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## Urban Transport for Development Towards an Operationally-Oriented Strategy

Slobodan Mitric



**TRANSPORT  
SECTOR  
BOARD**



# **URBAN TRANSPORT FOR DEVELOPMENT**

Towards an Operationally-Oriented Strategy

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Slobodan Mitric



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**WASHINGTON, D.C.**

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## **ABBREVIATIONS AND DATA NOTES**

CAS	Country Assistance Strategy
CERTU	<i>Centre d'Etudes sur les Réseaux, les Transports, l'Urbanisme et les constructions publiques</i> (Center for the study of networks, transport, urbanization and public works)
DPL	Development Policy Loan
MDG	Millennium Development Goal
UITP	International Association for Public Transport







## **OVERVIEW**

The specter of motorization is haunting large cities in low- and mid-income countries of the world. Ownership and use of motor vehicles rise along with increasing urban size, population, economic activities and incomes. Motorization can be led by cars (as in Central and Eastern Europe); by taxis, minibuses and other forms of for-hire vehicles (as in Latin America and Africa), or by motorized two-wheelers (in some cities of South and East Asia). Problems arise when waves of new motor vehicle traffic, carrying passengers or freight, encounter road networks ill-equipped in terms of size and structure to handle this increased load. Results include street congestion, with accompanying accidents and pollution, and reduced access to opportunities. Pedestrians and users of non-motorized vehicles are the first to suffer from this situation, followed by passengers and operators of street-based public transport modes. The latter may themselves become major contributors to poor traffic conditions, in addition to providing poor services. Congestion and accessibility problems are at their worst in cities with high population growth and low rates of economic growth. They can be serious also in stable-size, richer cities, there being few direct linkages between a city's wealth, budgets available to local governments, and the strength of local institutions. If left unattended, high transport costs eventually affect all segments of an urban society, becoming critical for livability, productivity and competitiveness of cities; a barrier to poverty alleviation; and a community health hazard in terms of safety and environment. Globally, cumulative transport emissions of greenhouse gases are contributing to climate change and the rise in aggregate demand for energy may not be sustainable.

Since urban transport issues cut across its chief concerns for growth, poverty reduction and environment preservation, the World Bank has been active in this sector since 1970s, with a stream of policy advice and development projects featuring loans for infrastructure, goods and services. About 100 projects were completed, another two dozen are ongoing and about 10 projects are in the pipeline. Projects are designed through a cooperative and interactive effort of client governments and the Bank. Project structure reflects the idea that problems cannot be resolved through provision of loans alone; interventions must also address the root causes in institutions and policies.

Every 5-10 years, the Bank reviews and updates its policies and strategies for dealing with urban transport problems, which are used to guide the work on projects. The Bank's transport sector strategy is stated in *Sustainable Transport (1996)*, recently updated and extended by *Transport for Development (2008)*. Work is underway to update *Cities in Transition (2000)*, the strategy document for the urban development agenda. *Cities on the Move (2002)* is a policy and strategy review focused entirely on urban transport matters.

This paper arose from the perception that a gap existed between the practice of project design and the formal Bank strategies for transport and urban sectors as stated in the cited reports. Formal strategies tend to be too general to be linked meaningfully to project designs. The paper in hand attempts to close this gap by putting forward a different, operationally-oriented concept of urban transport strategy and derives one such strategy from a review of recent Bank-funded projects. The

term “operationally-oriented” means that the strategy is expressed in terms of objectives, policies, institutions and investments, mimicking the structure common to all individual projects.

Projects on which the paper is based date from the last 15 years. They exhibit a wide diversity of features, reflecting inherited local conditions, the nature and rhythms of socio-economic changes underway, and the vintage of client-Bank relations. Yet, a strong central tendency is also evident, amounting to a coherent and robust approach. The core strategy, as this approach is called in the paper, aims to protect and nurture public transport services and non-motorized transport modes, with underlying meta-objectives of equity and environmental sustainability.

In the policy dimension, the core strategy features: (i) allocation of existing/new street space in line with preference for public transport and non-motorized modes; (ii) a provision model for public transport based on “for-the-market” rather than “in-the-market” competition, with services operated by the private sector under strong public regulation and oversight; (iii) a financially viable public transport system, with fares commensurate with costs and any necessary subsidies affordable to the government and targeted to the maximum possible to those in need; (iv) parking charges as a proxy for user charges for urban roads; (v) support for institutions ranging from municipal traffic management departments to multi-modal transport authorities, with urban area-wide jurisdiction; and (vi) a complementary array of cost-effective, environment-friendly investments in roads and public transport infrastructure and equipment. Echoing item (i), the investment dimension of the approach is increasingly oriented towards the provision and rehabilitation of public transport systems operating on exclusive rights of way, both roadway and rail-based, because of their potential for efficient, high-quality services as well as for being a vehicle for progress on several policy fronts. By a judicious selection of policies and investments, this strategy can accommodate projects that are poverty- and/or environment-oriented.

The core strategy is based on looking back at project experience. A complementary look forward is also needed, because of the stunning pace of urban growth and ever advancing motorization—especially in rising giants like China and India—and global issues like climate change and non-renewable energy. It is certain that much stronger medicine is called for than has been delivered in past projects. An expanded core strategy will need to address three pivotal but hitherto neglected policy matters—congestion pricing for urban roads, urban transport funding, and land development regulation. Making changes in these difficult dimensions is likely to require the leverage capacity of major investments in road and public transport systems, and/or policy loans. Also, the cross-sector nature of funding, land development and environmental issues will call increasingly for project designs where urban transport is combined with other urban, transport, and environmental matters.

