

PLANNING, SPATIAL STRUCTURE OF CITIES AND PROVISION OF INFRASTRUCTURE

The provision of infrastructure such as transport networks, water, sewerage, electricity and telecommunications plays key roles in the development of efficient, healthy and sustainable cities. Other urban facilities and amenities such as schools, health services, social services, markets, places for gathering, worship and recreation are also important to the development of liveable cities.

These elements of infrastructure and facility provision are important in shaping the spatial structure of cities, at a city-wide and more local scale, and can result in certain sections of the population becoming spatially marginalized and excluded from access to urban opportunities. While planning potentially plays important roles in the way infrastructure and facilities are organized and in the spatial structuring of cities, its role has often been relatively weak, largely due to informal urban development processes, the growing importance of urban mega-projects and privately driven developments.

As noted in Chapter 2, more than a third of all urban residents in developing countries are currently living in slums. While many urban poor live in inner-city slums, the majority of the urban poor in developing countries are living in informal settlements on the urban periphery. These settlements are often characterized by low levels of services. Access is also likely to be difficult since mass transit systems are often poorly developed, and areas accessible to the poor may not be located on main routes.

This chapter explores how contemporary urban spatial trends are being shaped by the ‘unbundling’ of infrastructure development, disjointed from spatial planning through forms of privatization, developer-driven growth, and urban mega-

projects. It also examines the links and interrelationships between forms of infrastructure provision, spatial organization and access; and between urban form, sustainability, efficiency and inclusiveness. The final section explores various contemporary initiatives to align spatial planning and infrastructure development.

SPATIAL PLANNING, THE PRIVATIZATION OF INFRASTRUCTURE DEVELOPMENT AND MEGA-PROJECTS

Traditional approaches to planning attempted to align land-use planning with infrastructure provision through a comprehensive master planning approach, and through the public provision of infrastructure. There were, however, many deficiencies in these processes, and from the 1980s, new urban development and infrastructure provision became far less a matter of planning, and far more dominated by private sector interests. This process of ‘unbundling’ has in part underpinned the spatial trends discussed earlier in this report.

One of the core functions of traditional **master planning** was to provide the basis for the integrated provision of transport, energy, water and communication with urban development. Master plans provided projections and guidance for the location, extent and intensity of particular land uses in the city. While this kind of planning might have been effective in some developed countries, there were problems in many others. Under communism in Eastern Europe and Central and



Urban sprawl is a common outcome of modernist urban planning during the era of cheap fossil oil

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Eastern Asia, master plans were driven by economic targets developed at the national level, without consideration of local needs. In most colonial contexts, planning and infrastructure provided by the public sector was only for an elite, and projections anticipated a small population which was soon outstripped by growth in the post-colonial period. Nor did patterns of development necessarily follow those anticipated, particularly with the rapid growth of high-density informal settlements. The accuracy of the ‘predict and provide’ approach was called into question.

In several countries, spatial planning occupied a marginal institutional position in relation to far more powerful departments responsible for various kinds of infrastructure planning and development. Departments ‘working in silos’ developed their own plans, which did not necessarily link to one another or to the master plan. In these contexts, the provision of infrastructure has been far more powerful in shaping the spatial form of cities than planning.

From the late 1970s, the **‘unbundling’ of infrastructural development** through forms of corporatization or privatization of urban infrastructure development and provision, and developer-driven urban development, has tended to drive patterns of fragmentation and spatial inequality in many countries. In many countries (particularly transitional and developing countries), a local government fiscal crisis underpinned a shift towards the privatization of service provision.

‘Unbundling’ has taken various forms and has occurred in both the provision of infrastructure and services, and in urban development projects. It includes leases and concessions; public-private partnerships of various kinds, but

also in major urban development projects; involvement of the private sector in building, financing and managing infrastructure; as well as private concessions to build and run toll roads, amongst others. Small local entrepreneurs and systems of community management are also being used in solid waste collection, water, housing and sanitation in many developing countries. The ‘unbundling’ approach has sometimes led to a relatively *laissez faire* approach to development, where proposals by developers are accepted even when they are contrary to plans.

The period since the 1980s has also seen a major growth of urban **mega-projects** linked to an emphasis on urban competitiveness and urban entrepreneurialism. In many cases, particularly in Europe, mega-projects are linked to urban regeneration initiatives designed to reposition declining economies to capture new or growing economic niches. In several Asian cities, mega-projects are being developed *de novo*, not only as prestige projects, but also to lay the basis for new forms of economic development. Box 9 summarizes six common forms of mega-projects.

