

# URBAN TRANSPORT AND CITY DEVELOPMENT

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Deteriorating transport conditions associated with urban sprawl and increased motorization are damaging the economy of large cities. Structural policies such as well-planned transport infrastructure expansion, planned deconcentration, comprehensive management of land-use structure, or liberalization of land markets can help, but they require careful coordination of transport policies within a broader city development strategy.

## URBAN TRANSPORT AND CITY EFFICIENCY

In this chapter we consider the impact of urban transport on the development of the city economy. In most developing countries the urban sector accounts for at least 50 percent of the gross national product (GNP); in some countries that number is over 70 percent. Cities in developing countries often devote 15 to 25 percent, and sometimes much more, of their annual expenditures to their transport systems. Between 8 and 16 percent of urban household income is typically spent on transport, although this can also rise to more than 25 percent for the poorest households in very large cities. About one-third of all city infrastructure investment need is for the transport sector. Despite recent developments in private sector involvement in transport infrastructure finance, most of this investment will have to come through the city budget.

Urban population is expanding at more than 6 percent annually in most developing countries. In many formerly rural economies, such as China, because of the need to decrease the number of persons dependent on agriculture and to improve productivity in rural areas, urbanization is viewed as a prerequisite of growth. Within a generation more than one-half of the developing world's population will live in cities. This implies an increase

of 2 billion—equal to the present-day total urban population of developing countries.<sup>1</sup> The number of megacities—cities with over 10 million inhabitants—is expected to double, with three-quarters in developing countries. Some growth will be in high-density peri-urban settlements outside the range of the existing urban facilities and authorities. Much growth is likely to consist of urban sprawl, which militates against adequate public transport service supply, encourages auto dependence, and hence reduces accessibility to employment and to urban facilities for the poor and very poor. It is therefore important to explore possibilities of improving the economic performance of cities by better integrating transport with other aspects of city development strategy (CDS).

Cities exist because of economies of agglomeration associated with industrial and trade activities. The “advanced” sectors are located there, and labor productivity is typically higher in cities than in rural areas. The dominance of large and dense capital cities in many developing countries suggests that these advantages continue up to megacity size.

Within these cities motorized road transport is the main mode of movement. While longer-distance movements of goods and passengers may make significant use of other modes, and nonmotorized transport (NMT) may perform an important role

in short-distance movements of passengers (and in some cities, of freight), most large cities in the world that are not dependent on mechanized road transport for the majority of internal freight and passenger movement are poor, relatively unproductive, and wish to change their situations. Of all cities, megacities have the highest travel times, the greatest congestion, and the most polluted environments. The strategic quandary, particularly in countries where the capital city dominates, is how to retain the economic benefits of city scale while limiting the deterioration of transport performance that may be associated with size and density.

Particularly in Asia, this deterioration of transport performance appears to be generating a rapid growth of motorized two-wheelers that are faster than either bicycles (because of their power) or buses (because of their personal nature, thus their maneuverability). The new two-wheelers are so inexpensive that even the relatively poor can afford them. For example, a recent study of Delhi, India, showed that with an average per capita income of less than \$2,000 per year, over 80 percent of households have motorized vehicles, mostly two-wheelers. They offer personal motorized mobility, albeit presently at a high environmental and accident cost (see chapter 5), although technology exists to clean them up very substantially at little extra cost. Moreover, there is also evidence that they make more effective use of road space per person than either bicycles or private cars. In the short term, therefore, there does appear to be a rather different development path available for the developing countries involving greater personalized mobility than was available in the industrialized countries at equivalent income levels in their development. The long-term strategic question is whether motorcycles are simply going to be viewed as a transition step to an unsustainable level of private automobile ownership and use, or whether by good traffic management and segregation they can be sustained as the core of a more mobile, but safe and sustainable, urban transport system.

In addressing that quandary, it must be recognized that cities differ greatly in economic, social,

and spatial characteristics. Moreover, any individual city will change its characteristics over time. We cannot hope to produce a simple blueprint for the development of urban transport systems that is appropriate for all cities at all times. Nevertheless, although each city has its own peculiarities, four characteristics stand out as explanations of transport differences:

- a. **Income.** Vehicle ownership is primarily dependent on income, in developing as in industrialized countries. Though rich countries tend to have more road infrastructure than do poor countries<sup>2</sup>—and at the national level, paved roads tend to be undersupplied in countries with low and middle per capita incomes<sup>3</sup>—the growth of urban road space with income is likely to be slower than that of traffic volume with income. Hence, unless vehicle use is dramatically restricted, as it has been in Singapore, traffic levels and congestion are likely to increase with income.
- b. **Size and size distribution.** As city size, and particularly spatial extent, increases, so typically do the average length of commute, the level of traffic congestion, and the environmental impact of road traffic. Megacities have some of the worst problems of urban poverty, as well as the worst problems of urban transport.<sup>4</sup> This is accentuated in countries that are dominated by their capital cities.<sup>5</sup>
- c. **Political history.** The form of modern cities inevitably reflects their historical transition between economic and social systems. The most notable are those differences between former socialist planned cities, many of which had widely dispersed pockets of high-density residences served by mass transit, and those cities where market forces played a greater role in shaping land use.<sup>6</sup> In particular, the transition economies combine rapidly increasing motorization with a rapidly declining fiscal capability to support their traditionally extensive public transport systems.

- d. **Population growth rates.** Rapidly growing cities are distinct for two reasons: they appear to have above-average car ownership rates in relation to income for the national average income levels, and they tend to have below-average proportions of land space devoted to circulation. Together these militate for high congestion.