# URBAN TRANSPORT FOR DEVELOPMENT: TOWARDS AN OPERATIONALLY-ORIENTED STRATEGY<sup>1</sup>

## 1 INTRODUCTION

Urban transport in developing countries presents a rare combination of challenge and opportunity, cutting across the main concerns of the World Bank: economic growth, poverty reduction, and environmental quality.<sup>2</sup> The Bank has been active in the urban transport field since the early 1970s, offering to its client cities and countries an array of advisory and financial services. The latter is done mainly through the provision of loans to fund specific investments in works, goods and services included in urban transport development projects. In addition to investments, typical development projects also have policy and institutional components, addressing what are believed to be the root causes of transport problems faced by cities.<sup>3</sup> About 75 urban transport projects were completed during the last 30 plus years; about 22 operations are under implementation as of this writing, and another dozen are in the preparation stage.<sup>4</sup>

Project design involves the coming together of two sides: the demand side—a specific situation and the intentions of a client government—and the supply side, represented by the Bank’s site-specific analyses, country assistance strategies and global strategies for the relevant sectors and themes.<sup>5</sup> Sector/thematic strategies are formal documents, approved by the Board of Directors, meant to guide all Bank activities in a given subject matter. Urban transport is a multi-sector theme, currently under the purview of the Transport Board. Formally, therefore, it is the Bank’s strategy for the transport sector that governs the making of urban transport projects. However, the urban strategy is also of essential relevance in this matter since its ideas apply to all urban functions and issues. Many urban projects in fact include urban transport components.<sup>6</sup>

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<sup>1</sup> A streamlined version of this paper is *A Framework for Urban Transport Projects – Operational Guidance for World Bank Staff* (World Bank, 2008).

<sup>2</sup> The World Bank’s clients are low- and mid-income countries commonly referred to as developing countries. Some are “transition” countries, i.e. the former socialist countries of Europe and Asia. In this text, for convenience, the term “developing” will refer to both groups.

<sup>3</sup> The term “institutions” as used in this paper encompasses government at various levels, all other organizations and entities established by governments with varying degrees of autonomy, and private sector entities. Examples: ministries, directorates, city administrations, authorities, commissions, government-owned companies. See also footnote 63.

<sup>4</sup> In the Bank’s management information system, the transport sector has a dedicated code, as does the urban sector, but urban transport is considered a multi-sector theme and has no such code. This makes it difficult to establish a clear-cut list of urban transport projects and carry out statistical analyses of this sub-sector program. The cited numbers are based on a search of the Bank’s Projects & Operations website, in January 2007, trying to identify all transport projects that have a significant urban transport content. These are certainly underestimates, since there have been numerous urban projects with major urban transport components (e.g. a sequence of urban development projects in Tamil Nadu (India) and Punjab (Pakistan)). A similar search dating from 2001-02, but limited to projects under implementation and preparation, produced a table shown in the Appendix of *Cities on the Move* (World Bank, 2002a).

<sup>5</sup> The term “sector” is reserved for traditional economic sectors, while “theme” is a multi-sector concern. “Global” is used to distinguish Bank-level strategies from regional, country or project-specific strategies for the same sector/theme.

<sup>6</sup> These arrangements shift over time. An earlier setup was to have urban transport projects in urban units.

Strategies are updated typically on a 10-year basis, their frequency depending on what is happening in the subject matter worldwide and/or in the larger social, economic, political and natural environments. The most recent transport and urban sector strategies are *Sustainable Transport*, published in 1996, and *Cities in Transition*, published in 2000, respectively. Complementing formal sector strategies are occasional strategy and policy reviews commissioned by the Transport and Urban Sector Boards to interpret, fine-tune or adapt positions taken in sector strategy documents, in the light of intervening developments and experiences. *Transport for Development* (World Bank, 2008) does this for the transport sector, and a similar effort is underway for the urban sector.<sup>7</sup> The most recent strategy review focused on urban transport matters is *Cities on the Move* (World Bank 2002a).<sup>8</sup>

The structure, scope and depth of Bank strategy reports varies among sectors, and from one update to another. This may be in part because the concept of strategy in development work has not been defined and there is no Bank “template” for this type of document.<sup>9</sup> In addition to variety, this conceptual vacuum has also led to vagueness in strategy statements, confusing to staff and clients alike. In the transport and urban sectors, the approach followed in strategy documents generally has been to review trends, problems and issues on both demand and supply side; state Bank views on how to resolve these; and draw implications for Bank activities in the subsequent period. By and large, the weight has been on “best practice” positions, framed as recommendations to client countries. Much less attention has been paid to the gist of what the Bank itself does, i.e. to the practice of making urban and transport development projects.<sup>10</sup> This has left a gap between nominal sector/thematic strategies and project design activities; and made it difficult to evaluate and change strategies in the light of accumulated project experience.

This paper, a companion to *Transport for Development*, proposes a different approach – a global urban transport strategy whose structure and language match that of Bank-funded development projects in this domain. The objectives are to: (i) make the global strategy more useful for putting together projects, and region- and country-specific business strategies; (ii) provide a perspective for cross-project and cross-regional comparisons and results evaluation; (iii) facilitate strategy evaluation and evolution; and (iv) clarify strategic positions and shifts to the Bank’s clients and partners. It is hoped that this approach will be debated, tried and enriched in practice, in time for the next update of the formal urban transport strategy.

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<sup>7</sup> Sector Boards comprise mainly the managers of regional and central (“anchor”) sector departments. Theirs is the key technical voice within the Bank. The difference between a “sector strategy” like *Sustainable Transport* and a “strategy review” or “business strategy” like *Transport for Development* and *Cities on the Move* is that the former has to be approved by the Board of Directors (representatives of the countries that are members of the World Bank) and the latter by the Transport Sector Board.

<sup>8</sup> Its predecessors are *Urban Transport – Sector Policy Paper* (1975) and *Urban Transport – a World Bank Policy Review* (1986). The next one will probably be done around 2012.

<sup>9</sup> A recent example, *Healthy Development – The World Bank Strategy for Health, Nutrition and Population Results* (World Bank, 2007), embodies a trend towards measurability of results, already present in operations, and adds staffing implications of a strategic shift. Conceptually, it eschews “in-depth... technical recommendations on the diverse and complex range of issues (which) must be country-context specific.... Instead, this Strategy outlines a new strategic vision for the World Bank in improving its own capacity to respond to these urgent questions globally....”

<sup>10</sup> In *Cities on the Move*, for example, individual projects are cited in these reports to illustrate recommended practice, but no attempt is made to have a systematic review of project experience as a basis for developing a new strategy.

