively poor.

In the light of these conceptual and practical issues it is, perhaps, not surprising that much of the current research on social exclusion and transport, should concentrate on questionnaires and focus groups applied at the level of individuals and households. This approach is of course, essential to the understanding of how individuals respond to the opportunities that may be open to them. However, in the absence of an objective assessment of transport accessibility to key activities this type of analysis will give only a limited appreciation of the extent to which transport factors may permit or limit the ability of individuals living in areas experiencing high levels of social exclusion to connect with opportunities, and the weight that should be given to transport factors in defining strategies for tackling social exclusion.

4. Indicators for social exclusion and transport

The second key objective of the first stage of the London Transport study was to consider the types of indicators that could be used to measure the effectiveness of transport initiatives and strategies to tackle social exclusion, and a review of the indicators that are currently used within the UK was carried out.

At the national level the 1998 Index of Local Deprivation contained no measure of accessibility. This will change with the release of the 1999 Index which is currently based on eight domains of indicators measuring income, work, health, housing, education/skills, crime/social order, physical environment and access to services. The consultation documents proposed identifying low-income areas using postcoded welfare benefit data and then three indicators would measure straight-line distance from these areas to post offices, doctor's surgeries and food shops. This will undoubtedly be useful for identifying areas of exclusion that lack local facilities. These new indicators do not, however, directly assess mobility levels, time-based accessibility or the provision of public transport. Whilst the proposed domain represents a recognition of the potential role of mobility as part of social exclusion, to be of value to transport policy organisations they will need to be supplemented by other measures of the transport dimension of social exclusion.

In the absence of nationally recognised indicators linking transport provision, mobility and exclusion there have been a number of varied local attempts to fill the gap. One of the more developed approaches can be found in Merseyside in

Table 1
Merseytravel indicators of social sustainability (*source:* Merseytravel 1998)

Proportion of households within 400 m of a bus stop
Proportion of households within 800 m of a rail station
Proportion of major facilities/services within 400 m of a bus stop or 800 m of a rail station (Facilities include hospitals, retail parks, multiplex cinemas, city parks, recreation areas and major centres of employment.)
Proportion of rail stations which are fully accessible to wheel chair users
Proportion of buses which are fully accessible to less able members of society
Proportion of concessionary passes issued to and used annually by those eligible

the North West of England where success in achieving Objective 1 status within the European Commission's regional programme meant that agencies in Merseyside addressed the issue of social exclusion in the mid-1990s. Importantly, the inclusionary approach adopted to developing Objective 1 policies led to the emphasis on the transport dimension of social exclusion. 38 'Pathway areas' for those areas of Merseyside with the worst levels of deprivation were designated and extensive consultations carried out with local communities in these locations.

The initial agency-defined strategies for the Pathway areas paid relatively limited attention to transport but the consultation exercise revealed it as one of the key issues perceived as important by local communities. This somewhat unexpected consultation outcome during policy development also raises a wider issue for the development of indicators. Experiences such as those in Merseyside are a reminder of why community participation in the definition of indicators is becoming established as good practice in analyses of exclusion (Scottish Community Development Centre, 1998). It is clear that any future development of indicators which link exclusion and transport will also require the use of appropriate means to identify and include the views of residents and community groups within areas of exclusion.

In response to the consultation outcomes Merseytravel (1998), in partnership with other agencies, has developed a number of transport initiatives to improve links to the Pathway areas which are grouped together under Merseytravel's Community Links Strategy. This strategy lists eight intended outcomes that include working towards social and economic regeneration, increasing the sense of local ownership regarding public transport, and the targeting of resources to tackle need. A wide range of indicators is used to measure progress on these objectives. Those defined as indicators assessing social sustainability are shown in Table 1 and are the key measures for examining the role of transport in tackling social exclusion.

The indicators in Table 1 illustrate the compromises that will normally have to be made by a transport policy organisations seeking to devise measures of policy effectiveness towards the transport dimension of social exclusion. The conceptual discussion earlier in the paper suggests that good practice in the development of indicators would include research to examine the extent to which the seven identified causes of transport exclusion are influencing people's ability to access opportunities, followed by the development of indicators to measure progress in tackling these causes. In practice monitoring of these outcomes relies on measures originally defined as indicators of transport sustainability, but which also have important implications for people's access to transport services. The indicators in Table 1 are effectively measures of provision acting as proxy indicators of the role of transport in relation to social exclusion. The indicators are believed to encapsulate issues that are important to certain socially excluded groups.