These influences clearly overlap and interact. Abstracting from the issue of city size, they give us a taxonomy of city types into which major cities can be divided (table 2.1), but which to some extent explains the type of public transport systems that they have acquired. For example, high-income countries are highly motorized and congested, but also tend to be more able to afford rail-based mass transit systems. Where growth has been very rapid, the development of mass transit is less likely to have kept pace. Where population growth has been slower, and particularly for the cities in formerly centrally planned economies that have suffered stagnating incomes, the probability of there being mass transit systems is greater than income alone would suggest. These differences between types of cities, and the influences which cause the differences, should be borne in mind when interpreting the more generic discussions that follow.

## THE ECONOMIC IMPACT OF POOR URBAN TRANSPORT

The pressures on urban transport systems are increasing in most developing countries as part of the process of growth. Motor vehicle ownership and use are growing even faster than population, with vehicle ownership growth rates of 15 to 20 percent per year common in some developing countries. The average distance traveled per vehicle is also increasing in all but the largest, most-congested cities. This growth exceeds the ability to increase road space, and the major impediment to the efficient working of the urban economies in large-size cities, and particularly in megacities, is the level of road traffic congestion. Travel speeds are decreasing and the travel environment for pedestrians and people-powered vehicles is deteriorating. Downtown weekday traffic speeds are reported to average 10 kilometers per hour (km/h) or less in Bangkok (Thailand), Manila (Philippines), Mexico City (Mexico), and Shanghai (China); 15 km/h or less in Kuala Lumpur (Malaysia) and São Paulo (Brazil). It is estimated that congestion increases public transport operating costs by 10 percent in Rio de Janeiro (Brazil) and 16 percent in São Paulo. Of the 16 developing-country cities with populations of more than 4 million, 5 of them (Bucharest, Romania; Jakarta, Indonesia; Kinshasa, Republic of Congo; Lagos, Nigeria; and Manila) cited aver-

TABLE 2.1 A CATEGORIZATION OF CITY CIRCUMSTANCES				
		Income/motorization rates		
		Low	High	
Population growth	High		Singapore	Formerly centrally planned
		Dhaka, Bangladesh	Bangkok; Manila; Hong Kong, China	Market
	Low	Samarkand, Uzbekistan; Almaty, Kazakhstan; Bishkek, Kyrgyz Republic	Moscow, Russian Federation; Warsaw, Poland; Budapest, Hungary	Formerly centrally planned
		Dakar, Senegal; Nairobi, Kenya	Prague, Czech Republic; Buenos Aires, Argentina	Market

Source: Authors.

age one-way commute times of one and one-quarter hours or more (UNCHS 1998). Growth of measured gross domestic product (GDP) is also reduced by freight congestion, delays and unpredictability, difficulties of conducting business, and increasing signs of disarticulation of the labor market in some large cities such as São Paulo, Mexico City, and Manila. All this is occurring despite the fact that motorization is still at a relatively early stage in most developing and transitional economies; most developing countries have fewer than 100 cars per 1,000 people, compared with 400 or more per 1,000 people in the richer industrialized countries.

Furthermore, most transport-originated air pollution, as well as nonbusiness time lost to congestion, is efficiency reducing but is not directly reflected in GDP statistics. The safety and security of travelers is also diminishing in many large cities. Some of these impacts can be, and have been, valued in monetary terms. Table 2.2 presents a summary of some estimates of external costs of road transport at national and regional levels. Recent World Bank estimates suggest that the total economic damage of air pollution represents up to 10 percent of GDP in polluted cities such as Bangkok, Kuala Lumpur, and Jakarta.<sup>7</sup> For six developing-country cities with a total population of over 50 million (Mumbai, India; Shanghai; Manila; Bangkok; Kraków, Poland; and Santiago, Chile), World Bank estimates show the costs of particulates and other vehicle emissions (excluding lead) as equivalent to 60 percent of the import cost of gasoline and over 200 percent of the import cost of diesel.<sup>8</sup>

## **SOURCES OF DECLINING URBAN TRANSPORT PERFORMANCE**

It is sometimes presumed that the deteriorating state of urban transport in many developing countries has been caused by relatively higher levels of motorization with respect to income levels than are experienced in the industrialized countries. The evidence does not support that proposition.

In terms of the relationship between income and car ownership, the developing countries are following a pattern very similar to that followed by the industrialized countries, as figure 2.1 shows. Most developing countries fall in the development track shown for France, Japan, Spain, and the United Kingdom. Only Argentina, Brazil, Mexico, and some of the transition countries of Eastern Europe have higher car-ownership-to-income ratios than the industrialized countries experienced. Chile, the Republic of Korea, the Philippines, and Thailand all have lower national rates, but all have highly congested capital cities that have much higher incomes and (contrary to experience in most Western industrialized countries) much higher car ownership rates than the national average.

The problems of the developing countries thus do not generally seem to result from motorization occurring at lower per capita income levels or at higher rates of income growth than that experienced in the earlier growth of the industrialized countries. Nevertheless, there are some respects in which the present situation does appear to differ from that of the industrialized nations at a similar stage in their income growth:

- High concentration of national population, economic activity, and motorization itself in one or a very few major cities that are expanding rapidly in size and population
- Inadequate quantity and structure of road infrastructure, often associated with rapid population growth
- Poorly developed institutional, fiscal, and regulatory arrangements at the municipal level.