The work plan adopted for this paper was to recast and augment ideas from *Cities on the Move* in an operationally relevant language, with cross-references to project experience and developments in the urban transport *problematique* since *Cities on the Move* was published. Bank-funded urban transport projects prepared over the last 15 years were reviewed, as were the reports coming out of region-specific urban transport research over the same period.<sup>11</sup> In addition to *Cities on the Move*, the paper's thematic lineage includes *Sustainable Transport* and *Cities in Transition*, but it differs from these documents in that its deliberate and narrow focus is on three fundamental project dimensions: policies, institutions and investments. As a result, the strategic framework proposed here is also narrow, and would need to be enriched when the next urban transport strategy is being prepared through the addition of other decision parameters, e.g. the full scope of Bank operational instruments, choice of borrower(s), twinning with related sectors inside the Bank, and partnerships with external institutions.

Expecting that the paper will be read not only inside the Bank, but also by interested external parties, it includes some elements of project design which are well-known to staff but not necessarily to outsiders. Following this introduction, the next three chapters are brief, meant mainly for outside readers. Chapter 2 provides a capsule statement about cities and motorization, with additional material in Annexes 1 and 2. An extensive treatment of these subjects and an exhaustive bibliography are available in *Cities on the Move*.<sup>12</sup> Chapter 3 summarizes the rationale for and modes of the Bank's involvement with urban transport problems in the client countries. Chapter 4 discusses the relation between the global sector strategy and the design of individual projects. The heart of the paper is in Chapters 5 through 7. Chapter 5 reviews the main building blocks common to both projects and strategies. Chapter 6 illustrates how these building blocks are used to make projects of different types. Chapter 7 presents the Bank's core strategic framework for urban transport, derived from designs seen in the reviewed projects. The need to go beyond experience is established and suggestions are made on how the core strategy ought to evolve to make a larger contribution to locally successful and globally more sustainable urban transport.

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<sup>11</sup> A comprehensive database and a review of all such projects is in the planning stage and, when completed, may reveal the evolution in the Bank's approach since the first projects were introduced in the early 1970s.

<sup>12</sup> There are numerous recent efforts to review the urban transport status quo and prospects for its sustainable future. For example, see World Business Council for Sustainable Development, 2001 and 2004; Sperling and Salon, 2002; SYSTRA, 2006; CERTU, 2008 (forthcoming).





## 2 PROLOGUE: CITIES AND MOTORIZATION

The specter of motorization is haunting cities in low- and mid-income countries of the world, adding another twist to the yet-unresolved urban transport dilemmas of higher-income countries. Ownership and use of motor vehicles rise with increasing urban populations, spatial extent, economic activities and incomes, and also feed these processes.<sup>13</sup> Benefits of motorization are essentially lower transport costs mapped into the welfare of households, and the costs and revenues of business enterprises, in both the short and long term. Problems arise when an increase in transport demand is not matched by appropriate responses on the supply side, in terms of infrastructure and services. If this mis-match continues, high transport costs become a drag on city productivity and competitiveness, a barrier to poverty alleviation, and a community health hazard in terms of safety and environment. Yet another serious agenda emerges when various impacts of motorized transport are aggregated beyond city and country boundaries. Greenhouse gases, to which motor vehicles are significant contributors, are now linked to climate change. Together with the rise of demand for oil and other non-renewable energy sources, global warming lends a menacing aspect to local and national debates on social, economic and environmental sustainability of current urbanization and transport trends.

The patterns of urban demography and population growth, their interactions with urban transport systems, the canon of the professional disciplines involved with this field, and the actions by governments to manage and shape urban patterns and activities have all shown a great variety over time and place (see Box 2-1 for a cross-section of different settings).

The post-WWII explosion of individual motorization in the U.S., in an already wealthy society going through a period of sustained economic growth, urbanization and suburbanization, led to the emergence of traffic engineering, urban transport planning and policy making as new fields of concern and expertise. The freedom promised by the private car fit snugly with concepts of individualism and markets underlying the American society. The urban transport problem initially was framed simply as that of missing road capacity. For several decades, the policy response in the United States—based on a predict-and-provide planning framework—was to accommodate individual motor vehicles and low development densities to the maximum possible by building extensive and hierarchically structured road networks. In cities, the car became the dominant transport mode, while public transport services were retained at a low level, in terms of both quantity and quality, for the dwindling market of the car-less, the old and the young. Eventually, negative side effects of urban road construction created a political backlash, in parallel with a realization that increasing road capacity did not bring long-lasting relief from congestion. The planning approach was in time modified to reflect environmental and other social concerns, but essentially has remained focused on the private car and predicated on continued low-density spatial expansion of cities with ever-weakening centers.

Today, car ownership in the United States has reached levels as high as 700-800 vehicles per 1,000 people, with a mere 3 percent of households having no vehicles.<sup>14</sup> In passenger travel, the market share of public transport has sunk to as low as 2-5 percent even for cities over 1 million population. Only a few cities show a different pattern in passenger travel and land density. In goods transport, all intra-urban distribution is by road-based vehicles and most of the external and pass-through freight is by road.<sup>15</sup> Major US cities function at increasing levels of congestion, but a new era of road building

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<sup>13</sup> Annex A has additional material on urbanization and motorization.

<sup>14</sup> The data are from US National Personal Travel Survey 1995 quoted in Giuliano and Narayan, 2004.

<sup>15</sup> External trips are those with either origin or destination outside an urban area.

faces a much altered social, economic and political milieu. Awareness of the scarcity of non-renewable resources and the fragility of the global environment is spreading, though radical measures regarding fuel efficiency standards for cars, fuel taxation, congestion pricing, land development regulations and other public policy instruments are yet to be seriously reached for.

**Box 2-1. A variety of urban transport settings**

**Dar es Salaam, early 2000s:** 2.2m people, rising at about 4.4% per annum; economic growth rate roughly twice the population rate; dominance of walking, minibuses and shared taxis; 20 non-commercial motor vehicles per 1,000 people.

**Hanoi, 2006:** 3m people, demographic and spatial growth with economic growth; former bicycle dominance now shattered by motorcycles; public transport still rudimentary;

**Lagos, early 2000s:** 13-15m people, 9.5m poor; vast demographic and spatial expansion; economic stagnation; poor infrastructure; walking dominates transport, followed by privately-owned minibuses and motorcycle taxis;

**Lahore, late 1990's:** 5.1m people; dominance of 7,000 weakly regulated, privately-owned minibuses, and cars; demographic and spatial expansion with moderate economic growth; subsequent introduction of concession-based, formal services on major bus routes;

**Los Angeles, 2005:** population 3.8m city, 13m area; high-income and moderate density, still expanding; city famous for large freeway system and record car ownership (1.8 cars per registered driver); public transport based on extensive street-bus lines and budding rail and bus rapid transit, carries 1.7m trips (2.6%) of the daily commute estimated at 65m trips.

