

Underdevelopment in the context of Hypermobility: Some Reflections Upon the Contemporary Relevance of Gunnar Myrdal

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Abstract

Communication infrastructure can set the context for the potentiality of both rural and urban regeneration. New opportunities for accessibility of areas can set the parameters for such regeneration. This paper traces merely one thread in the debate over modern communication and transportation systems and urban form. It draws upon Gunnar Myrdal's pioneering 1957 work on development and underdevelopment. (Myrdal, 1957). In essence the argument is that there must be much greater clarity of the purpose of new pieces of transport infrastructure. The development consequences of transportation and communication investment can be more easily understood as a consequence of redefining and re-elaborating Myrdal's concepts of "spread" and "backwash". The disposition of settlement is crucial in achieving optimal benefits for quality of human life and enhancement of nature. A re-defined sense of 'spread' and 'backwash' allows us identify how infrastructure will shape development forms. Some comments on the emerging planning framework for north-west Europe as expressed in the European Spatial Development Perspective, 1999 (ESDP) and A Spatial Vision for North-West Europe, 2000 are offered. These theoretical reflections arise from work carried out under the CORRIDESIGN study (INTERREG IIC for the NWMA) in the period 1999-2002.



Introduction

This paper attempts to identify large-scale, long-term trends in the restructuring of settlement pattern and economic activity in southern England. It utilises concepts developed in quite other contexts and draws together these redefined ideas in order to offer a way forward for planning which addresses both the issues of the urban renaissance (Urban Task Force, 1999; DETR, 2000) and hypermobility on a scale larger than that of the existing English regions, but in a way which is both trans-national and at the same time sub-national. The term 'underdevelopment' is deliberately chosen to both highlight the crisis of inner cities in the UK and it consciously echoes the work in the mid 1950s of Gunnar Myrdal and his success in addressing issues of hinterland development in countries emerging from colonial rule (Myrdal, 1957). The term 'hypermobility' has been chosen as a way of capturing both 'counterurbanisation' (Beale, 1975; Berry, 1976; Cross, 1990; and Champion, 1998) and increasing car-dependency (Newman and Kenworthy, 1989; Newman, 1992; Calthorpe 1993; Owens, 2002).

It was not considered possible to properly address the relationship between urban regeneration and processes of hypermobility, without looking at the connectivity of the regions conceived on the scale of north-west Europe. Lever (1993) welcomed the possibilities of 're-urbanisation' in the context of what has come to be called 'the urban renaissance' as an opportunity for reducing social distance. He concluded that this would only be possible on the basis of treating "the whole conurbation and its suburbs as a planning unit. The paper makes the assumption that sustainable urban development cannot be achieved through actions that are limited to the confines of the urban area alone. Action is required across the wider non-urban territory.

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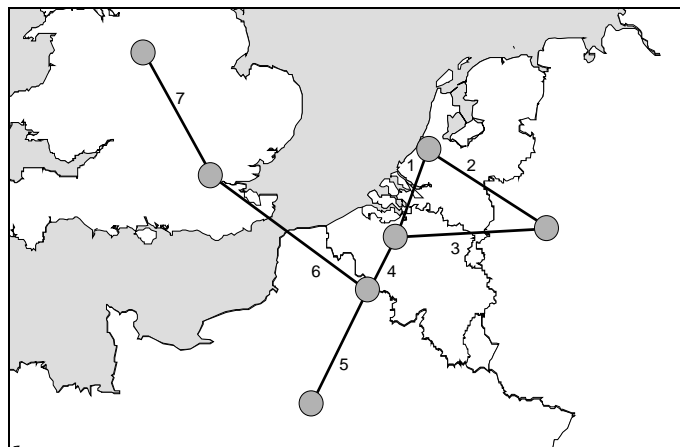
In considering southern England and its connections to other parts of the UK and Europe, the CORRIDESIGN reach team made use of other concepts: megacorridors (Chapman *et al*, 2000, 2001a, 2001b) bundles and braids of infrastructure (Chapman *et al*, 2000, 2001a, 2001b), urban and suburban armature (Chapman *et al*, 2000, Roberts *et al* (1999); spread and backwash, beads on a string (Pedersen, 1980; Schaeffer & Schar, 1975; Hall, 1996.), polycentricity (EC, 1999), and lastly the proposal for Territorial Impact Assessment (EC, 1999).

This theoretical contribution arose from the need to make sense of what was happening in the North West Metropolitan Area (NWMA) of the European Union in relation to the development of inter-regional megacorridors. The project was funded under INTERREG IIC arrangements of the NWMA of the European Union. The project was called CORRIDESIGN and was composed of teams in Holland, Germany, Belgium, France and two in the UK (Fig 1). The project team defined megacorridors as cross border bundles of infrastructure which could be understood as axes of economic development, urbanisation and as a institutional/governance issue. Developing appropriate theory involved the team in looking at Gunnar Myrdal's concepts of "spread" and "backwash" and re-elaborating both of these ideas (Myrdal, 1957). The research took place against the background of the European Spatial Development Perspective (EC, 1999) and the Spatial Vision for North West Europe (EC, 2001).

Newman and Kenworthy, (1989), Newman (1992), Calthorpe, (1993); Owens, (2002). and Breheny (1995) have extensively discussed the settlement patterns arising from the increased reliance upon motor vehicles for commuting and business. Whilst Newman and Kenworthy made the initial assessments of the environmental impact of car-based urban development and Owens translated the issues to the UK, Breheny (1995) argued that the fundamental dislocation of home and workplace had already occurred. In view of this, it was unlikely that UK settlement patterns could beneficially be remodelled to achieve more sustainable travel patterns. Frost *et al* (1997) carried out assessments concerning the contribution that various types of regular travel made to CO² emissions and this revealed that work travel journeys were less than half the figure for non-work journeys travelled per person per week in kilometres in the West Midlands. In considering the period 1981-1991, they concluded that the increasing reliance on cars for work-travel was significantly increasing the total energy use for work travel. The figures for Birmingham were 31.5%, for Manchester 32.5% and for London 15.9%. Hypermobility had emerged in the 1990s as a fact of life especially for rural areas and the provincial conurbations.

Corridesign, however, was concerned particularly with physical and information flows between major centres within a radius of 250miles of Brussels.

Figure 1: The focus of Corridesign: seven megacorridors within the NWMA area.