## **LONG-TERM DYNAMICS OF URBAN ECONOMIC STRUCTURE**

There is also a long-term dynamic interaction between transport and the nature of the city economy. Cities have economic cores explained by various forms of agglomeration economies, which are often based on a traditional industrial or trading base. Those employed in the city center choose their places of residence by trad-

Country or city	Year	Source	Road costs	Land and parking	Con-gestion	Accidents, net of insurance	Pollution				Sub total	Revenue from road users	Net sub-total	Others	Total
							Noise	Local air	GHGs	Other					
United States 1	1989	WRI	1.64 <sup>a</sup>	1.56	—	1.00	0.16	0.18	0.50	—	5.04	a	5.04	0.46	5.5
United States 2 <sup>b</sup>	1990	NRDC	1.25 <sup>a</sup>	0.43-1.74	0.19	1.71	0.05	2.09-3.83	—	0.07	5.69-8.84	a	5.69-8.84	0.78-2.61	6.47-11.45
United States 3	1991	Lee	1.76	2.41	—	0.24	0.19	0.73	—	0.26	5.59	0.88	4.71	0.87	5.58
EU1	Early 1990s	ECMT	1.75	—	0.74	2.40	0.30	0.60	0.50	—	6.30	1.67	4.63	—	4.63
EU2	Early 2000s	ECMT	1.49	—	0.75	1.20	0.30	0.15	0.47	—	4.36	1.67	2.69	—	2.69
United Kingdom	1993	CERGE	0.24	—	3.03	0.46-1.49	0.41-0.49	3.12	0.02	—	7.28-8.39	2.60	4.68-5.79	—	4.68-5.79
Mexico City	1993	Ochoa	—	0.08	2.56	2.32 <sup>c</sup>	—	0.64	—	—	5.60	—	5.60	—	5.60
Poland	1995	ISD	1.14	—	0.30	1.60	0.10	0.30	—	—	3.44	2.81	0.63	—	0.63
São Paulo	1990	IRBD	—	—	2.43	1.11	—	1.55-3.18	—	—	—	—	5.09-6.72	—	5.09-6.72
Buenos Aires	1995	FIEL	0.73	—	3.42	0.5-2.00 <sup>d</sup>	—	0.97	—	—	5.62-7.12	1.01	4.61-6.11	—	4.61-6.11
Bangkok	1995	Misc.	—	—	1.00-6.00	2.33	—	2.56	—	—	5.89-10.89	—	5.89-10.89	—	5.89-10.89
Santiago	1994	Zegras	1.37	1.92	1.38	0.94	0.15	2.58	—	—	8.35	1.64	6.71	—	6.71
Dakar	1996	Tractebel	—	—	3.37	0.16-4.12	—	5.12	—	—	8.65-12.61	—	—	—	8.65-12.61

--- Not available.

Note: GHGs = greenhouse gases; EU = European Union. In most cases, congestion costs are calculated in comparison with either a free-flow speed or an "acceptable" traffic performance, and not with a calculated "optimum" level of congestion. The calculated values may thus overestimate what it would be economic to eliminate.

a. Road costs given net of revenues from road users.

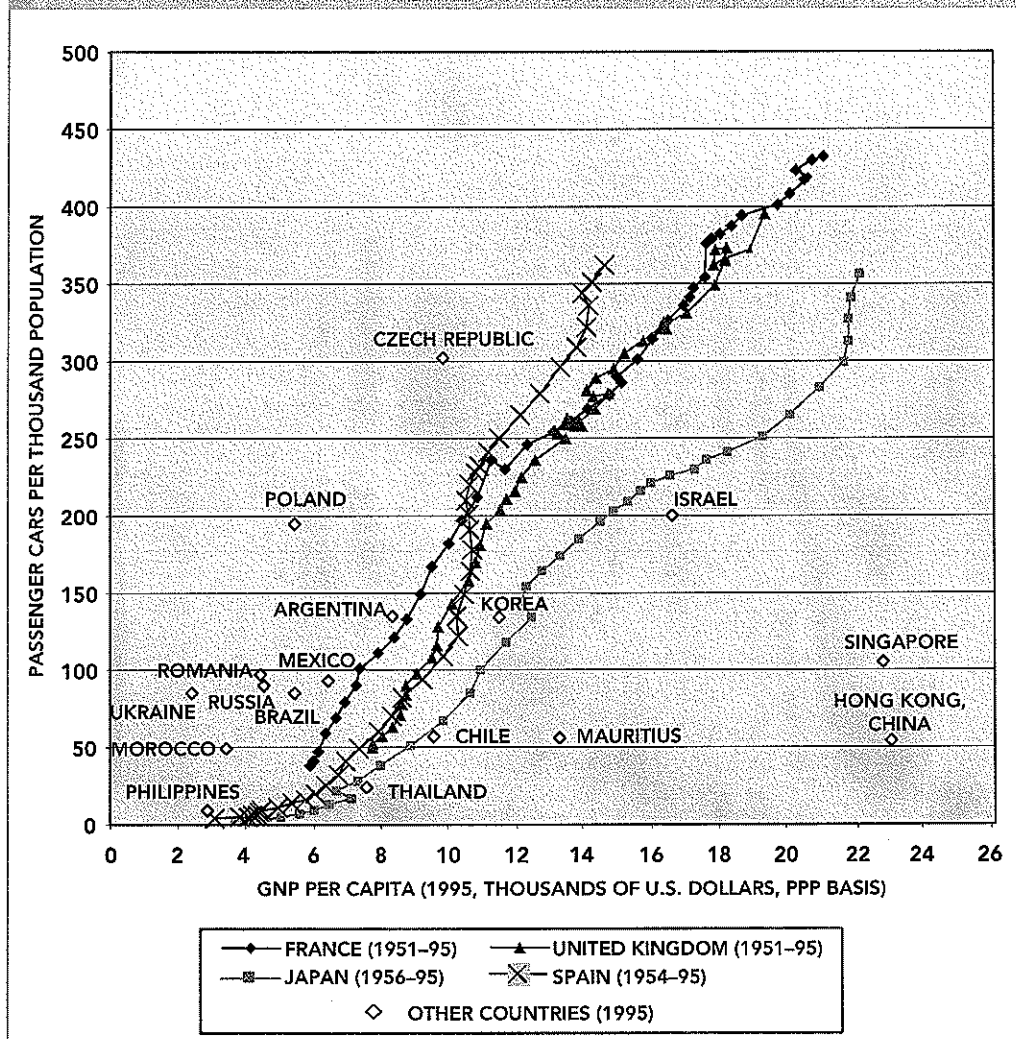
b. Cars only.