**Rio de Janeiro, early 2000s:** 10m people, low economic growth; multi-modal public transport is dominant at 65%; includes metro, commuter rail, formal and informal street buses; cars account for about 11% of trips.

**Tianjin, China, early 2000s:** 5-10m people; moderate demographic growth with high economic growth; long bicycle dominance challenged by rising vehicle ownership (50 cars per 1,000 people, but 4 times higher if all motor vehicles are included); pervasive, crowded, street-based public transport, with a nascent, lightly-used metro system;

**Tokyo, 2006:** 12.5m population, density 5800 per km<sup>2</sup>; built around metro & suburban rail lines and stations; rich city, world's largest metropolitan economy; public transport system carries 66% of daily commute travel.

**Warsaw, late-1990s:** 2 m people; little demographic growth, some spatial extension, economic recovery from major recession in early 1990s; public transport—multi-modal, public-owned system—still dominant at about 70% of all trips (but falling); challenged by car-led motorization (392 cars per 1,000 people in 1998).

A diametrically opposite strategic approach to urban transport was taken after WWII in the Soviet Union and its East European neighbors. These countries also had high levels of urbanization, but much lower levels of disposable income than in Western Europe. Here, cities were planned and built, with strong centers and at high densities, directly by governments.<sup>16</sup> The urban transport problem was framed in terms of communal welfare. Public transport was chosen by governments as the primary mode for passenger transport, and was treated as a nearly free public good, with corresponding capital investments and pricing policies. Railways were preferred for intercity travel of both passengers and freight, and rail-based modes were favored in urban travel. Urban road networks remained at a modest scale and, relative to US cities, undifferentiated in terms of movement and access functions.<sup>17</sup> In the mid-to-late 1980s, for example, at the twilight of socialism, the market share of public transport modes was as high as 80-90 percent in Moscow, Budapest and Warsaw. Car ownership was typically under 100 vehicles per 1,000 people, and vehicle use was low. These countries then moved

<sup>16</sup> The land use pattern featured a rise in density at urban fringes, due to high-rise bedroom communities.

<sup>17</sup> The absence of limited-access, high-performance urban roads is the key feature of these networks.

to liberalize their systems of government and their economies. The 1990s saw patterns of severe recession and then recovery, the latter rapid in some countries and much slower in others, but in most cases with sharp increases in income inequality. The era of generous public funding apparently over, urban public transport systems came under strong pressure to raise fares, reduce services, and increase operating efficiency. The rise of motorization and the spatial restructuring of cities—also among the consequences of these systemic changes—meant an erosion of the market share of public transport, and added loads on urban roads that were originally designed for other lifestyles and different land use patterns. The initial period of acute crisis now over, the major East European cities are struggling to find a new modal equilibrium. Incomes and motorization continue to rise and the dilemma remains of how far to go to accommodate private cars while ensuring the survival of high-quality public transport services.<sup>18</sup>

**Box 2-2. Two contrasting approaches to urban transport development**

In the US, the first country to experience large-scale motorization, the approach has been to favor the private car to the maximum possible extent, by building roads and taxing automotive fuels minimally, while keeping public transport modes available mainly for captive travelers. The land use counterpart of this has been low-density suburban expansion of residences and businesses.

In Eastern Europe and Central Asia, public transport infrastructure and services were given top priority, both in cities and on national networks. Extensive railway networks were built, while roads remained rudimentary. Urban land development patterns featured strong centers, and generally higher densities, even at city fringes. Wage and price policies made modest rates of car ownership possible, but usage rates remained low.

The common aspects in both experiences are the strength of institutions and the importance of public policies for the provision of infrastructure, land development, fuel taxation, the supply and pricing of transport services, and consequently, the modal choices of travelers.<sup>19</sup>

Urbanization and motorization arrived in Latin America, Asia and Africa later than in the United States, Japan, Australia and Western Europe, and under quite different circumstances. Over the last 30 years, these countries saw their cities expand vastly in population and land, while also becoming home to an increasing share of each nation's low-income and poor households. In much of the developing world, motorization rose in cities that previously had not relied on public transport services but on a variety of non-motorized modes: walking, bicycles, rickshaws, and animal-drawn carts. Nor does motorization necessarily consist of buying cars. Taxis, minibuses and other forms of shared vehicles are the main growth category in many Latin American and African cities, where they also provide employment for people on lower rungs of the economic ladder. Motorized two-wheelers (mopeds, scooters, motorcycles) lead the wave in Southeast and South Asia. In Asia and Africa, urban car ownership rates are typically well under 100 vehicles per 1,000 people, but—because of two-wheelers—total vehicle ownership rates in some cities are reaching or exceeding 400 vehicles per 1,000 people.<sup>20</sup>

<sup>18</sup> This may be 50-60% of motorized trips. Compare to Helsinki at about 35%, Singapore at about 45%, Vienna at about 47%, and Hong Kong at about 74%. Major European cities like Paris, London and Madrid are just under 30%. These numbers refer to year 2001 and come from the UITP's Mobility in Cities database (International Association for Public Transport, 2006).

<sup>19</sup> The Eastern European and US cases are cited as examples of two extremes. Approaches followed in Japan and Western Europe fall between the U.S. and "socialist" ones. In spite of high levels of motorization, 300-600 cars per 1,000 population, public transport modes have remained essential for Western European cities. Singapore belongs to this group, but is unique, with 117 cars per 1,000 people, income at US\$30,000 per capita, and the most comprehensive and successful array of transport policies and investments in the world.

<sup>20</sup> Kuala Lumpur is approaching the level of 500 cars and motorized 2-wheelers per 1,000 population (Gakenheimer and Zegras, 2004).