The difficulties and costs of devising easily and regularly measurable indicators of the causes of transport-related exclusion are likely to result in proxy measures remaining the norm for most transport organisations in the near future. The conceptual discussion has suggested, however, that transport-related exclusion is in part caused by accessibility problems between the residential location of socially excluded households and the location of facilities and opportunities that enable participation in society. Policies addressing exclusion from facilities or geographical, economic and time-based exclusion will all often require initiatives to improve accessibility in terms of journey times. Thus indicators that measure changing accessibility between key opportunities and areas with high levels of social exclusion are to some degree assessing policy effectiveness in tackling the causes of the transport dimensions of social exclusion. Such indicators are likely to involve the use of proxies and compromises between ideal and practical measures. The advantage of indicators focused on accessibility is that they are concerned with an aspect of social exclusion that can to some degree be directly influenced by transport policy organisation. They can also be calculated as part of comparative strategic city-wide studies rather than just being measures for particular communities with high levels of social exclusion. London Transport's proposed methodology for considering the connections between transport provision, accessibility and social exclusion is considered in the next section.

5. Measuring accessibility and social exclusion in London

CAPITAL is London Transport's tool for measuring travel time to a specific destination or from a specific origin, for example a town centre or hospital. It takes into account all the main aspects of journey time i.e. walk access time, waiting time, in vehicle time and interchange time. It works by combining information from London Transport's Planning and Development Geographical Information System (PDGIS) and its public transport assignment model

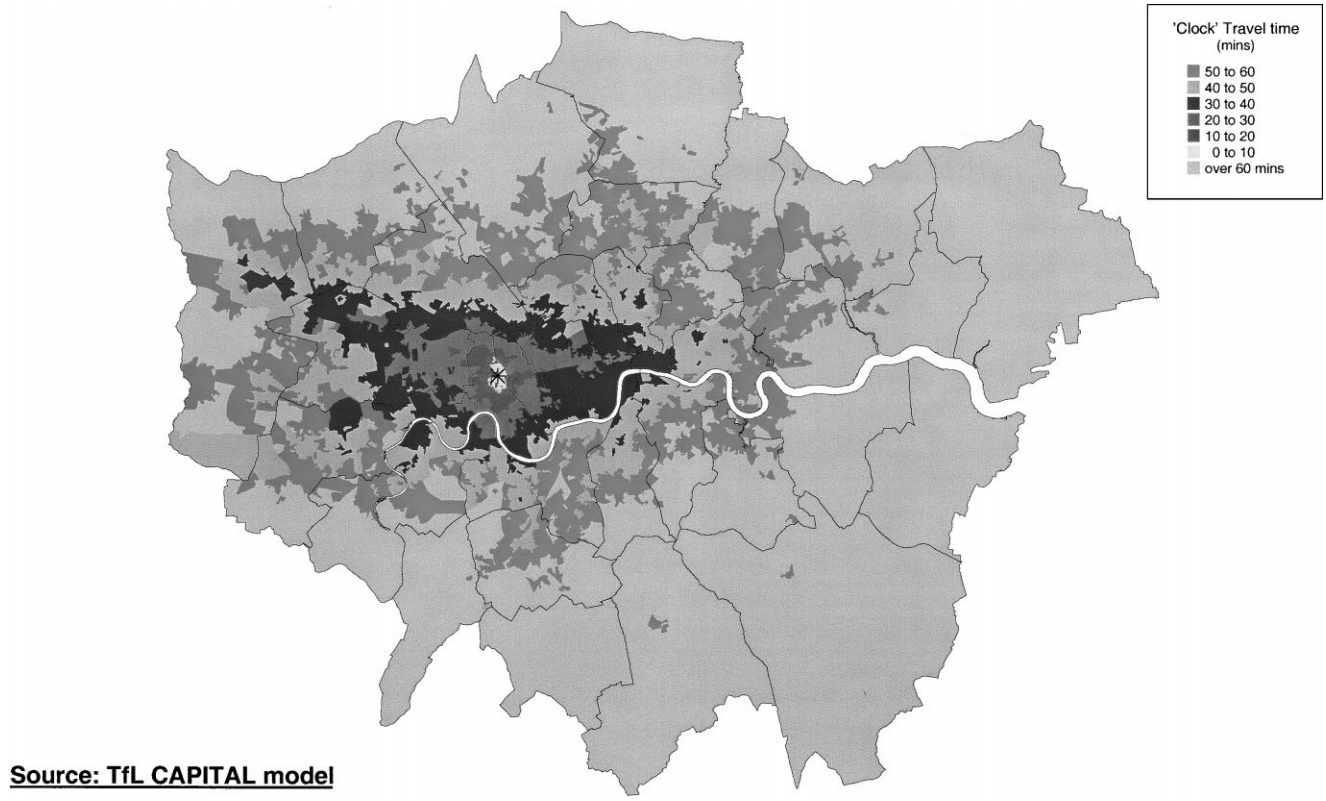

Fig. 1.