c. Gross of insurance compensation.

d. Calculated on nationwide basis and gross of insurance compensation.

Source: Willoughby 2000a.

**FIGURE 2.1 MOTORIZATION AND INCOMES: GROWTH OF CARS VERSUS GROWTH OF PER CAPITA INCOMES IN FRANCE, JAPAN, SPAIN, AND THE UNITED KINGDOM, 1950s TO 1995; AND THE RELATIVE POSITIONS OF SELECTED OTHER COUNTRIES, 1995**



Source: Authors.

ing off increased travel costs against the lower land costs (and greater availability of space and amenities) as the distance between places of residence and employment increases. As both city-center congestion and incomes increase, people are willing to pay more for space and amenities, so they travel farther to live where land is less expensive and home-based movement easier. Thus the area of the city increases. Paradoxically, to avoid road congestion, people move to loca-

tions in which they become increasingly dependent on the car. This trend is accentuated by investments in radial trunk route capacity and by technology improvements that increase speed and reduce cost.

Similar considerations motivate firms. As the city grows and its economic base diversifies, those which need more space—often the larger export-oriented companies engaged in modern assem-

bly-line production technology—may flee from the old, high-rent, congested city center to locations with less expensive land cost and better external access to ports or intercity trunk road systems, while firms in trades and services may stay in the center to maintain access to customers.<sup>9</sup> In many industrialized countries, this has already led to a relocation of freight movement-intensive activities to peripheral locations. The existence of a limited number of major radial transport routes may lead to star-shaped patterns. There may be several subcenters along any radial; where radials intersect with external rings, new nodes of high commercial density emerge. Despite this the old city center survives, retaining the highest-value commercial activities.

In richer industrialized countries, urban sprawl is characterized by unbounded outward spread of development from the urban core, at low density, often “leapfrogging” areas of undeveloped land to enter new jurisdictions competing for development.<sup>10</sup> When employment follows residential development, it creates the phenomenon of the “edge city.”<sup>11</sup> It is generally agreed that sprawl increases the public and private costs of infrastructure per residence, while draining the fiscal capability of the traditional core causing decay of the core’s infrastructure and decline of its services. In transport terms it is generally agreed that this increases trip lengths (even when employment is also decentralized) and auto dependence, although it does not necessarily increase household travel expenditure, trip times, or overall congestion. Sprawl fosters a spatial mismatch between the places of work and residence of the poor. Despite these disadvantages, suburbanization appears inexorable in higher-income cities.<sup>12</sup>

Not all of these features of sprawl are replicated in the municipal development process of transitional and developing economies. In many of the former socialist cities, leapfrogging was part of the planned structure, with high-density enclaves in peripheral areas surrounded by undeveloped land and linked to centralized employment by

high-capacity public transport links. The new sprawl in these economies tends to take residences even farther out, however, and away from the traditional high-capacity public transport axes. In many of the rapidly growing developing cities, it is the poor rural-to-urban migrant who is located in the peri-urban settlements; land-use policies may even counter inner-city densification. The peri-urban settlements are too low income to be served by private automobiles, so that their development is associated with increases in household travel time and household budgets.

From the individual or company point of view, this outward shift of activity is an economically rational adjustment to increase accessibility, either to the amenity of space in the case of households or to markets and suppliers in the case of firms. In making decisions to change locations, however, neither individuals nor firms need to take into account the indirect effects that their decisions are having on others. If transport prices are less than real costs (because they do not take into account congestion or environmental effects) or if infrastructure is provided below cost in new peripheral locations (because connection charges and impact fees are too low), then the city will sprawl farther and faster than is economically optimal. Some administrative action will then be necessary to curb this distortion. Planning intervention may also be necessary at the micro or local level, where new industrial developments may have adverse effects on the amenity of existing residential activities for which they are not charged, with the consequence that the mix of activities (or environmental protection in mixed activities) is suboptimal.

## **URBAN TRANSPORT IN CITY DEVELOPMENT STRATEGIES**

The process of strategy development will vary from city to city. It is likely to require collective vision for the city shared by city government and the major stakeholders in civic society; an agreed-on strategic framework for realizing that vision;

to move to alternative locations, this focused strategic treatment of freight movement tends to channel freight movements in ways that are mutually acceptable to those concerned with local congestion and the environment, and those concerned with efficient freight movement. Even in the great port cities of the world, the shift of port facilities downstream has usually shifted concentrated freight traffic flows out of the cities rather than into them.