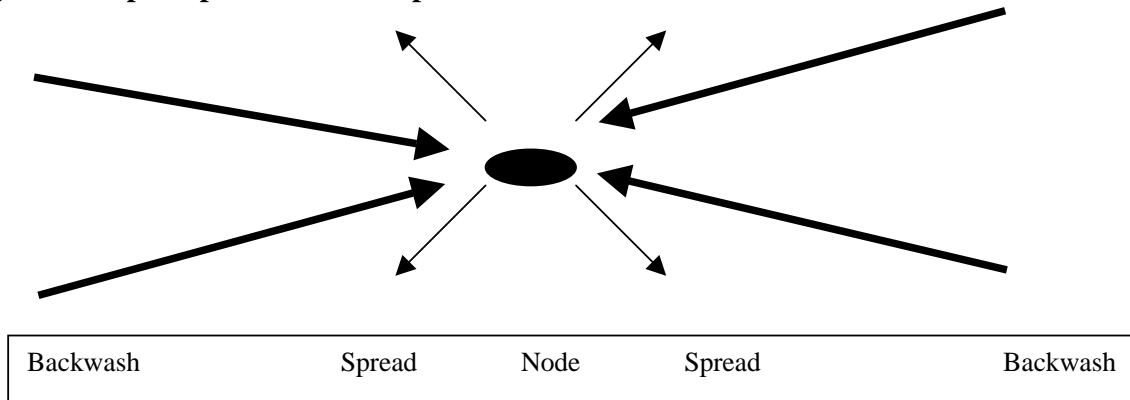
The Corridesign Teams each looked at a part of hypothesised megacorridors between the West Midlands, London and the Nord Pas du Calais, Ile de France/ Nord Pas du Calais, Nord Pas du Calais/Flanders, Flanders/Rhine-Ruhr, Rhine-Ruhr/Randstad. Its objective was to study the dynamics of megacorridors, to analyse actual spatial infrastructure policies and to design policy and networks to promote economic vitality, ecological quality and sustainable mobility in these corridors.

Each of the six teams was charged with looking at a section of megacorridor in the NWMA. The task of all six teams was to consider economic, social and environmental aspects of the development of megacorridors linking the strongest growth areas of North West Europe. The period and the context were therefore very different from those of Myrdal’s work. Clearly there are still enormous challenges to bring the more remote areas of North West Europe closer into the economic opportunities of the rest of Europe. However within the economically-strong areas of Europe, the principle challenge is not so much to *spread* the benefits of concentrated economic advantage as to *shape* those benefits spatially so as to meet economic, social and environmental concerns. The team came to hold the view that the shaping of development into more sustainable forms could be better tackled if some overarching concepts were evolved. Myrdal’s concepts of ‘spread’ and ‘backwash’ provided a starting point.

Myrdal's Original Concept and How we Proposed to Change its Sense

For Myrdal, the 'backwash' of economic activity from a region to a major, often colonial, growth pole was a negative phenomenon. He regarded the subsequent ‘spread’ of economic activity from the growth pole into its surrounding areas as a weaker but more positive position. (Myrdal, 1957). He was concerned that the development of underdeveloped regions proceeds in an uneven way. It involves giving advantages to settlements around connections to the wider world are concentrated, whilst denying and even draining resources from other areas. The first effects are described as ‘spread’ and the latter are ‘backwash’ (see figure 2). Hence we were appropriating Myrdal’s concepts where backwash was a negative feature sucking development into core areas. For us, the same term had beneficial connotations, suggesting the regeneration of core city areas that had suffered from suburbanising and exurbanising processes. By contrast spread was a positive feature for Myrdal since he was concerned with achieving the more even distribution of economic growth beyond ports and administrative centres into the hinterland. For us, however, we saw spread factors as very problematic, since growth was often promoted in locations which were heavily car-dependent.

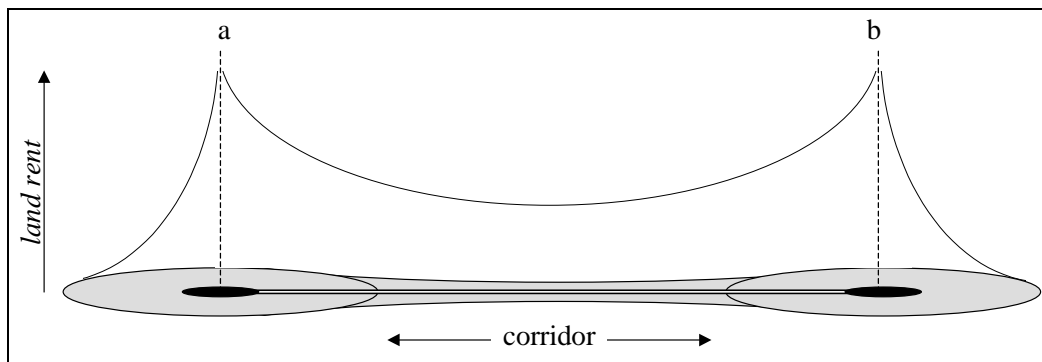
Figure 2 Simple representation of spread and backwash



Other Related Concepts

At an early stage the Corridesign team drew together some important theoretical ideas, which it was hoped, would inform its deliberations. Trip (2000) reiterated some classic location theory insofar as it would have a bearing on the design of megacorridors. Von Thunen's model for agricultural land value was based upon accessibility to the market (Von Thunen 1830, Goodall, 1987) When combined with Christaller's Central Place Theory, Trip (2000) posited a re-imagining of the land rent peak. Applied to a highway with infinite points of access, which is linking two central places, the 'land rent peak' in the original Von Thunen model now becomes, in the words of Trip "a mountain range between two peaks" (see figure 3). This, in turn had been derived from Peter Haggett's (1983) graphic representation of market and administration optimising patterns of nodes around hexagonal space. Hagget used this approach to identify on a regional scale the optimal location for utilities such as hospitals and universities.

Figure 3: The location theory of Von Thünen applied to a transport corridor between two towns a and b.



Source: Romein, A., *et al.* (2000). p.31.

Obvious variations for this model would include central places of differing importance, a corridor with braids of infrastructure to which accessibility is discontinuous and finally congestion effects, which reduce mobility. The term 'braids' is here used as a metaphor for parallel and alternative flows.

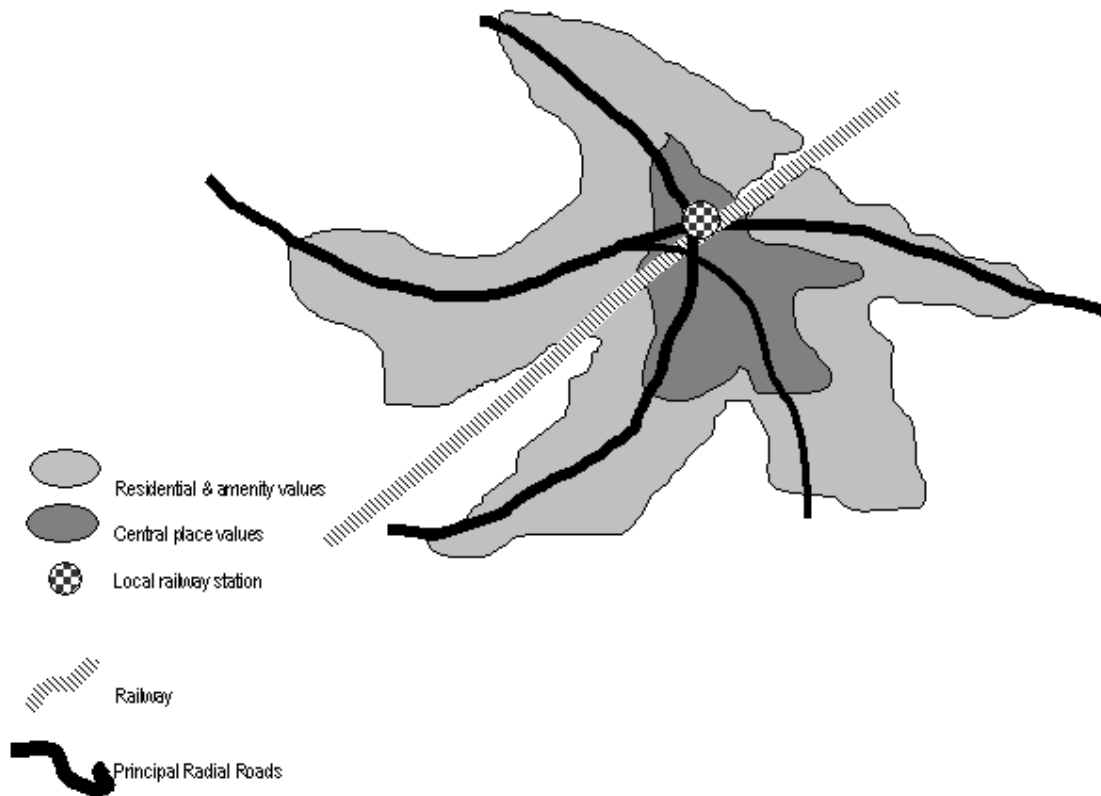
Accessibility to an infrastructure braid will determine the value and the use of adjacent land. This will vary according to the frequency and location of access terminals on and off the braid, for example a motorway with limited junctions would be very different to an all-purpose road with more or less unlimited access points. With a railway it would vary according to not only the location of stations, but also whether trains stopped at them and how often - i.e. it would vary temporally as well as spatially. But new nodes increase local traffic and this creates congestion and causes frustration for long distance traffic, but it also creates opportunity for more local economic development if the opportunities are both afforded and grasped.