Projects of this type have varying relationships to the public sector. While some are completely privately driven and provided, in other cases, they are initiated and funded by the public sector in the hope of attracting private development. Private-public partnerships, or arrangements in which the public sector provides bulk infrastructure and connections while the private sector undertakes development within these parameters are also common.

Although there are some examples where such projects work with spatial planning processes and inclusive

Box 9 Common forms of mega-projects

- Developments linked to event tourism, such as conference centres, exhibition sites, sports stadia.
- Redevelopment of old industrial areas and ports towards a new service, leisure and tourist economy.
- Development of new areas linked to high-tech industries and economic activities.
- Major new satellite cities with international standard facilities.
- Major enclave developments taking the form of gated communities containing a variety of retail, school, entertainment and other facilities for the wealthy.
- Enterprise zones or special economic zones set up by national or local governments to attract new investment, sometimes linked to major airports and other developments.

visions of urban redevelopment, in many cases, mega-projects are in contradiction to spatial plans, and enable unequal development out of synchrony with the needs and aspirations of ordinary residents.

THE INFLUENCE OF INFRASTRUCTURE ON URBAN SPATIAL STRUCTURE AND ACCESS

Among the various forms of urban infrastructure, **transport networks and systems** are generally acknowledged to be the most powerful in shaping urban spatial structure. As recognized in classical urban economic models, the significance of access translates into higher land values around nodes and routes offering high access. Thus economic activities requiring high levels of accessibility cluster around rail stations and tram routes, along main roads or in nodes close to major intersections of highway systems. Residential developments similarly seek accessibility, thus the development of new routes and transport systems provide important ways of structuring cities over the long term. The accessibility-value relationship however means that high-income groups are more able to pay for access and thus to locate close to good transport routes that suit the transport mode that they use, although they may also choose more distant locations and longer travel times.

Much has been made of the role of highways in facilitating the suburban form of development, and in encouraging urban sprawl. Accommodating the motor car has been an important theme of 'modern' planning in many parts of the world. High levels of car-dependence and the low densities associated with car-dominated cities, however, make access difficult for those without this form of transport — the elderly, disabled, youth, women in families with single cars, and low-income workers in suburban office locations and homes, such as cleaners, domestic workers, and clerks. Further, the emphasis on planning for mobility in cities neglects the significance of pedestrian and other non-motorized forms of transport in cities in developing countries. Amsterdam provides an example of where sustainable accessibility has been created through a combination of appropriate land use and transport policies.

The structure of public transport systems can also shape the spatial organization of cities in important ways, and has been a crucial element of attempts to restructure cities spatially, for example in Curitiba, Brazil, and Portland, US.



Development of major highways facilitates urban sprawl

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Heavy rail systems in large dense cities (often taking the form of underground systems in central areas) are critical in supporting both good interconnections in central areas, as well as links between central and outlying areas. Commuter rail systems mainly link outer areas to the centre, while light rail and tram systems provide good connections within central areas, and between these and secondary nodes and suburban corridors. Rail and train stations provide potential points for more intensive developments, but potentials are contingent on the way these services are used, as well as how stations are regulated and developed.

Buses are more adaptive, and require lower densities to operate, but are also slower and less efficient, and are likely to have less impact on spatial organization. The use of dedicated busways, however, increases speed and capacity and thus usage, and does create more structured routes around which more intense development can occur.

Major infrastructural systems for **water, sewerage, electricity and telecommunications** have also structured cities spatially in important ways, although their direct impact is less obvious than is the case for transport systems. All of these systems involve the establishment of major bulk elements which require large fixed investments and thus provide capacity for growth in particular areas. Such bulk elements include dams and water treatment works, reservoirs, pump stations, sewerage treatment facilities, power sub-stations, mobile phone masts and fibre-optic cables.

The availability of trunk lines for water, sewerage and transmission lines for electricity in particular areas reduces development costs and thus influences patterns of growth. While bulk infrastructure does not usually feature high on

planners' agendas, it can be key in shaping patterns of spatial development. However, proximity to networks for water, energy and sewerage does not mean that households can afford access to them.

The spatial form of cities, their **liveability and inclusiveness**, is also shaped by access to a broader range of infrastructural facilities and amenities, such as schools; clinics; crèches; community halls; libraries and learning facilities; safe spaces for recreation; spaces for religious and cultural practices; fresh food and other local markets and retail outlets; and appropriate spaces for economic activity.