Very different considerations apply in many developing-country cities.<sup>15</sup> Ports, industry, and commodity markets often remain in their historic city-center locations. Roads in these areas are often narrow and encumbered, requiring the use of more, and smaller, vehicles for freight flows, including very small nonmotorized vehicles—such as handcarts, bicycles, and rickshaws—in many places. Peripheral infrastructure, which attracts much freight-intensive activity out of the center of developed-country cities, is less well developed. Freight vehicles therefore account for a larger proportion of urban road traffic flows, freight transport performance tends to be inferior, and the perceived congestion and environmental impact of freight transport greater.

Many of the most successful developing countries have achieved rapid growth through export-led industrial development. This development is often based, initially, on the exploitation of inexpensive domestic labor. As incomes rise, however, it depends more on the labor force's quality and its ability to participate efficiently and flexibly in global manufacturing and distribution systems. Reliable transport, both within cities and in connections to international networks, is critical to this development.

For the most part, logistic networks are entirely private sector, and often led by multinational companies. However, there are some important external requirements for these networks' development. An open domestic transport market, with freedom for modal integration and good

seaport and airport facilities, is central to these requirements. This transport market must be supported by good telecommunication facilities. These elements are to be found in the rapidly industrializing economies, and are notably absent in the stagnating ones. City growth thus depends not only on actions that can be taken at the city level but also on the support of a national government committed to liberalizing freight movement.

That still leaves some important supporting policy requirements for economic growth at the municipal level. Development planning, supported by land-use control, can foster well-located industrial development both in relation to external transport links and in relation to domestic labor markets, thus avoiding both local traffic congestion and divisive environmental impacts. A good planned example of this approach is Curitiba, Brazil. The effective protection of the city environment from the impacts of industrial and port-related traffic through the combination of road infrastructure and industrial location policies is also one of the most notable features of the Dutch planning system.

Many large cities draw their wealth from commercial as much as from industrial activities. Here again the combination of a liberal commercial environment with good internal transportation and telecommunication links is critical to the attraction of the city to international business.

#### **THE ROLE OF THE PRIVATE SECTOR**

Responsibility for urban transport is being decentralized to the cities in many countries. In this decentralization process, the expenditure responsibilities of municipalities tend to expand much more than the intergovernmental transfer of financial resources. Only a small fraction of the necessary resources can come from the multilateral and bilateral agencies.<sup>16</sup> Cities will therefore have to broaden their financial bases in order to be able to finance the infrastructure that they want, as well as to support any social objectives they are pursuing in controlling transport operations.



As a result cities increasingly look to the private sector to provide facilities and services.

As far as transport services are concerned, it is estimated that at least 80 percent of all urban bus services provided around the world are now privately owned and operated, including those operated privately for public sector clients. The onus for financing both rolling stock and, to a lesser extent, the supporting infrastructure is thus transferred to the private sector to be financed through fares. There is increasing concern, however, about the quality of service available in many unregulated regimes. As discussed in chapter 7, some of these concerns can be addressed effectively with competitively tendered franchising of services. That requires a clear legal and regulatory framework, as well as a strong public planning and public procurement capability. While the legal framework is typically provided through national legislation, the planning and procurement is essentially a local responsibility that depends heavily for its success on how well these arrangements relate to the rest of the city development strategy (CDS).

Many municipalities harbor parallel expectations that transport infrastructure capacity can also be privately financed. In many cases they have seen successful privatization or concessioning of power, water, and telecommunication utilities, and believe that roads and mass transit systems can be similarly financed. Although some existing urban expressways and urban railways have been successfully concessioned in a number of countries (see chapter 7), new infrastructure is more difficult to finance privately. In the road sector, the scope for private financing through tolls is limited by the need to be able to limit access. In any case, the proportion of the network that can be financed in that way is relatively limited. Shadow toll systems have been developed to extend the scope of private participation, but experience is so far limited, and in any case the charges of such systems remain on budget.

As far as urban rail systems are concerned, pure private finance has not yet been successful in a

developing country (though the Bangkok Transit System [BTS] could change this conclusion). The financial difficulties arise partly due to undercharging of the competing, congested road space. Significant operational difficulties have also been experienced in cities such as Kuala Lumpur, Manila, and Bangkok because of their failure to integrate the private systems effectively within a comprehensive urban transport and development strategy. These issues are discussed further in chapters 8 and 10.

It is not the intention here to discourage increasing private sector participation in urban transport infrastructure finance, but there are some general observations that can be made on the requirements for success in utilizing private finance effectively. First, purely opportunistic finance is to be avoided. Unless the private developments conform to a general structure plan, they may impose unforeseen, and sometimes very significant, contingent costs on the public budget. Second, careful attention is required to individual contract design to ensure that the objectives of the CDS and the financial requirements of the private financiers are effectively reconciled. Third, cities may need to consider carefully their priorities for private finance in order to strengthen their creditworthiness to be able to access domestic and international capital markets. These considerations all highlight the need for any attempt to secure private financing of transport infrastructure to be integrated within a CDS, both with respect to physical and to financial planning.

#### **STRATEGIES FOR STRUCTURAL CHANGE: LAND-USE AND TRANSPORT PLANNING**

In most countries local transport performance is better, and costs lower, in smaller rather than in larger cities. In a number of developing countries, of which Thailand is the extreme example, the dominance of the capital city is such that these differences are very large. Structural strategies to improve transport may therefore focus on the distribution of activities among cities—particularly through planned deconcentration—or

the distribution within cities through land-use planning and development controls.