Even at these low motorization rates, problems are legion. Waves of new motor vehicle traffic, carrying passengers and/or freight, encounter road networks and transport services that by and large are ill equipped in terms of size and structure to handle this added load. Consequences most evidently include street congestion, with accompanying noise, accidents and pollution. These are mapped through various mechanisms into reduced access to opportunities, lower standard of living, higher costs of economic activities, and a loss of competitiveness for urban areas.<sup>21</sup> Pedestrians and users of non-motorized vehicles—typically from poor and lower-income households—are the first to suffer from these adverse impacts, followed by passengers and operators of street-based public transport modes (where they existed).

The scale of problems, in terms of both mobility and external impacts, is the largest in mega-cities like Bangkok, Cairo, Lagos and Mexico City, and most damaging to their economies, but problems are also present in medium-size cities.<sup>22</sup> City size apart, the situation is at its worst in places where population growth is much faster than economic growth, notably in all of Sub-Saharan Africa and many Latin American countries. Even in cities where population and spatial growth were accompanied by significant economic growth (e.g. Bangalore), it is not unusual to find the business and investor communities to voice explicit concerns about urban transport infrastructure and public transport services. Direct links are weak between city wealth, budgets available to city governments, and the capacity of the relevant institutions.

In contrast to the preceding account, some cities in the developing world have conceived and implemented successful urban transport programs that are the envy of the world. Most are in Latin America, and are now being emulated on other continents. Curitiba was a pioneer in launching bus-based rapid transit in 1970s, and in making a unique link between land use and transport infrastructure development. More recently, Bogotá carried out a successful shift from a low-quality public transport system based on informal transport operators to *Transmilenio*, an advanced version of bus-based rapid transit integrated with a high-quality, trunk-and-feeder system using street buses. Complementing this remarkable development, Bogotá invested heavily into facilities for pedestrians and bicycles. Santiago de Chile was known for a combination of a high-performance, financially successful metro system, an over-supplied, unsafe, environmentally damaging market of private street-buses, operated without subsidies, and a well-developed network of toll freeways. The city is now moving, though with major implementation hitches, to improve also the quality of services for lower-income travelers and reduce accidents and air pollution, through introducing bus-only trunk corridors and by tightening up the regulation of bus operations.

Urbanization and motorization waves are welling up at unprecedented rates in China and India, the two most populous countries in the world. Initial conditions, the nature of change and public policy responses differ from each other, and from those in the United States or Europe (Boxes 2.3 and 2.4). How they will evolve is of global significance on account of their economic growth, global demand for steel and oil, and the climate change.

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<sup>21</sup> Annex B has additional material on various manifestations of urban transport problems.

<sup>22</sup> Some examples for large cities are cited in Willoughby (2000). For medium-size cities, see Dimitriou (1997).

**Box 2-3. Motorization in India**

Motorization in India is—so far—mainly of a 2-wheeler variety, though a recent rollout of an inexpensive, locally produced car may change this. The growth of motorized 2-wheelers has had major negative impacts on the performance and the patronage of the hitherto dominant mix of walking, biking and public transport modes. Traffic safety and air quality have plummeted. In most large cities, public transport companies, running street-based buses, are still in government ownership, and provide low-level services. Where permitted, private operators are weakly regulated but do the job. Informal modes are ubiquitous and dominate in smaller cities. In large, prosperous cities, companies provide door-to-door minibus services for their employees. Reactions to motorization are on a much lower scale than in China, but this may be changing, given the new awareness that urban accessibility is on the critical path for economic growth and the living standards (including health) of both rich and poor. Notable developments include a new metro in Delhi, bus-based rapid transit in Ahmedabad, a major overhaul of the suburban rail system and roads in Mumbai, and a court-ordered conversion of buses to CNG also in Delhi. Many cities are either slow to move or rely on least-resistance actions to provide temporary relief (e.g. enthusiastic building of fly-overs in Bangalore). Neither urban development nor transport institutions in Indian cities are up to the daunting challenges cities face, in terms of staffing, funds, concepts or instruments. Recent actions at the national level (adoption of an urban transport policy, setting up of an urban infrastructure development fund) are promising, but jurisdictional and financial relations between state and local governments remain a major stumbling block. Importantly, the mass of poor people in cities (50-60%) calls for a much more balanced approach than hitherto tried. Enthusiasm for investing in large-scale roads and public transport systems is in sharp contrast to the poor level of basic amenities for pedestrians and bicycles, on-street public transport services, and generally a low traffic management effort. Inclusive growth strategy will include immediate “repair” of these shortcomings, complemented by a disciplined approach to expanding road and public transport networks first in the mid-range options, then moving up the scale ladder.

Overall, the scale of urban transport problems in developing countries exceeds by far those experienced in the developed world during its early stages of urbanization and motorization. The developed countries had major advantages: a considerably higher level of wealth, more equitable income distribution, and far stronger government and market institutions. Importantly, both urbanization and motorization grew at a slower pace, and the cumulative damage done to the environment was still at low levels.<sup>23</sup>

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<sup>23</sup> In spite of these advantages, things have not gone smoothly even in the most developed countries. Urban transport was recognized long ago to belong in a class of “wicked” problems, lacking a definitive formulation, having no exhaustive set of potential solutions, no rule for stopping (“the problem is solved”), and little opportunity to repeat experience (cf. Rittel and Webber, 1973). Even today, urban transport is considered an open issue in the United States and Western Europe, since “solutions” of one era have turned into problems of subsequent periods.

**Box 2-4. Motorization in China**

China is seeing two decades of steady, double-digit economic growth now being translated into car and motorized 2-wheeler ownership, growing exponentially, together with the a rise of lower-density suburbs. The car is both an engine for economic growth (automotive industry being chosen by the government as one of four pillars of development) and its byproduct. Most Chinese cities are evolving from a bicycle and walking dominated model to a competition between ascendant cars and weakly developed public transport modes. Cities are choosing different response paths. Some are taking the accommodation route by expanding road infrastructure, others have opted for massive public transport systems, rail- or bus-based rapid transit. Beijing opted for both. Some cities have introduced prohibitions and quotas, but these focus on bicycles and motorized 2-wheelers, not cars. Responses so far lag behind traffic growth, with Beijing being the most striking case. Despite massive road building and an extensive and growing metro network in the capital, high levels of street congestion, pollution and accidents are taking place at a relatively low level of motorization (average of under 200 cars per 1,000 people in 2005). It is slowly being recognized that urban transport problems are too complex to be handled mainly through massive infrastructure construction. In time, the bicycle may have a renaissance.