Ideally, local planning should create places that meet the everyday requirements of diverse groups of people: men and women; old and young; the disabled; different cultural groups, and so on. Understanding and responding to these diverse needs is an important part of planning. The tradition of gender analysis and gender mainstreaming within planning is increasingly providing useful methodological tools and frameworks for assessing needs and potential responses, as does the more recent emphasis on planning for diversity.

THE COMPACT CITY DEBATE: SUSTAINABILITY, EFFICIENCY AND INCLUSIVENESS

While there is a predominant spatial trend in most cities towards sprawl, many analysts argue for promoting more compact cities. Some countries such as South Africa, and cities such as Curitiba, Brazil, and those linked to the 'smart growth' movement in the US, have adopted these ideas as policy, although implementation often falls short of intentions.

Arguments in favour of compact cities revolve around claims that they are more efficient, inclusive and sustainable. The costs of providing infrastructure are lower, there is better access to services and facilities since thresholds are higher, the livelihoods of the urban poor are promoted and social segregation is reduced. The time and cost spent travelling is also lower. Compact cities are less reliant on cars and minimize distances travelled and hence fuel use, and have less impact on farmlands and environmental resources. As a consequence, they are theoretically more resilient in the context of climate change, and have, generally, fewer harmful impacts. Critics, however, question several of these claimed benefits, and argue that compaction is contrary to market forces towards sprawl, the decentralization of work, and residents' desires, and hence is not politically feasible — or even desirable. Higher density, they argue, is associated with



The Plaine Saint-Denis mega-project in Paris illustrates the way urban infrastructure has been developed in recent years

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congestion and pollution, higher crime rates, and puts greater pressure on natural resources. Containment policies push up land costs and also encourage development beyond restricted zones.

Much of the debate has focused on cities in developed countries, where high car ownership rates in an era of low fuel costs have propelled low-density sprawl. Nevertheless, higher densities only provide the conditions for public transport, they do not guarantee it. Nor do they prevent rising car ownership and use, even where public transport systems are relatively good, as, for example, in Japan.

Cities built on low density lines may, however, find adaptation or change towards greater compaction difficult to achieve. Cities are 'path dependent' in that their spatial structures are largely set in place and change slowly. Major changes require well-coordinated and consistent policy and implementation over a long period of time on infrastructure development, taxation and land-use regulation, and there are few cases where this has been possible — Curitiba, Brazil, being a notable exception. Research indicates that it is difficult to provide efficient public transport in cities with lower densities than 30 people per hectare, but the actual threshold varies by transport type as well as in terms of contextual factors such as spatial organization and topography.

Pre-existing conditions for compaction vary between contexts. On the whole, urban densities are much higher in developing than developed and transitional countries. Critics question whether the concept has relevance in the cities of developing countries, which already contain many elements of urban compaction: mixed use largely as a consequence of the lack of regulation, very high densities (at least at the

centre), and a reliance on public transport, largely as a consequence of low incomes. Furthermore, densification processes are often occurring in informal settlements through processes of autonomous consolidation. The role of public policy or planning in this context is thus questioned.

Yet, the benefits of urban densification, at least for the inner-city poor, are apparent: while housing costs are high and they have less space, they have greater livelihood opportunities (particularly in the informal sector) and access to employment. Transport costs are low and they are able to rely to a greater extent on non-motorized transport. In many respects, dense areas in cities of developing countries, including informal settlements, are living versions of compact city ideas — and they arguably have greater relevance in this context. Planning and public policy might most appropriately work with these processes of change to consolidate the position of the inner-city poor, and to support existing processes of informal upgrading, and improvement of infrastructure and services.

Do compaction ideas have value for development on the periphery of cities in developing countries, or for managing urban growth? The urban periphery has in some cases provided space for households willing to trade lower housing costs and more space for longer travel distances to economic activities. Where there are local economic opportunities or few commuters in a household, peripheral location is likely to be attractive. The opportunity to rent housing or to combine incomes from rural and urban economic activities are some of the livelihood opportunities for households located on the periphery in many developing countries, suggesting that the needs and livelihood strategies of poor households are diverse, and generally logical.