### **DECONCENTRATION**

Limiting the further expansion of the major cities by consciously promoting the development of lower-order urban developments is a beguiling strategy. France and the United Kingdom have both adopted policies of controlling the capital, encouraging the provinces, and developing peripheral new towns. China has similarly been seeking effective policies to discourage all rural migrants from going to the booming coastal cities. The case for limiting further capital-city growth because of intolerable transport conditions has been argued even for a city of only 2 million inhabitants, such as Nairobi.<sup>17</sup> Given the transport problems of many large cities, it is tempting to see decentralized urban growth as a solution.

There are two major problems with that strategy for attenuating the transport problems, and other problems, of the megacities. First, neither the magnitude of agglomeration economies nor the significance of environmental externalities are understood clearly enough to be able to make any universal judgment about how far or how fast to push deconcentration. Second, attempts to control concentration, either by land-use and development constraints in the megacities or by inducements to locate outside the megacities, have had limited impact and dubious benefit.<sup>18</sup> Many capital-city authorities prove to be lukewarm in their support for such policies and tend to resist even the dispersion of some central government activities.

Given these doubts, it is likely to be better to concentrate on using macroeconomic policies to allow markets to work more effectively in locating activity, rather than to engage in strong administrative redirection of economic activity. Protectionism and autarky appear to reinforce the dominance of capital cities. Open markets are likely to create a more-level playing field between core and peripheral manufacturing and between urban and rural activities. The quality

of intercity transport and communications can also contribute to that level playing field. For example, it has been estimated that a 1 percent increase in the share of GDP spent on government transport and communications investments is associated with a 10 percent reduction in primacy; barriers to internal trade reinforce primacy.<sup>19</sup> Similarly, the removal of subsidies to the megacity—including transport subsidies—might reduce megacity size without adverse social consequences.

### **PLANNING AND MANAGEMENT OF URBAN LAND USE**

Two extreme approaches to improving the structure of activities within cities may be characterized.<sup>20</sup> Urban planners tend to define a preferred urban form, albeit based on extensive consultation and consideration of transport demand, incorporated in a structure plan. This provides the required physical framework for market forces, private sector investment, and public sector programs for urban change and growth. The plan can be indicative and passive, or it can be actively pursued through public sector transport and urban regeneration investment. Economists, in contrast, tend to concentrate on applying an efficiency criterion to each policy decision, without prejudging the structural outcome.

Neither approach is sufficient in itself. Full internalization of externalities, precluding the need for any planning intervention, has not been achieved even in the most sophisticated of market economies, such as the United States. Moreover, the longevity of major infrastructure is such that conventional financial decisionmaking discounts the effects over much of its life. On the other hand, planning undoubtedly works better if supported by, rather than working against, economic incentives. Thus it is advisable to look at the effectiveness of both administrative and market-based instruments in the search for a strategy on land use and transport.

The possibility of manipulating urban land use for transport policy purposes has been recently

incorporated into an environmental argument for densification, based on the undisputed fact that gasoline consumption per capita in cities is highly correlated with the overall density of the city.<sup>21</sup> Proponents of this view argue that reducing density increases trip lengths, makes public transport less viable, encourages greater use of, and dependence on, the private automobile (auto dependence), and hence generates more environmental impact per capita. They also point to the adverse effects of increasing auto dependence on those without access to a private car, who find themselves progressively excluded from access to economic and social activities.

In their simplest form, policies designed to promote land-use concentration so as to save energy have been challenged on the grounds that energy consumption is but one input, and that it is inappropriate to concentrate only on minimizing energy consumption irrespective of its effects on

other aspects of the quality of life (particularly the amount of residential space per person).<sup>22</sup> This has also proved to be a very difficult area for policy implementation, even in sophisticated governance systems. There is much evidence to show that where individuals have been free to choose the location of their residence, suburbanization has continued as incomes increase, irrespective of land-use planning policies. This has shifted the focus of research in the direction of obtaining better understanding of the determinants of this behavior and transferred the policy emphasis to other instruments, such as land-use mix, public transport structure and quality, which operate on travel choices in ways that more obviously respect individual preferences.

Effective administrative control of land use requires, above all, the willingness and foresight to plan. One of the defining features of cities that are widely believed to have been most success-

#### **BOX 2.2 MATCHING LOCATIONAL CHARACTERISTICS AND USER DEMANDS**

In the Netherlands a system called the "ABC" system is used to match the characteristics of land uses to characteristics of the transport network. Types of location and types of activity are both classified at a central government level according to their traffic-generating characteristics and according to their need for accessibility by public transport or by private road transport. The distinction between the locations should then be reflected in public transport planning and in parking restrictions on "A" and "B" locations implemented at the provincial or municipal level.

The approach requires a hierarchical control to avoid competition between adjacent jurisdictions from undermining the functional allocations, as well as parallel financing actions on public transport development to prevent new residential developments from becoming auto dependent. It has had a significant effect in areas directly controlled by the national government. From dispersed sites throughout the country, the Ministry of Housing, Physical Planning, and the Environment relocated to a new office building directly adjacent to the central railway station in The Hague. This resulted in a dramatic drop in commuting by auto from 41 percent to only 4 percent, while commuting by rail increased from 25 percent to 57 percent. Bus and tram use went from 9 percent to 20 percent. Lower-level authorities appear to have implemented the system with varying degrees of commitment. Nevertheless, it has undoubtedly contributed to sustaining the public transport share of trips to major administrative, office, and educational locations, while ensuring good road transport access for industrial and commercial plants.