### **3 RATIONALE, MODALITIES AND OBJECTIVES OF WORLD BANK'S INVOLVEMENT IN THE URBAN TRANSPORT SECTOR**

The rationale for the Bank's involvement with urban transport stems from the ever-increasing importance of cities in matters essential to human development: economic growth, poverty reduction, and environmental quality; and from a perception that transport activities in cities are among major, sometimes critical, contributing factors to each of these.

#### **3.1 Importance of cities and urban transport**

Large cities are recognized widely as prime engines of economic growth by virtue of their size and benefits of proximity, including the depth of labor markets and the ease of interaction between producers and consumers of goods and services. At the same time, cities in many developing countries contain growing numbers of poor households, due in great part to an influx of migrants from smaller cities and rural areas hoping to avail themselves of jobs and amenities that large cities offer. In the environmental dimension, cities have significant adverse impacts, because of the loss of fertile land, waste generation, and pollution of air, water and soil.

Transport is an important medium of interaction between economic and spatial processes in cities, and also a significant contributor to pollution and noise. Economic and other activities of households, and city productivity and livability all depend vitally on the performance of urban transport systems. When urban roads and public transport services are not good, consequences are felt by households, by businesses, and by the urban community at large. If poor performance goes unattended, transport may become a binding constraint on both economic growth and social development. Over the long term, environmental problems resulting from transport operations in individual cities will accumulate and have far-reaching consequences for the global environment, including climate change.

There are also supra-urban consequences of urban transport for economic growth of countries, in the sense that cities are major nodes of national transport networks and gateways to the world. Urban roads and public transport services are essential contributors to the performance and cost efficiency of rail and road terminals, ports and airports.

From another angle, expenditures for the urban transport sector—be they for investments or various current expenditures and operating subsidies—account for significant budget outlays of urban governments. Some urban transport construction projects may be among the largest capital investments in the history of a given city. Whether the source of funds is local or national, urban transport investment planning takes place in the context of a tough competition for budgets, since rapid urbanization generates an all-around pressure on both the operating and capital expenditures of cities. It is therefore essential to get good economic returns from urban transport investments, not to mention avoiding major losses. Experience shows that many large investments (roads and public transport included) are made without a reasonable effort to develop a full range of alternatives or to evaluate fairly their economic and financial consequences. Likewise, operating subsidies for public transport services, caused by low fares that are nominally justified in terms of concern for low-income citizens, all too often are associated with supply-side inefficiencies and/or the leakage of benefits to non-poor households.

Potentially large benefits lie in all these challenges, in terms of economic productivity of cities, household economics and quality of life, social equity, local and global environmental health, energy consumption, land conservation, and public finance. The World Bank's urban transport program aims to help its client cities reap these benefits and provide examples of good practice that can be emulated elsewhere.

### 3.2 Modalities of Bank involvement

The Bank's assistance in the urban transport sector, indeed in all economic sectors where it is involved, has three essential components:

- Advice on how to improve policies, regulations, laws, investment programs, and other instruments available to decision makers;
- Advice on how to improve institutions (changes to jurisdiction, organization, staffing, internal processes and incentives, cooperative mechanisms) so they are capable of better future responses;
- Funding for urban transport investments, to cover the period until improved policies and institutions make such loans unnecessary or available from ordinary banking sources, local or international. Investments are expected to have immediate benefits to travelers, shippers, operators, the urban community overall, and beyond. Included are road and public transport infrastructure; fleets and engines; maintenance equipment; traffic control systems; information processing and other equipment helpful in the provision and management of transport services; training, advisors, consultants, and equipment to improve the workings of sector institutions and/or to produce specific plans, policies and other outputs.

Accordingly, the instruments for the Bank's assistance can be divided into two main groups: advisory assistance, and development loans.<sup>24</sup>

#### *Advisory assistance*

Advisory assistance commonly comes in the form of economic and sector studies, carried out by the Bank following a request by client governments. In the domain of urban transport, such studies can be regional, national, involve several cities, or just one city.<sup>25</sup> They may lean on major work already done by the client governments and their consultants, or initiate work where none had been done before, or not recently enough. Some urban transport reviews, as they are often called, are comprehensive, while others focus on one transport mode (e.g. urban road network or public transport services), or even on one aspect (e.g. fares and subsidies, traffic management, poverty, air pollution, road finance, public expenditures). Box 3-1 shows a commonly used structure for a broad-based urban transport review, focused on a single city.

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<sup>24</sup> These instruments are common to Bank operations in all sectors. *World Bank (2003a)* has an exhaustive listing of instruments used by the Bank.

<sup>25</sup> Examples from the last 15 years include: *Urban Transport in Asia: an Agenda for the 1990s* (Midgley, 1994); *Poland: Urban Transport Review* (World Bank, 1995); *China's Urban Transport Development* (Stares and Liu, 1996).



**Box 3-1. A generic list of tasks for a city-based transport review**

1. Assess the performance of urban transport systems, in multiple dimensions, from the point of view of travelers and shippers; the larger urban community; and from other relevant angles (national, international).
2. Trace the genesis of the identified performance problems and external impacts to providers of infrastructure and services, thence to governing institutions, their instruments and their actions.
3. Identify issues whose resolution is critical for improving the performance; and
4. Recommend corrective actions in terms of policies, regulations, plans, programs, funding, investments, and institutional design.

Urban transport reviews may be free-standing, or part of a transport or urban sector study, or even an infrastructure study. They can be independent of Bank lending to the country in question, or they may cover Bank activities as well.<sup>26</sup> In the latter case, the above shown structure is complemented by a retroactive look at past Bank-funded urban transport projects, the creation of an analytic basis for making development loans, and recommendations for future lending operations.

*Development loans*<sup>27</sup>

The main idea behind development loans is the use of funding to leverage policy and institutional changes. Loan instruments come in two main formats: specific investment loans and development policy loans (DPLs).

*Specific investment loans*

These are commonly referred to as Bank-funded projects, or simply Bank projects. During more than 30 years of urban transport lending by the Bank, this has been and continues to be the dominant instrument of Bank assistance in this matter.