One only has to compare the nature of land adjacent to railways entering and leaving cities with radial highways at the same distance from city centres. For the former, housing must suffer only inconvenience of the noise, vibration, and barrier effects both visual and in terms of mobility. For the latter, whilst there are all of these disadvantages, there is at least the compensation of being able to use the route oneself.

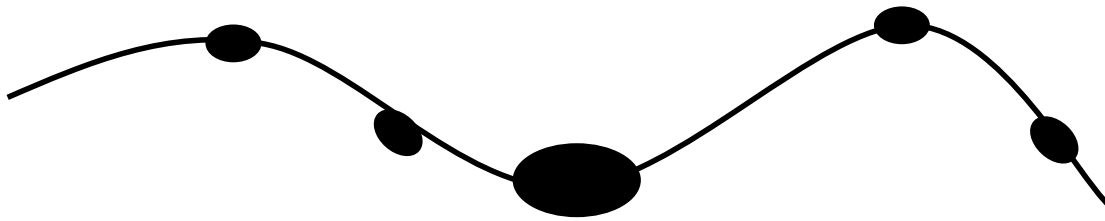
Figure 4 is a simple representation of the relative effects of historic road and rail routes to a

central place. The effects are represented merely as the relative values of central commercial space and residential location with high amenity and high accessibility. Other types of land use are ignored for the sake of simplicity.

Figure 4: A simplified distribution of the values of a central place with road and rail connections distinguishing central place values from residential and amenity values.



Modern transport and communication systems increase the complexity of the determinants of how land uses will be established. Motorways with few access points will limit opportunities for local economic advantage. An increase in the number of halts on a railway, or the introduction of parkway type rail stations (park and ride) will increase local opportunities. Similarly, the location of broadband communications accessibility will transform local opportunities. Some authors have noted the effects of ex-urban railway stations, which create pressures for polycentric development (European Commission, 1999) or beads on a string (Pedersen, 1980; Schaeffer & Schar, 1975)[see figure 5]. It was Patrick Geddes who first used the term in 1925 when he applied it to the proposed settlements along Lake Erie linked by roads rail and motorways, a part of the planning activity offered by the Regional Planning Association of America (Hall, 1996, p155). The railway policy of establishing park and ride stations (parkway stations) is designed to disperse the nodal development effect rather than to concentrate it. Peter Calthorpe's 'transit-oriented development' seeks, by contrast to concentrate the effect in developments within walking distance of the public mass transit node (Calthorpe, 1991).

Figure 5: Beads on a string.

The value of Myrdal's approach for current study of development and transport in mega-corridors is that he looks beyond the merely urban or merely rural and embraces a scale that is regional and pan-regional. The effects of dynamic nodes for adjacent and distant parts on a regional scale are captured by his concepts of "spread" and "backwash". It is of value, therefore on a scale above that of the city region or conurbation. In the UK at present, issues of urban containment can be addressed at the regional scale (through the RPGs) and are not systematically addressed at the national level. The call in the ESDP for polycentric development is yet to be matched by a suitable methodology for doing so. Issues of underdevelopment of old centres and hypermobility on an inter-regional scale have yet to be addressed in the UK.

For Myrdal the actual economic expression of 'backwash' would have been depopulation, abandonment, dereliction and decline. Whilst this may be experienced in the more remote regions of the most economic developed countries of the European Union, for the developed regions, backwash would be experienced as the absence of development pressures. Such absence is welcomed by society from a number of perspectives. Tranquillity, solitude and serenity are qualities associated with nature. Increasingly society values nature for its own sake and environmental economics attempts to identify the intrinsic or inherent value of natural resources in contrast to the exchange values that may be released from their exploitation (Dombrowski, 1997). Public policy seeks to restrain the economic exploitation of such areas. The task of the team was to improve the economic operation of megacorridors, but we were aware through our early interviews with key stakeholders that issues of social equity and nature conservation were held to be similarly important.

Hirschmann underscored the bias inherent in the vectoring of spread and backwash. For Hirschman, entrepreneurs tend to over-estimate the attractiveness of investment opportunities in growth centres and underestimate the opportunities on the margin. But in modern conditions it would seem that this relationship has been reversed in many circumstances. New investment location decisions are at present more likely to be prejudiced against old centres and predisposed towards decentralised localities. In fact it could be argued that there has been an historic shift towards decentralisation and these trends are represented in various different forms, for example 'edge city' (Garreau, 1992). The forms comprise public policies, urban form, new types of land uses, new types of spatial specialisation and new types of spatial advantage. Some of these were observed in the West Midlands and London parts of the Corridesign study and are represented in Table 1.

Table 1: Some historic shifts in the nature ‘spread’ and backwash’ effects observed in Central England.

Backwash	Spread
Few nodes/interchanges Few access points to the corridor	Many nodes/interchanges Many access points to the corridor
Land Use Policies Planning restrictions on development between nodes e.g. Green Belt, strategic gaps, AONB Social/political restrictions e.g. ‘gentry’ landscapes	Land Use Policies Land releases for development on the edge of existing urban areas e.g. for business parks, housing,
Urban morphology Compact settlements, high density uses, emphasis on townscape quality	Ex-Urban morphology Urban sprawl, low density developments, Emphasis on landscape quality
Economic Development Policies Those relying on, or promoting ‘Path-dependency’	Economic Development Policies Those promoting technological dispersal/diffusion
Spatial Concentration of Uses Central Business Districts, Legal & financial services (front office functions) Location of Internet Protocol Addresses Hubs for movement of Traditional Automotive Componentry	Urban/rural fringe relocations New Business Parks Legal & financial services (back office functions) Prime Industrial Sites British Motor Sports Industries Information Communication technology spokes e.g. ISDN and ASDL network development
New Industrial Space Cambridge Phenomenon in the 1980’s	New Industrial Space Cambridge Phenomenon in 2000’s Cambridge – MK – Oxford ‘Technology Arc’
Population ‘Churn’ Of young people (including students) Recent migrants	Population ‘Churn’ Of affluent young families Retirement people
Housing Social, lower cost ownership in the 1970’s-80’s City centre apartments/lofts/gated settlements	Housing Speculative and higher cost in the 1970’s-90’s Social, lower cost ownership in the 2000’s
Public transport- dependent behaviour Transit-oriented development	Private car- dependent behaviour Provision for car-parking in central places (strong effect) Park and Ride schemes including rail parkways (weaker effect)