Source: NEA Transport Research and Training 2000.

ful in managing the relationship between transport and land use (such as Curitiba, Brazil; Zurich, Switzerland; and Singapore) is the early existence of an integrated land-use and transport structure plan in support of which a wide range of sectoral policies were employed. In many countries this is hampered by the lack of appropriate institutions and consistent political leadership at the metropolitan level. The hitherto successful attempt to transfer experience on strategic planning and urban development from Zurich to Kunming (China) through a twinning arrangement enjoys the active support of both Swiss and Chinese central governments.<sup>23</sup> Structure planning also needs to be supported at the implementation level by guidelines relating the nature of the activities being developed in any location with the transport facilities available to it. In the Netherlands national guidelines have been established to foster such consistency in land-use and transport planning (box 2.2).

A second essential requirement is the existence of the necessary technical skills to develop a plan that is comprehensive and internally consistent. In the absence of an internally consistent and fully integrated spatial policy, infrastructure invest-

ments and regulations often work at cross-purposes. For example, in some Indian cities attention is given to the avoidance of congestion in existing built-up areas and to the need to provide more city-center parking space, while at the same time developing "suburban" greenfield sites (box 2.3). A more consistent policy might be to let parking space provision be entirely a private, market-driven, activity. This would change relative costs of public and private transport, and might actually improve the split between public and private transport.

A third requirement for effective planning of the land-use and transport interaction is the ability to implement land-use, public transport, and development controls in a coherent manner that consistently supports the planning objectives. For example, many Indian cities adopt an unrealistically low permitted floor area ratio in central areas, which not only restricts the ability of developers to build office and retail buildings where there is most demand (in the central business district [CBD] and around transport nodes), but also pushes new residential construction to the periphery. Similarly, imposition of inappropriate setback and coverage requirements tends to keep the

#### BOX 2.3 INTERNAL CONSISTENCY IN PLANNING

In Bangalore, India, land-use regulations prevent the densification and the creation of new office space in the city center. However, the city is planning a major investment in a light rail transit system whose economic feasibility depends on the creation of new jobs in the current central business district (CBD), and therefore in the building of new office space. Simultaneously, new technological parks are built in distant suburban areas (out of range of the light rail lines) to try to create enclaves of adequate infrastructure and services, while the city-center infrastructure is left to deteriorate. The Bangalore Revised Comprehensive Development Plan for 2011 plans for three concentric ring roads (beltways), which would further contribute to the dispersion of jobs. The main issue is the inconsistency between different projects. This implies that the appraisal of either is dependent on the strategic priority that is given to the other.

Similar problems exist in Ahmedabad, where the imposition of low floor space ratios in the CBD prevents the renovation of buildings in the prime location, and hence contributes to the flight of activities to the suburbs.

Source: Bertaud 1999.

wrong space underoccupied compared with a policy of having a strong position on public open space. Even if effectively enforced, as in Seoul, Republic of Korea, greenbelt policies tend to exert strong upward pressure on the price of housing.<sup>24</sup>

### THE ROLE OF MARKETS IN LAND-USE DISTRIBUTION

Even in an administrative planning context, market tendencies and values need to be recognized in implementation. Redevelopment can only happen when regulations allow it, when real estate transaction costs are low, and when the municipality is willing and able to redesign and finance improved infrastructure to accommodate new types of land use and land densities.

Any reduction in unit transport costs will tend to have the effect of reducing density, expanding the spatial scale of the city, separating different land uses, and, possibly, increasing total transport expenditure and transport resource use (including fuel). Any undercharging of transport costs—whether it is for road use, parking, or public transport—will similarly accentuate the sprawl. Urban boundaries and greenbelts may constrain that outward pressure for a time, but they tend to be jumped over without necessarily leading to the establishment of new self-contained cities with a balance of employment and residence. An “efficient pricing” approach to urban structure attempts to reflect costs—both of transport and of land occupation—in prices, and to allow individual preferences on land use to reconcile the variety of tastes with regard to space and other forms of consumption.

There are important limitations to this approach. Given that the major distortions arise from underpricing of environmental and congestion impacts, a quantification of those effects is required, at a highly disaggregate level, accompanied by a charging mechanism to implement the price regime. The same applies to properly internalizing the “costs of sprawl” in land development charges. Finally, it is necessary to handle the redistribution implications of the charging mechanism.

Even if these difficulties exclude the possibility of sole reliance on market forces, it is still prudent to attempt improvement of land-market operation.<sup>25</sup> In developing countries there is a long agenda of actions necessary to facilitate demand-driven land-use change, including:

- Clarification and recording of property rights to generate security of tenure, provide a base for investments and borrowing, and enable efficient transfers of property between owners
- Establishment of procedures for speedy adjudication of land invasions and informal acquisitions, and for assignment of property rights, especially in cities where much of the housing is provided and developed by the informal sector
- Replacement of existing types of title, which often provide only restricted rights, with a full ownership title that is recorded in a single, open, registry containing full information about liens, mortgages, easements, and so on
- Incorporation of the full costs of ancillary infrastructure development in connection charges for on-site public utilities and fees for trunk infrastructure
- Conversion of existing land-use controls into a transparent zoning and building control system, sensitive to demand signals
- Elimination of obstacles to recycling of publicly owned lands, particularly in formerly Communist countries, in which enterprise managers and local government officials often combine to prevent reassignment of industrial land in prime locations
- Broadening and deepening of financial markets’ support for housing, with emphasis put on groups who would otherwise be unable to obtain appropriate accommodation.