A Bank-funded urban transport project normally is a three-dimensional package, containing an action program for policies; an action program for institutional change; and an investment program, funded in part by a loan from the Bank (Box 3-2). In each individual case, policy and institutional changes and investments should make a coherent whole that responds to objectives drawn from the place-specific context. The agreed objectives and actions must fall within the decision-making power of the borrower, be this city-level or higher-level government, or some blend of governments.

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<sup>26</sup> Older studies tended to be of the latter type. For example, *Tunisia Urban Transport Review* (World Bank, 1985) was the foundation upon which the Second Urban Transport Project was built. In the recent past, Bank activities are addressed in separate documents. *Poland Urban Transport Review* (World Bank 1995) was not linked to or followed by a lending operation. The country transport sector study for India (World Bank, 2002d) has significant urban transport content, not linked to the Bank's lending program. The same holds for the recent study focusing on urban transport institutions in China (World Bank, 2006).

<sup>27</sup> Formally, the term "loans" is reserved for lending by the International Bank for Reconstruction and Development, while "credits" refers to lending by the International Development Association. Credits feature significantly lower interest rates and long repayment periods and are reserved for lowest-income countries. In this text, for convenience, "loan" is used for both. Since Bank loans provide only a portion of funds needed for specific projects, the balance is made up by the client government's equity and/or loans/grants from other sources – other development finance agencies and the private sector. The agreed action program may also contain investments not financed by the World Bank loan, but by the client government alone.

The relative weights assigned to policies, institutions and investments may differ from one place-specific project to another, depending on local circumstances, the complexity of implementation, and other sources of assistance available to client governments. For example, some small-size loans and grants focus entirely on policy and/or institutional change, typically by financing technical assistance, training and other actions for capacity building. Conversely, when a loan finances an investment in works and/or goods that is especially complex to prepare and implement, policy and institutional components of such a loan may be few, or narrow, or not present at all. Another variant in project design is used when client governments prefer to maintain policy/institutional dialogue outside of Bank-funded projects, or in parallel with them, in which case an active and demonstrably productive dialogue is a prerequisite for having a lending program.

**Box 3-2. Structure of a typical Bank-funded urban transport project**

1. A set of objectives based on the place-specific context;
2. An action program for policies;
3. An action program for institutions; and
4. An investment program funded by a combination of a Bank loan and city/country equity, sometimes with participation of other co-financiers.

Advanced forms of investment loans include *sector-wide loans* and *adaptable program loans*, alone or in combination. Sector-wide loans involve working with an institution (e.g. a Ministry of Transport or an urban government), with an established track record as Bank client, to fund time-slices of that institution's investment program. Adaptable loans, be they sector-wide or of a narrower scope, feature 2-3 stages, where a go-ahead for a later stage depends on the success of the preceding one(s). Loan sizes tend to be larger than for ordinary projects, and the policy and institutional components involve important structural changes. In practice, there have been no free-standing urban transport loans of this type, but some sector-wide and adaptable program loans have included urban transport components.

*Development policy loans (DPLs)*

These loans are not linked to specific investments, but are disbursed directly to the national treasury of the client government. Loans are used in tandem with a major action program on policies and institutions. In the urban transport context, this instrument is particularly useful when the warranted action program extends beyond city governments to national level policies and institutions.<sup>28</sup> In the history of the Bank's urban transport lending, DPLs exclusively oriented to urban transport matters, such as the Santiago DPL described later in this paper, have been rare, but may acquire more prominence as cities reach the threshold where radical policy changes (e.g. congestion pricing) become warranted.

Each of the above-cited instruments has its place and specific usefulness, and may be used individually, or as a complement to others. This paper, however, will focus only on the specific investment loans because of their dominance in practice and because, structurally, they are more comprehensive than the other two. Sector loans and DPLs are best handled within country-specific strategies.<sup>29</sup>

<sup>28</sup> Occasionally, an urban transport component, most often involving a major policy change, is included in macro-level, and/or multi-sector policy loans known as structural adjustment loans.

<sup>29</sup> Development policy loans can be seen as projects with the investment dimension lopped off. Sector-wide and/or adaptable program loans introduce innovations in size, allocation of appraisal responsibility between the Bank and the borrower, and staging to provide performance incentives for the borrower.

### 3.3 Bank objectives

Generally, the Bank's objectives in the urban transport sphere are the same as in all other sectors: to seek ways for the client countries to achieve economic growth with greater social equity and inclusion, and with an increasing and explicit attention to sustainability regarding non-renewable resources and environmental impacts. In recent years, there has been an increasing emphasis on measurability in development assistance, with the adoption of Millennium Development Goals (MDGs) as the most visible outcome. These are a set of numerical targets for poverty reduction and other improvements in welfare.<sup>30</sup> None refers directly to transport, but there is work underway to establish an exhaustive set of universal transport indicators that would be an addendum to the MDGs. These indicators would be drawn upon in the design and evaluation of individual transport projects, and would permit cross-project comparisons and program evaluations.<sup>31</sup>

In view of complex and hitherto intractable processes linking urban transport actions in a given city and levels at which economic growth and other results are measured, the practice in urban transport development lending has been to pursue a set of discrete micro-objectives, drawn from site-specific circumstances and allowing some form of measurement, perhaps even modeling.<sup>32</sup> In individual projects, an effort is made to have numerical indicators and targets for as many of the agreed objectives as possible, and to make some of the targets contractual in loan agreements. The underlying assumption is that achieving these micro-objectives, all other things equal, would contribute to reaching growth and other higher-level objectives, though an explicit and quantified link is not made.<sup>33</sup> This approach is under increasing "stress" as the seriousness of global impacts increases, notably those related to climate change and the pressure on non-renewable energy sources.

The list of categories from which micro-objectives are drawn, shown in Box 3-3, is based on project experience. The list is the same for investments, policies and institutional dimensions of projects, hence wide variations regarding measurability. When used for investments, most objectives can be expressed in cardinal numbers. Others will have yes/no outcomes, and yet others can only be based on judgment. For objectives related to policies and institutions, cardinal numbers are less applicable, and judgments are most often used. It is also recognized that there are different time lags between project instruments and the achievement of objectives. Some instruments (e.g. investments in fleet, traffic control, minor infrastructure, fare changes) tend to have a short action-effect linkage, and others (e.g. major infrastructure) have long-term and diffuse impacts. Likewise, there are different lengths of cause-effect chains. Actions to strengthen institutions and policies ultimately will lead to achieving one or more objectives from the list, but within the horizon of the project some intermediate objective (target) may have to be used.