Historical Changes in the nature of Spread & Backwash effects

Government policy in the UK since the final abandonment of the New Towns strategy at the end of the 1970s and the increasing recognition of the crisis in the industrial heartlands a few years earlier has seen a switch to strong containment policy. This policy has been strengthened in the 1990s through the elaboration of planning policy guidance notes, which have increasingly justified this shift on grounds of pursuing more sustainable forms of development. Initially the Retail PPG 6 introduced the notion of the ‘sequency test’ as a way of guiding shopping to existing centres. Later the Housing PPG 3 followed suit. However the development industry has sought to expand opportunities outside of these old urban areas and the strength of these market-led forces has led to official policy continuously trying to catch up with this phenomenon in an attempt to control it. We can therefore reflect upon the typology outlined in Table 1, distinguishing both spread and backwash effects in relation to the evolution of different types of corridor.

The evidence coming from 2002 census data indicates that the process of exurbanisation has continued since 1991 in a pronounced way. Figures 6-8 show the form of these processes for the

West Midlands region. Core area populations decline, peripheral ones increase (Figure 6). At the same time birth-rates are higher in the core areas (Figure 7). Peripheral attract greater migration (Figure 8). These three figures demonstrate what the West Midlands team called population ‘churn’, characterised by the elderly and market-strong exurbanising, whilst the ‘replacement’ population was concentrating in market-weak areas.

Figure 6: Population Change West Midlands 1991-2001

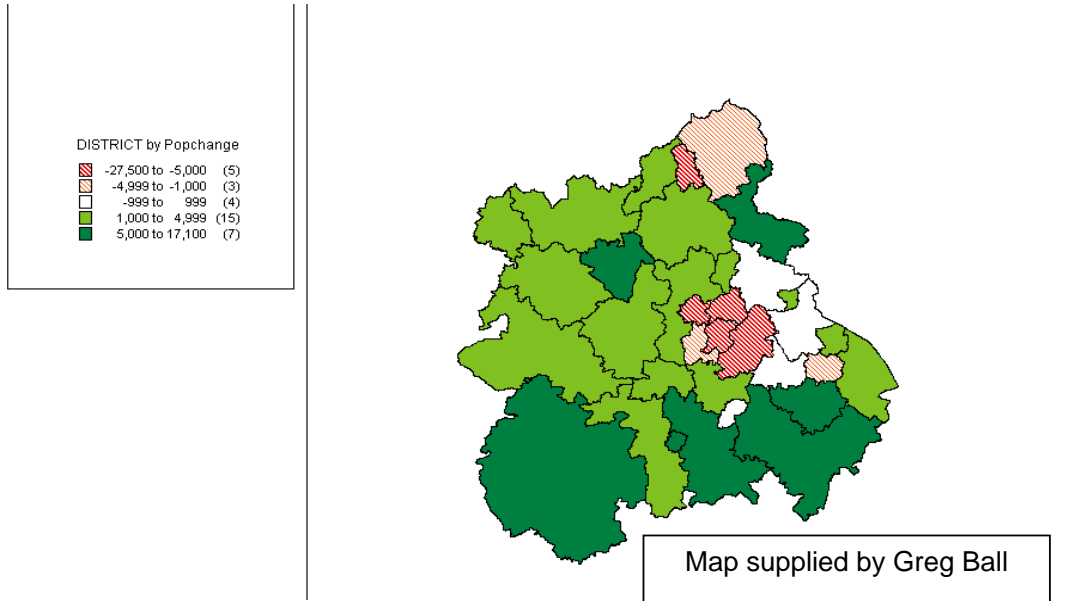


Figure 7: Natural Change West Midlands 1991-2001.

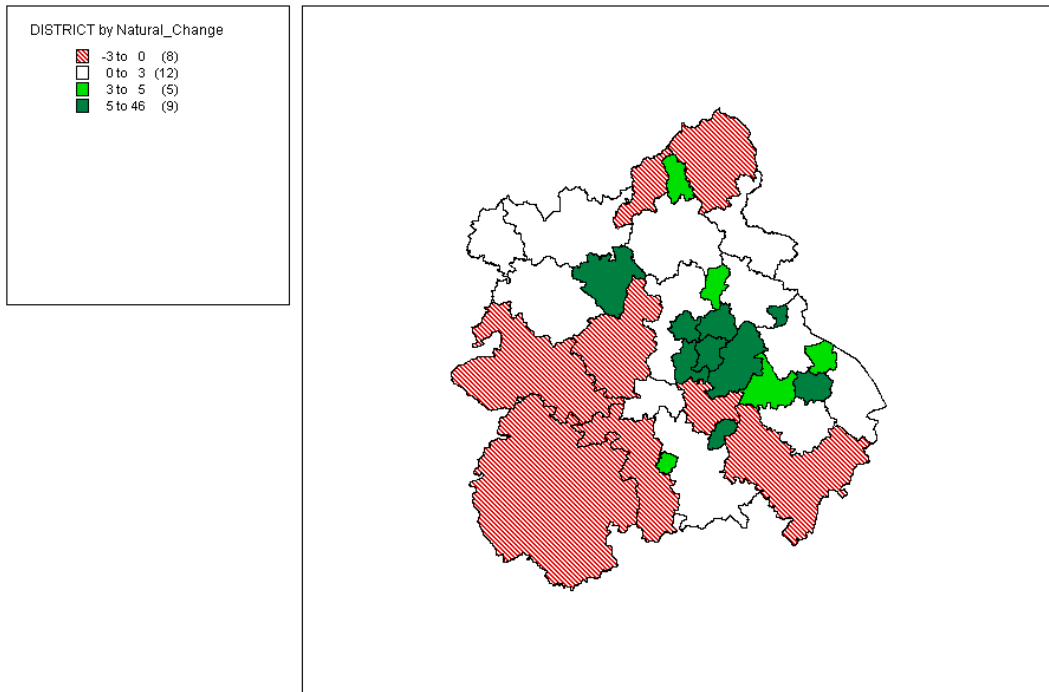
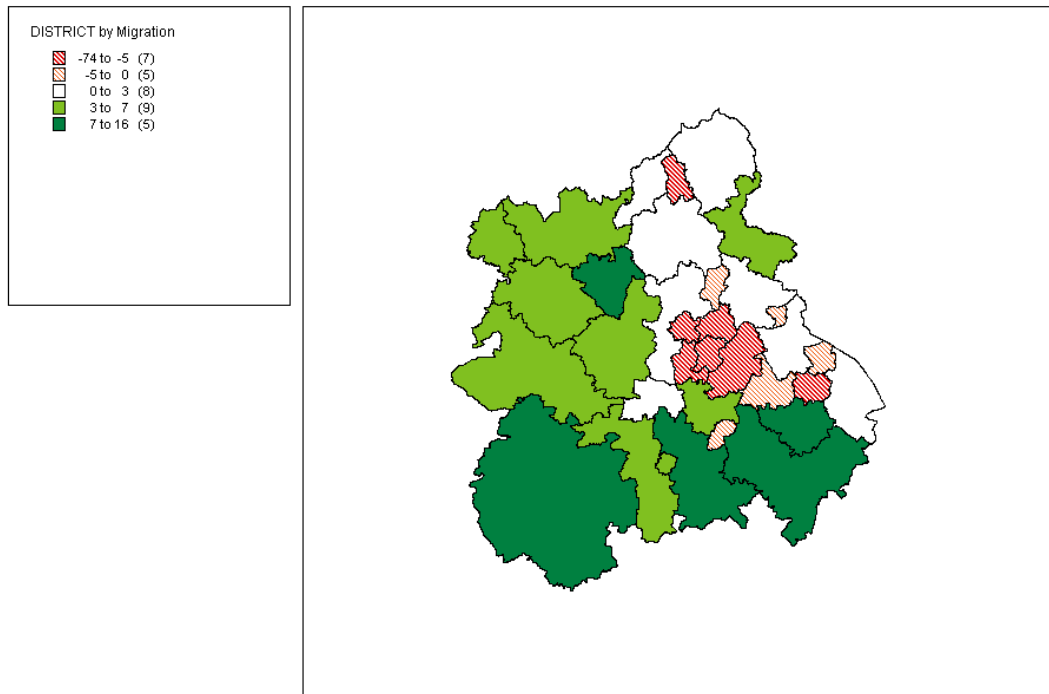
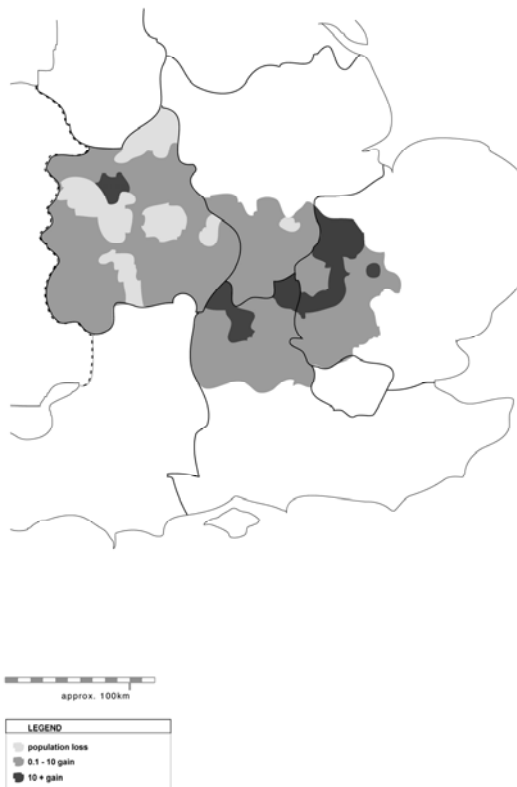