(RAILPLAN). PDGIS is used to calculate the walk access time to or from the public transport network whilst RAILPLAN is used to calculate the journey time through the public transport network. The file of travel times can be fed into PDGIS and used to create a thematic shaded map showing isochrones of journey times to and from a particular location (L.T. Planning, 1999).

Stage two of London Transport's study of transport and social exclusion involves on-going research during 2000 that uses CAPITAL to measure public transport accessibility between locations with large concentrations of socially excluded people and key activities, for example, employment centres, town centres with their concentrations of shops and public facilities, healthcare facilities, and educational facilities. This will not be a straightforward task for reasons that have been identified earlier. There are continuing debates over the problems of identifying locations with high levels of social exclusion, and measuring the extent of social exclusion in these areas (Social Exclusion Unit, 2000). Also accessibility is only one aspect of the transport related causes of social exclusion, and the existence of a high level of accessibility does not necessarily imply that people are able to benefit from it.

The approach currently being adopted is to utilise measures of social exclusion which maybe composite indexes, such as the Index of Local Deprivation, or single measures, for example poor health or unemployment. These are then used to identify those parts of London that are experiencing high levels of these problems. CAPITAL then measures the accessibility of these locations to relevant facilities, for example, in the case of areas with high levels of poor health, accessibility to health care facilities, and in the case of areas with high levels of unemployment access to major employment opportunities.

Recent analysis of this type has involved examining accessibility to major regeneration sites in London. The last thirty years have illustrated the ambiguous effects of urban regeneration in London on social exclusion. Major urban land redevelopments for commercial or industrial use will not necessarily alleviate high levels of social exclusion in surrounding areas (Church and Frost, 1998). In addition, accessibility improvements associated with regeneration initiatives can have both positive and negative effects on neighbouring communities. For example, in London Docklands the Docklands Light Railway whilst opening up the local labour market to external competitive pressures for local jobs (Church and Frost, 1998), was also viewed by the long term residents of the area as one of the key improvements stemming from regeneration (MORI, 1996). Thus, by using CAPITAL to examine the accessibility of London's regeneration sites it is possible to identify levels of social exclusion within a fixed journey time and to consider the possible positive and negative implications for developers, employers and residents in adjoining areas of improving accessibility and therefore increasing the distance that can be traveled within a fixed journey time isochrone.