Regulations should also be revised to avoid distortion of land use. Legally required standards for building and site development (including minimum plot sizes, setbacks, and parking provisions) should reflect the availability and affordability of

cities, where government employment is concentrated. For example, moving activities from the former central district of Mumbai to new locations farther up the peninsula may make a very important contribution to improving the transport situation in the old city center.

#### **INSTITUTIONAL AND FINANCIAL PLANNING IMPLICATIONS**

Most of these problems of intersector strategy coordination have both an institutional and a financial dimension. Institutionally they call for channels of coordination, both between functions and between jurisdictions. It is not possible to propose a blueprint institutional structure applicable to all countries and all political systems. The most critical point, however, is that there should be some effective integrating mechanism or process through which the issues become explicit and receive attention. Some relevant principles and models are discussed in detail in chapter 11.

In parallel with the need for an appropriate coordination of institutional responsibilities is the need for coordinated financial planning. Chapter 10 presents the argument for a flexible financial system for urban transport, allowing resources to be efficiently allocated between modes. In some cases this may justify the establishment of a multimodal urban transport fund. The relationship between that arrangement, justified in terms of intrasector efficiency of resource allocation, and the municipal budgetary allocation process needs careful structuring.

#### **CONCLUSIONS: A STRATEGY FOR URBAN TRANSPORT IN CITY DEVELOPMENT**

It has been argued that cities are the engines of economic growth in most developing countries, and that urban transport is the oil that prevents the engine from seizing up. Unfortunately, deteriorating transport conditions are already damaging the economy of many large cities,

particularly the megacities, worldwide. Because demand for transport is essentially a derived demand, urban transport must be viewed strategically as an integral component of the city economy and hence of its development strategy.

The economic performance of the sector can be improved by more careful attention to the requirements of freight transport and logistics, as well as by improvements to infrastructure, including privately financed infrastructure, where appropriate. While expanding cities require adequate infrastructure, it is physically and economically impossible to escape from congestion by building roads in the densest cities. Broader structural approaches are also required. Deconcentration of activities can be encouraged, but is difficult to achieve. Planning and management of land-use structure is essential, but has practical limitations. Liberalization of land markets can help, but the direct impact is weakened by the inability to internalize the external costs of development. Integration and coordination of sector policies are also central to the more integrated development approach.

Although no single, simple, structural policy offers a complete solution to the transport-related problems of urban growth, it is possible to identify some elements of each policy that can be advocated as robust components of a strategy for transport within an urban development strategy. These elements include:

- Elimination of policies favoring the capital city together with properly appraised investment in intercity transport outside the capital region
- Development of a structure-planning capability as the basis for positive CDSs.
- Provision within structure plans of space for transport infrastructure that would be adequate for immediate demand but also capable of adaptation as the city grows
- Coordination of the planning and development of land use with that of transport infrastructure and services

- Encouragement of development-control skills and practices at the city level
- Elimination of obvious price distortions in both land and transport markets, including the introduction of congestion prices for road use and full-cost connection charges and impact fees for land development
- Improved road investment appraisal to take account of the economic and environmental effects of induced traffic in assessing the need for capacity expansion
- Strategic consideration of the benefits that could be achieved through traffic management, and demand restraint in the base-case for road investment appraisal
- Coordination of transport sector policies with the policies of the sectors that transport serves.

## NOTES

1. *World Urbanization Prospects* (United Nations 1996), projects urban population of 1.9 in 2000 and 3.7 billion in 2025. By that date it is projected that there will be 500 cities of over 1 million inhabitants and 35 megacities of over 10 million inhabitants.
2. Ingram and Liu 1999.
3. Canning and Bennathan 2000.
4. There is less agreement, however, concerning the size of city at which these problems begin to dominate the advantages of agglomeration, or why some cities, particularly in developing countries, continue to grow despite having reached this situation.
5. City size distribution is very skewed in many Asian and African developing countries, but not in most Latin American or Eastern European countries. In Thailand the capital city is over 40 times as large as the second city, and this ratio (the "primacy index") is above three for other highly populated countries such as the Philippines, Malaysia, and Indonesia (Karan 1994).
6. Dutt and others 1994.
7. Hughes and Lovei 1999.
8. Lvovsky and others 2000.
9. This pattern, well documented in industrialized countries, has been shown to be equally forceful in developing cities such as Bogotá, Cali (Colombia), and Seoul. See K.S. Lee 1989.
10. Burchell and others 1998.
11. Garreau 1991.
12. Fouchier 1997.
13. It is 11 percent, for example, in Bangkok and Kolkata (India).
14. Koster and de Langen 1998.
15. For a comparison of the cities of Rotterdam (the Netherlands), Dhaka, and Nairobi, see Arcadis Bouw/Infra 2000.
16. In the case of the World Bank, the requirement of a sovereign guarantee is a particular impediment for cities in countries whose governments are unwilling to give such guarantees.
17. Howe and Bryceson 2000.
18. For example, the Korean greenbelt policy for Seoul appears to have produced perverse density gradients, high housing costs and travel distances, and arguably has militated particularly against the interests of the poor.
19. Krugman 1991.
20. D. B. Lee 1999.
21. Newman and Kenworthy 1989.
22. World Bank 1996.
23. Joos 2000.
24. Dowall 1995.
25. Elaborations of these points are to be found in Dowall 1995.
26. Pendall 1999.