CONTEMPORARY APPROACHES TO LINKING SPATIAL PLANNING TO URBAN INFRASTRUCTURE

This chapter has shown that urban infrastructure developments have shaped the spatial form of cities, but in ways that intersect with social, economic, political and institutional dynamics. While the detailed and static land-use planning associated with traditional master planning has generally been discredited, strategic spatial planning that is able to give direction to major infrastructure development is an important part of the new approach to planning. Table 9 provides a simplified summary of contemporary initiatives to link spatial planning to urban infrastructure development, and



The Stade de France, built for the 1998 FIFA World Cup, is part of the Plaine Saint-Denis mega-project in Paris

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to use major elements of urban infrastructure, such as transport routes and systems, to influence spatial form.

CONCLUDING REMARKS

The ‘unbundling’ of urban development, and a weakened role for the public sector and for planning, has in part underpinned trends towards socio-spatial polarization and growing urban sprawl. Yet there is a growing recognition of the problems associated with these patterns, and a search for new approaches to spatial planning that link more closely with infrastructure development in this context.

Planning should seek to promote compaction in ways that are appropriate to the local context. Yet, most future development is likely to continue to involve further expansion on the periphery. If planning is to be effective, it must seek ways to direct, support and structure this growth, and to reinforce informal processes of upgrading and consolidation. Enabling the expansion of economic activity and of the livelihoods of the poor, and improving infrastructure, services and facilities on the periphery is also important.

Linking spatial planning to infrastructure development is critical in this context. The public sector should provide the main routes and infrastructure trunk lines in advance of development, allowing the private sector, NGOs, other agencies and communities to connect to these main lines as they are able.

Planning of this sort will require a good understanding of trends, development directions and market forces, but it will also need to be based on collaborative processes that draw together various public sector agencies and departments with a range of other stakeholders from civil society and business.

Broad approach	Important terms and approaches	Strengths	Weaknesses and contingencies
Smart growth and transit-oriented development	Smart growth Compact development Integrated development Mixed-use development Intensification Coordination Transit-oriented development	Encourages inter-sectoral and inter-agency links Encourages links between planning and implementation Improves sustainability Improves public transport Strong transport–land-use links Can slow urban sprawl	These good links are difficult to achieve Assumes significant capacity and organization Poor or narrow implementation undermines prospects Popular support difficult to achieve due to conflicting views and lifestyles Claimed benefits contested
Integrating land use and transport	Bus rapid transit (BRT) Corridors and axes Integrated rail redevelopment Linking economic activities to transport type New transport/land-use models	Improves public transport Improved usage of public transport Reduces energy and improves efficiency Better transport–land-use links New models enable better understanding of patterns	Heightened property prices on transport axes can marginalize the poor Required integration can be difficult to achieve Needs good understanding of social and economic dynamics and space – difficult to achieve Land use–transport links undermined by different logics, institutional divides New models still data hungry, aggregated, distant
Strategic spatial planning and infrastructure planning	Strategic plans Infrastructure plans Transport–land use links	Can give long-term direction to development Can avoid inequitable and unsustainable development Avoids fragmented development	Conditions required to work are demanding/difficult to achieve Credible analysis Inter-sectoral coordination Stakeholder involvement and buy-in Regular review Internal champions
Integrated urban development and management plans	Multi-sectoral investment plans (MSIPs) Physical and environmental development plans (PEDPs)	More flexible, less data demanding, and easier to prepare than master plans Participatory Helps to manage urban growth in context of scarce resources/capacity Can be used iteratively in decision-making process	Problematic if seen in static or narrow way Required inter-sectoral cooperation hard to achieve Can be countered by political decision-making
Strategic structure planning	Integrative framework Long-term vision	More flexible, less data demanding and easier to prepare than master plans Participatory Multifaceted approach Combines short-term actions with long-term planning	Required political and stakeholder buy-in may be difficult to achieve May still be relatively technocratic May not provide detail necessary for some decisions
Linking spatial planning to infrastructure planning	Integrated development plans Spatial frameworks plans	More flexible, less data demanding and easier to prepare than master plans Participatory Gives direction to infrastructure planning GIS-based models can be used as an input	Required consistency in policy and coordination between agencies difficult to achieve Can be too broad to be useful May be contradicted by the market
Linking mega-projects to infrastructure development	Urban regeneration Multifunctional	Powerful driver in urban form Evolving approaches allow linking to planning over the long term Building cooperation between various sectors and agencies	Mega-projects often politically driven and one-off: approach is hard to achieve Level of integration and cooperation difficult to achieve

Table 9

Approaches linking spatial planning to urban infrastructure