Figure 8: Migration West Midlands 1991-2001.



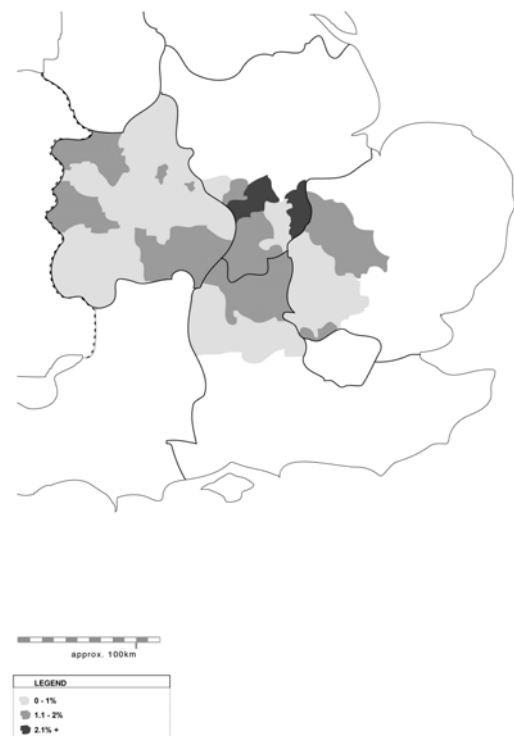
The Corridesign West Midlands team presented maps of population change (fig 9), Housebuilding rates (Fig 10), house price increases (fig 11) and generalised maps of development constraints (fig 12)

Figure 9: Population changes 1998-2000.



Map 6. Projected population change, 1998 - 2008

Figure 10 Housebuilding activity 1998.



Map 7. Incidence and distribution of private housebuilding activity, 1998

Figure 11: House prices.



Map 8. Mean house price, October/December 2000

Figure12: Containment.



Map 2. Areas of importance for protection of the natural environment

The Corridesign West Midlands team prepared maps for the whole of central and southern England to identify the location of new industries. The clusters map in particular demonstrated the new industrial spaces that were emerging. The newer clusters were both ex-urban and configured, not along the megacorridor but horizontally opposed to it. This cluster pattern follows lines equidistant from the metropolitan conurbation and areas of predominantly non-urban character. (Figure 13). These might almost be understood as ‘edge clusters’, since they eschewed the urbanism of industrial districts, yet maintained connectivity with per-urban advantages. We drew on the work of Shiode and Dodge (1998) which emphasised the pre-eminence of existing centres in the provision of Internet nodes (Fig 14). Cyberspace appears to reconfirm traditional urban centrality at its current stage of development in the UK.

Figure 13: Clusters.

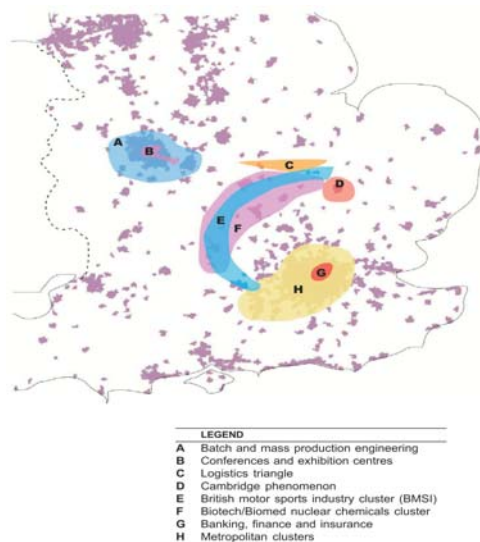
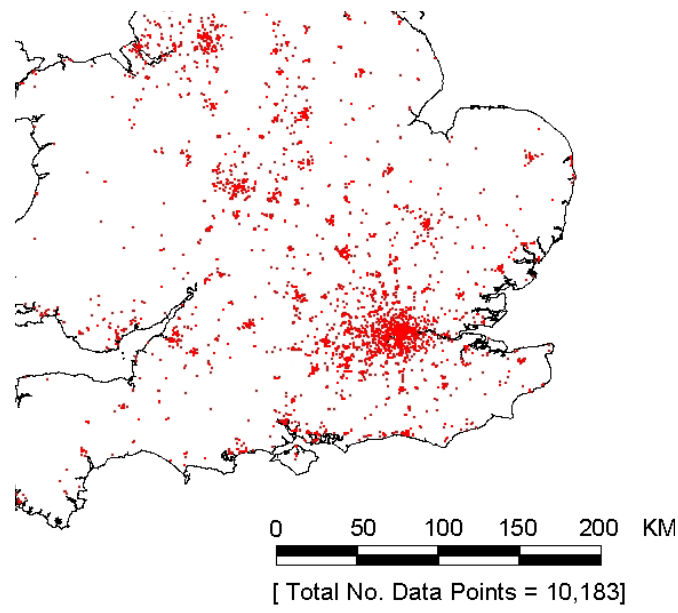


Figure 14: The location of internet protocol addresses - Shiode & Dodge (1998).