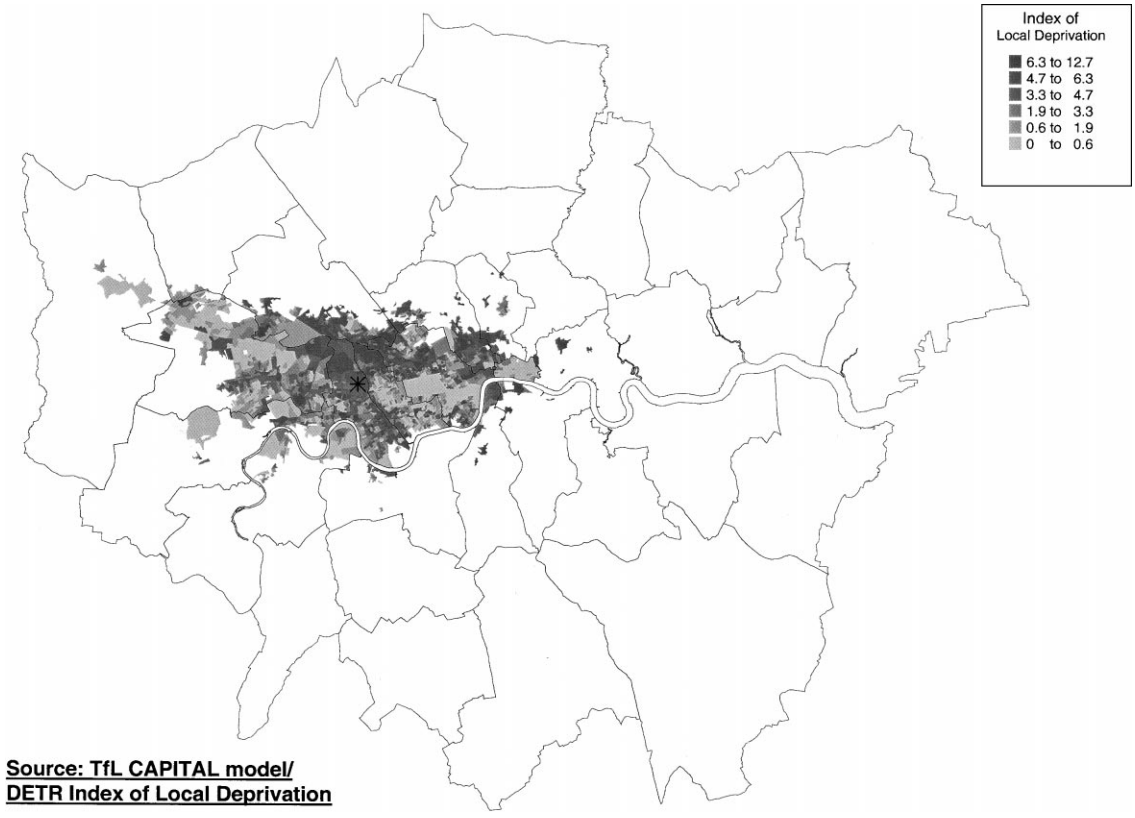

Fig. 2.

Figs. 1 and 2 provide an example of accessibility analysis using CAPITAL. Fig. 1 illustrates accessibility levels to the major White City regeneration site, one of the major sites in west London. Fig. 2 outlines the levels of deprivation within the 45 minute catchment area using the 1998 Index of Local Deprivation for enumeration districts. This suggests that in this case transport accessibility may not be a major issue in initiatives seeking to facilitate links between new opportunities created by regeneration and residents in areas with high levels of social exclusion. The site, in terms of journey time, is very accessible from some of the major pockets of deprivation in west London. There may, of course, be other significant barriers that limit the take up of new opportunities by residents in adjoining areas. These may relate to skill levels or some of the other causes of transport-related exclusion such as fear-based exclusion. The figures also serve to illustrate the limited accessibility to west London opportunities from east London, which contains the largest relative and absolute concentrations of social exclusion in the capital. Despite may parts of east London having direct underground links to White City nearly all of the areas to the east of the City of London are outside the 45 catchment once CAPITAL has measured true journey times.

The figures provide an initial analysis highlighting the role of some of the key processes that were considered in the earlier conceptual discussion on the determinants of an individual's ability to access activities required to participate in the 'mainstream'. The Index of Deprivation provides an indication of the residential areas likely to experience social exclusion and is based on certain measures that are likely to limit ability to travel, such as unemployment. The travel isochrones are based on a detailed analysis of the transport network in terms of journey time. The figures, however, do not contain details of the nature of the new opportunities on the regeneration site. The ongoing analysis by London Transport is seeking to integrate data with CAPITAL that measures the relevance of the opportunities to socially excluded people seeking them. For example, in the analysis of the geography of poor health and the location of hospital facilities, details will also be included on the range and availability of particular services at hospitals. These refinements to accessibility analysis are likely to require interpretation using local knowledge and London Transport plans to seek the assistance of the London local authorities and other key agencies with a detailed knowledge of local people, services, and places to assist with these tasks.

6. Conclusions

The lack of 'connection' between somewhere around a quarter of the capital's residents and many of the activities and opportunities that are required to participate fully in society cause social exclusion in London. There are many reasons why this 'disconnection' occurs, one of which is the

inability of people to physically access opportunities because of travel difficulties. However, tackling these difficulties requires not only changes to the transport system, but also policies to combat those factors that limit an individual's journeys at either end. Clearly, tackling these issues will require a multi-agency approach, and it is acknowledged that such an approach needs to be developed before detailed policy formulation begins.

It is also evident that if area based strategies are developed, people with detailed knowledge of local conditions need to be involved, both as experts, for example in the interpretation of data, and as local people, for example, in defining strategies and indicators.

In the next stage of its research London Transport will concentrate on those elements of transport based exclusion that it is equipped to tackle, particularly public transport accessibility between areas with high levels of social exclusion and key opportunities, and the accessibility of key regeneration sites. Whilst it is recognised that improvement of the public transport system is a key element of any strategy to tackle transport based social exclusion, it is clear from the work that we have done so far that it is not the whole solution.

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