The Midlands-based Corridesign team identified schematically the regional and inter-regional dynamics and connectivity of central England. This allowed us to explore in a preliminary fashion some of the features of the urban form and the characteristics of the transport infrastructure, which are likely to promote 'spread' and backwash effects. This preliminary thinking is represented in Figure 15.

Figure 15: odern Transport Flows for Central England.



Conflicts Of Functionality of the Transport Infrastructure

The task of the Corridesign team was to advance a series of design principles that would address the issues thrown up by the need for large-scale communication infrastructure across national boundaries. Inevitably, clashes of functionality were strongly observed. The extent to which local traffic impedes or is impeded by longer distance traffic on both road and rail networks is dependent upon local overall capacities of the networks. The team produced schematic maps of these overcapacities and proposed major improvement schemes (see Figures 16 -18).

Figure 16: Infrastructure Capacity Limitations.

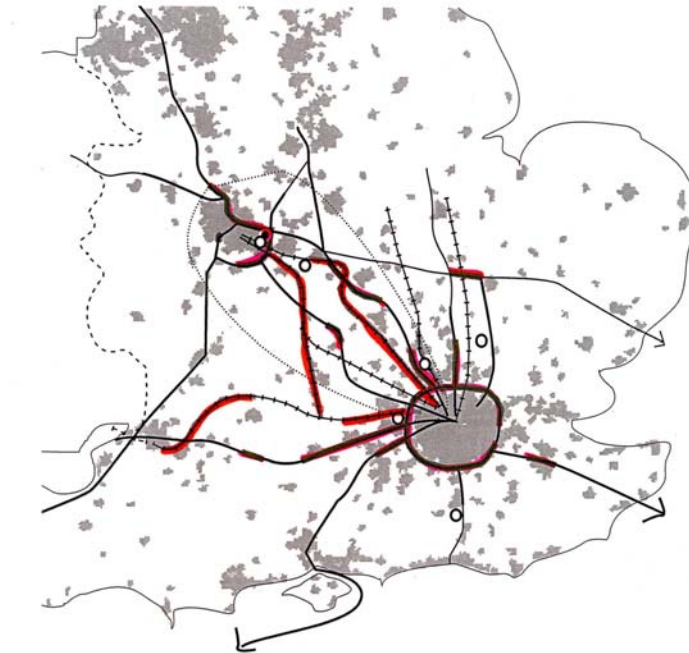
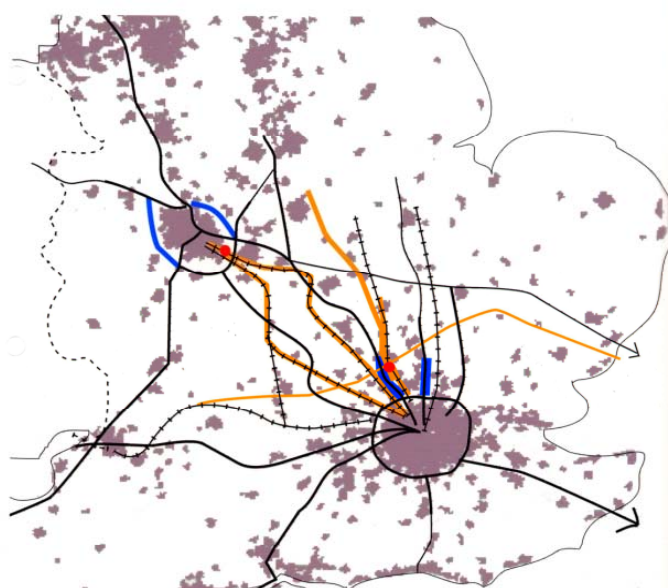


Figure 17: Opportunities and Improvements.



Several major improvements to the transport infrastructure of the study area have been proposed by various agencies for some time. Figure 17 identifies these in general terms. But there are significant refinements that will be necessary and the following section discusses these in relation to the likely 'spread' and 'backwash' effects of each.

It is now suggested that the best way to alleviate such overcapacity problems is to distinguish local from long distance use and dedicate the routes accordingly. In general, if many points are provided at which the network may be joined, it will increase the demand from local traffic. However, providing only few points of access will favour only long-distance traffic.

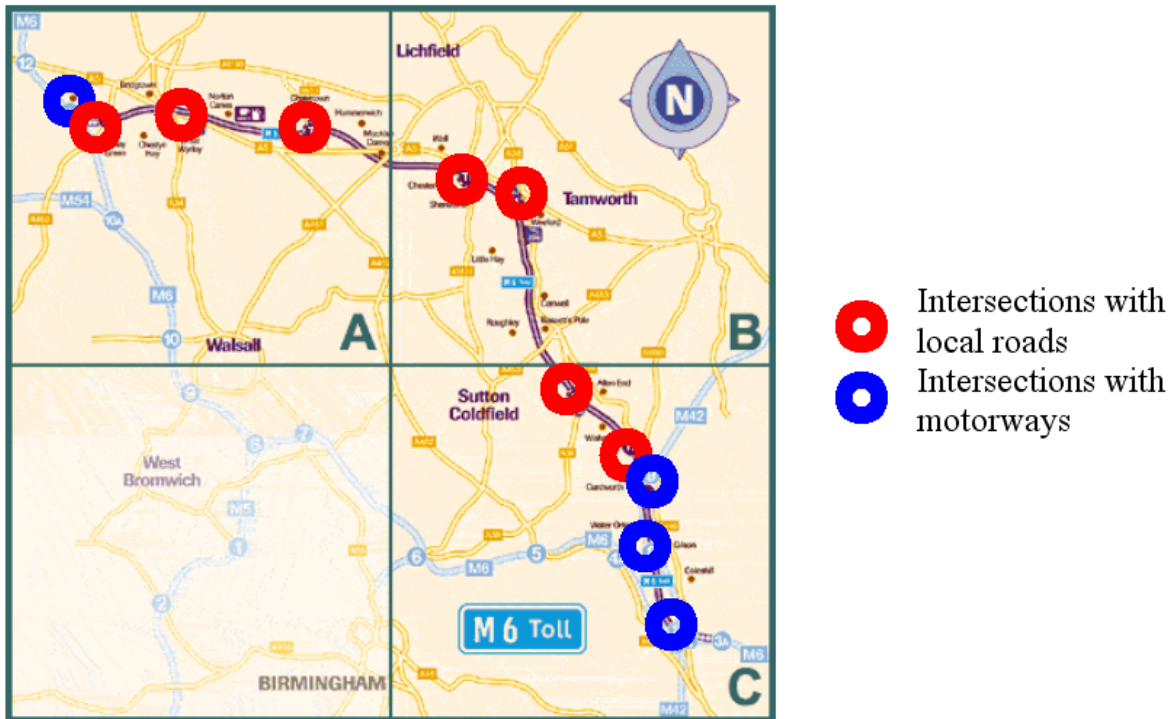
Figure 18: Ports and Airports of the developing transport armature.



Obviously, in areas where population densities are higher, there will be stronger political pressures to facilitate access at more points. Yet these issues have been addressed in the past, albeit on a smaller scale. For example the elevated section of the M6 through north east Birmingham features a junction (J5), east of the Gravelly Hill Interchange (aka Spaghetti Junction), allowing traffic to leave or join it, only in a south-easterly direction (i.e. join M6 leaving town or exit M6 entering town). This prevents local people using the M6 as a short hop into town and avoids some additional congestion of the motorway by short-haul traffic (see figure 19). The multi-modal study carried out for the M6 north of Birmingham has revealed the extent of mingling of local and long distance traffic (M6 Multi-Modal Study Final report, 2002).

Figure 19: Limited access to the old M6.

New provision aimed at relieving long distance traffic congestion but providing many points of access is fundamentally flawed. Such is the design of the Birmingham Northern Relief Road (now called the M6 Toll – see figure 20). Designed initially to relieve the long distance traffic on the M6 as it passes through the northeast corner of the West Midlands conurbation, it has no less than 9 junctions over its 27-mile length (M6 Toll, 2002). The deterrence to use by local traffic will hence not be physical, but instead, it will be financial through the tariff system. MC Toll currently propose a standard tariff structure irrespective of distance travelled of £3 for cars and £11 for heavy goods during the day with a reduced rate at night (M6 Toll 2003). Heavy goods vehicles would be able reclaim VAT. A commercially led tariff system may sacrifice long-range connectivity to short-term profitability. Other criticisms include those that consider the likely effects of the tariff will be to induce greater car use, whilst heavy goods continue on the existing motorways. It might be thought that changing tariffs is easier than changing junctions but agreements between the operator and the government give the government little scope to regulate the tariff structure for many years to come. Furthermore the policy context of the tariff system would have to be clarified if the tariff system were to embrace an element of congestion charging.

Figure 20: M6 Toll.

By contrast the M40 has a limited number of junctions and this clearly favours the concept of ‘a corridor of movement’ rather than ‘a corridor of development’. Such a distinction was first made in the 1994 Regional Planning Guidance, (RPG9, 1994). It was further reinforced in the 1998 Oxfordshire Structure Plan (Oxford CC, 1998, section 3.9.3). The introduction of additional junctions to existing motorways has to be carefully considered from the perspective of the motorways’ long-range functionality. A hybrid alternative solution is to separate short and long haul traffic by rigid segregation of lanes, but this runs into the problem of mixing slow long distance with fast long distance traffic on the one hand and slow & fast short distance traffic on the other. Other subvariants include segregating public service vehicles from other types. These ‘solutions’, however, are not concerned with addressing the impacts upon demand for land uses, which are at the core of this paper.

Before we turn to a consideration of land-uses, however, a few remarks on applying principles to the current situation facing the UK rail system may be timely. Certain train tracks may be designated as long-haul or high-speed, whilst others are designated as short-haul or for ‘stopping’ trains. Many parts of the historic rail system had been designed with 4 tracks (2 ‘up’, 2 ‘down’, 2 ‘fast’, 2 ‘slow’). Mixing the two where both long and short-haul trains must utilise the same track or same platforms at stations will interfere with the functionality of the system. The inability of Railtrack (as it was), now Network Rail, and the Strategic Rail Authority to rapidly re-establish these fundamental distinctions of functionality is a recipe for confusion and chaos. Critical elements of the system share these functions. At present for example, the Wolverhampton to Rugby section of the West Coast Mainline (WCML) has to cope with this confusion of functionality. In order for 125mph trains to run on this line at four trains per hour, an investment of over £9 billion was announced in October 2002.

In addition the possible blurring of the functionality of parts of the system, which are currently distinct, can only add to the problems of congestion and dysfunctionality. The example that comes to mind in this case is the progressive upgrading of the Chiltern line (Snow Hill, Birmingham to Marylebone, London) as a rival to the WCML between New Street, Birmingham and Euston, London). This latter route is succeeding as a consequence of the confusion of functionality on the WCML.

The Design of the Transport Infrastructure and the Effect Upon Development of Land Uses

The functionality of communication system will have important effects upon the demand for land uses. Broadly, the provision of short-haul connections in the immediate hinterland of important nodes is likely to contribute to spread effects. By contrast the absence of these short haul connections on corridors of long-haul connectivity will enhance backwash effects as development concentrates at and around the nodal point.

Objectors to new road construction often cite examples of existing settlement form expanding to the limit of new radial and circulating road systems. The M6 Toll attracted this type of criticism and it remains to be seen how strong the planning system will be in relation to the strengthened forces for development along its length. Oxfordshire County Council's long-standing policy and reiterated again in the 1998 structure plan, in relation to the M40 has already been mentioned.

The geography of the Internet (Dodge and Shiode, 1998) is producing quite surprising forces of backwash. The availability of office districts where the main Internet Protocol (IP) addresses are to be found appears to favour the 'downtown' type of location. This may be the result of the way that the IP addresses are registered in geographical space, but the research carried out by Dodge and Shiode on the density of addressees in geographical space clearly concludes that "the majority of the UK's internet space is owned by a few urban centres" which they identified as "London and the surrounding satellite towns, along with Nottingham, Cambridge and Birmingham." (Dodge & Shiode, 1998) We may speculate the reasons for this comparative concentration. In theory Internet space activity could be carried out anywhere. In practice the organisations, which are the heaviest users, will concentrate their servers in convenient locations. These locations will need to be secure, and accessible for maintenance and modification. They may well require modern office space with its attendant cabling capacity and air-conditioning to maintain computers at their optimum efficiency. In this sense cyberspace is downtown and may be capable of promoting backwash effects contrary to initial assumptions that Information Communication Technology was going to destroy the relevance of distance and accessibility. However, whilst the location of the most intensively used servers may well be concentrated, the location of individual workstations may well be dispersed and hence the development effects of them may also be spread. The pattern of this spread will be shaped by other factors such as the distribution of skills and the pattern of the ASDL, ISDN or Broadband networks.

Polycentricity and Armature

Western Europe, as elsewhere, has been faced with dichotomous dilemmas for many years. Darwent (1969), in summarising the literature on 'growth poles and growth centres in regional planning identified them as follows: growth versus welfare, imbalance versus balance, concentration versus dispersal. He recalled Rodwin's (1961, 1962) advocacy of concentrated decentralisation in order to distribute investment, whilst taking advantage of urbanisation economics.

It is not hard to see the similarity both in appeal and design characteristics of ‘beads on a string’ (Pedersen, 1980; Schaeffer & Schar, 1975; Hall *et al* 1966; Houghton-Evans, 1978)) and the European Spatial Development Perspective’s notion of polycentricity. (1999). But to express the corridor design dilemmas in such analogous terms would require consideration of different sizes and densities of beads and different distances between beads. Hall has developed the concept of connecting a number of ‘beads’ of varying densities (Hall, T, 2003). Put in terms of polycentricity, the argument is one in favour of a hierarchy of polycentric functions.

The French debate over growth poles had thrown up the concept of ‘*armature urbaine*’, an attempt to solve the problem of ‘*Paris et le desert francais*’ in the early 1960’s. The Midlands group of the Corridesign team also proposed the concept of armature. “An armature is a wire framework around which a sculpture is modelled (Chambers Dictionary, 1995), but the term could be developed in our theoretical debate as much more than a mere framework or support. First the armature can be conceptualised as multilayered, with different infrastructural and institutional systems interacting at various nodal points. Secondly it would allow for the territory associated with the armature at a local level to vary while still being seen coherently at a transnational scale. Thirdly the infrastructure and flows can be represented as the complex matrix which occurs, rather than confining them to a limited linear *zone*. The concept can also allow a variety of institutional relationships to be incorporated.” (Chapman *et al*, 2000, P18).

Roberts *et al* (1999) have also discussed the use of the term in the context of a new larger scale urban design agenda. This new agenda is proposed as a contribution to reorienting urban design “away from its traditional focus on sites and centres” and “towards an inclusion of networks, transport interchanges and suburban sub-centres” (Roberts *et al* P.51). It is important that they developed the notion that there was a danger that the urban village could be a general prescription for sustainable urban living. Roberts *et al* offer instead, a more inclusive urban framework for sustainability. They define ‘armature’ as “not the network as a whole, rather it comprises the key features of the various urban resources which combine to form a core of movement activity and meaning” (P.56). By embracing the connectivity of the city centre and at the same time densifying the more suburban centres, “the long term aim of achieving a more compact overall metropolitan structure” is pursued (P.62) It is not proposed here that the scale of the armature will have finite characteristics, rather that it will be appropriate to specific locations and stages of development. For example at greater distances from the metropolitan areas the armature will have lower densities of its infrastructure provision. Closer to the metropolitan areas the armature’s density of infrastructure will rise.

It is proposed that for selecting appropriate policy measures, a set of alternatives or combinations of alternatives could be set out. The team summarised the potential spread and backwash effects that were likely to be the consequence of various public policies and these are illustrated in Table 2. The table attempts to set out in simple (dualistic) terms the choices for public policy as a set of consequences for hypermobility on the fringe and underdevelopment for the urban core. This is not intended to be a definitive list of policy-effect connections, nor does it attempt to weight or rank the effects.

Table 2: The likely spread and backwash effects of various policies for the study area of central England.

Backwash	Spread
Infrastructure design policy Few nodes/interchanges Few access points to the corridor	Infrastructure design policy Many nodes/interchanges Many access points to the corridor
Land Use Policies Containment Compact settlement Mixed use in old spaces	Land Use Policies Release of open land for new development
Urban morphology Densification and in-filling Mixed use designations in historic mono-use districts	Ex-Urban morphology Design guides for new settlements
Economic Development Policies Path-dependent policies Area bounded e-portals	Economic Development Policies Chase opportunities escaping existing settlement forms
Spatial Concentration of Uses Local competitive-cooperative policies	Urban/rural fringe relocations Land releases on the fringe/edge
New Industrial Space Re-use of existing buildings Brown field development Sequency test (e.g. for retail and homes)	New Industrial Space Grants for new buildings in new spaces Premium industrial locations in open land
Population ‘Churn’ Supporting good services for existing centres Investment in education, training in existing centres	Population ‘Churn’ Supporting services in suburbia and exurbia
Housing Urban renewal	Housing Planning agreements that work best in the most profitable sites
Public transport- dependent behaviour Historic nodes Maintaining investment Sequency testing	Private car- dependent behaviour

The Development of European Spatial Policy

What is the current thinking in Europe in relation to infrastructure provision and possible impacts on concentration and deconcentration? Continuing urban sprawl is identified as a problem in the ESDP. “Uncontrolled growth results in increased levels of private transport, increase in energy consumption, makes infrastructure and services costly and has negative effects on the quality of the countryside and the environment” (EC, 1999, p65)

These problems are compounded by processes of increasing social segregation in cities as a consequence of differential suburbanisation of ‘middle-to-higher’ income families (EC, 1999 p66). The ESDP sees the polycentric development model as a basis for better accessibility and espouses “parity of access to infrastructure and knowledge (EC, 1999, p26). The ESDP identifies two effects which are deemed undesirable: firstly the ‘pump effect’ where high speed/high capacity rail lines and motorways “might lead to the removal of resources from structurally weaker and peripheral regions”; secondly the ‘tunnel effect’ where these (weaker)

areas are “crossed without being connected” (EC, 1999, p26). The existing and future extensions of the Trans-European Networks (TENS) are seen as fundamental in spreading the benefits through the polycentric pattern. But secondary networks are seen as vital for the integration of the regional and urban economies and their competitiveness. The ESDP offers this view of these secondary networks whose efficiency and density will influence the strength of “the smaller and medium sized towns and their functions in generating regional development overall” (ESDP, 1999, p27). Finally the ESDP expresses concern that the development of the secondary networks and their connections to the TENS should not be allowed to lag behind (ESDP, 1999, p27). Clearly a methodology for evaluating the likely consequences of infrastructure investment for development pressures is called for.

Conclusions – a Beginning for a Territorial Impact Assessment Methodology?

Many organisations have identified the connection between the failure to regenerate the urban core, defined in this paper as ‘underdevelopment’ and the diffuse problems of urban sprawl, road and rail congestion and hypermobility. Yet in the UK we do not have in place either agencies or methodologies for addressing these issues. The EU, with its much greater emphasis on the regional scale, has developed some of the elements of agency and structure, yet without yet elaborating a methodology.

The ESDP, with its level of abstractness seeks to achieve the best of all possible worlds. It expresses a desire to safeguard existing urban hierarchy, but it seeks to make it more efficient through the development of TENS and their secondary transport networks. However such improvements are likely to transform the urban hierarchy as the geography of locational advantage is itself transformed. A consideration of likely ‘spread’ and backwash effects of transport and communication networks and corridors may well prove very useful in determining the best design for the networks. The call in the ESDP for territorial impact assessment (TIA) as an instrument for spatial assessment of large infrastructure projects (EC, 1999, p28) is to be welcomed. The elaboration of the spread and backwash ideas may be a fruitful way of building such a TIA methodology. The characteristics of such TIA are yet to be elaborated. But it would seem that any significant changes and additions to elements of the armature should be the subject of a TIA. If the TIA idea is to grow, it remains an important task to construct its methodology. The relevance of reworking Myrdal’s concepts of ‘spread’ and ‘backwash’ are likely to prove beneficial. In the UK, the regional context for making an integrated spatial framework for planning has come into existence over the last ten years. CORRIDESIGN showed that the scale needed for such activity needed to be pitched also at a supra-regional level, whilst many current infrastructure investment decisions are made at sub-regional, with insufficient being made at regional and national level. TIA would capture policy issues across the broader region. Specifically it would provide opportunities to evaluate the impact of non-urban infrastructure investment upon the existing urban and rural areas. It would begin with a list of proposed investments that would become the subject of TIA as part of normal planning activities, whether they are to be decided at national level, through the regional strategic statements or local development frameworks.

Any mistakes and shortcomings of this paper are accepted as the responsibility of the principal author.

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