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<sup>30</sup> A good summary account is in Devarajan et al, 2002.

<sup>31</sup> An early Bank effort in this matter is recorded in Gannon and Shalizi, 1995.

<sup>32</sup> An entirely different approach, transcending the work on individual projects, has been to study linkages between aggregate transport infrastructure investments and city productivity, or some other overall objective. The Bank carried out several such studies internally and assisted in having studies done by other institutions (Kessides, 1993; Polèse et al, 2003), but this approach has never been used to evaluate individual projects.

<sup>33</sup> In some Bank-funded urban transport projects, positive impacts going well beyond common micro-objectives— notably greater urban productivity or lower poverty—were claimed at the appraisal stage. While such benefits are plausible, they cannot be verified readily for individual projects and are best left out. It is difficult enough to have meaningful micro-indicators measured and evaluated in pre-investment and completion studies.

**Box 3-3. Objectives commonly used in urban transport projects**

1. Demand-side objectives:
  - Greater mobility for household and business users of the system, across all modes and types of trips;<sup>34</sup>
  - Greater equity: mobility improvements for vulnerable populations, defined by mode of travel, income, gender, age or handicap;
  - Greater safety for people (in terms of accidents, injuries, deaths) and property; and
  - Lower air pollution and other adverse (local) environmental impacts of traffic.
2. Supply-side objectives:
  - Greater effectiveness in the provision of transport infrastructure and public transport services;
  - Greater cost-efficiency in the provision of transport infrastructure and public transport services, with potential downstream benefits for travelers, shippers, and for the public finance (better services, lower subsidies); and
  - Improved financial health of public transport operators and infrastructure providers.
3. Community and government objectives:
  - Equity, safety and environmental improvements (and downstream health improvements) beyond what is perceived on the demand side;
  - Energy savings;
  - Public finance benefits stemming from reduced subsidies;
  - Public finance benefits stemming from high quality of investments financed under the project, in terms of selection, preparation and implementation;
  - Employment generation and other specific economic development objectives;
  - Positive impact on land development; and
  - Increased inclusion in the sense of community participation in planning and decision-making.
4. Global objectives: impact on climate changes;
5. Demonstration effects outside the project: scaling up and replication elsewhere.

**3.4 Conflicts between objectives**

The multi-objective nature of most urban transport development projects provides simultaneous opportunities to increase economic growth, reduce poverty, and improve air quality. Some project actions are conflict-free in that they lead to improvements in one or more of these dimensions without negative consequences in others. Unfortunately, conflicts between objectives are more common, and require compromises and trade-offs. Policymaking and investment planning in such settings are complex and contentious, and often beyond the powers and knowledge of city or national governments to resolve.

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<sup>34</sup> The term “mobility” is used here in an all-inclusive way. It refers to travel time, money, comfort, convenience, reliability, safety, and security from the point of view of both travelers and shippers. Equity, safety and environmental aspects are included under multiple headings to reflect the distinction between demand and community valuations of these important benefit categories. The profession at large, and the Bank transport community also, are trying to replace the mobility-oriented approach by looking at accessibility, which refers to desired destinations. The shift has been made at the level of rhetoric, but actual project work (especially economic evaluation of investments) is still done in mobility terms. The reason is that accessibility is much more difficult to “operationalize” than mobility.

The form in which conflicts arise differs from place to place. In one common scenario, a city's economic success increases its population, especially in the low-income category, and adds to poor communities that are spatially segregated on increasingly distant urban fringes. At the other end of income distribution, higher incomes lead to increased individual motorization with gains in mobility but at potentially large social costs. Thus, the stage is set for travel markets with sharply different demand profiles: (a) low-income travelers who rely on walking, other non-motorized modes and informal public transport; (b) middle-income travelers who use formal public transport, taxis and motorized two-wheelers; and (c) higher-income households and businesses that rely on cars. All compete for the same street space. The objective of improving the lot of the first group, e.g. by providing sidewalks and bike lanes, collides with interests of the motor vehicle traffic, including all types of street-based public transport modes.

Conflicts also arise within the public transport milieu. In a frequently found setting, informal, free-wheeling services, favored by many low-income travelers, encroach upon the market of formal (fixed-route, scheduled) operators. Suppressing the former in favor of the latter produces gainers and losers amongst both operators and travelers. Yet another example involves constructing high-capacity, reliable, and comfortable public transport systems on off-street right-of-way (e.g. metros) in order to retain and/or attract mid-to-high income travelers (on multiple grounds). This inevitably involves high capital costs and sometimes high operating costs. If fares are set accordingly, the service becomes unaffordable for low-income passengers; if fares are set low, the resulting subsidies threaten to bankrupt city governments.

Clashes between environmental and poverty objectives are also frequent. It was noted above that poor households bear more than a proportional share of the burden from poor transport services, low safety and adverse environmental impacts. Conversely, low-quality public transport services (weakly regulated street buses, important both for service provision and as employment generators) and motorization at low income levels (motorized two-wheelers with two-stroke engines) tend to have especially adverse air pollution impacts and high accident rates. Efforts to correct these may collide with poverty alleviation objectives on both demand and supply sides.

Even more generally, there is a conflict between objectives derived from the mobility-pursuing paradigm, on both poverty and economic growth grounds, and the notion of sustainability in terms of the climate and the energy supply. In the simplest terms: under commonly found conditions of suppressed demand, investments justified on cost reduction basis and built following strict environmental safeguards will lead to increased traffic, and probably net environmental losses. For the time being, as noted above, the practice proceeds with the underlying assumption that local cost and pollution reduction impacts add up to a positive contribution to sustainability.<sup>35</sup>

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<sup>35</sup> This is a gradualist, or "weak sustainability" school of thought, essentially placing faith in the capacity of science and technology to resolve both energy and environmental challenges (Himanen et al, 2006).



## 4 ELEMENTS OF PROJECT DESIGN

The preceding chapter described typical Bank-funded urban transport projects as being three-dimensional packages, consisting of complementary action programs for policies, institutions and investments, linked to a set of locally relevant objectives. How are these arrived at in specific situations?

The process of putting together an urban transport project is initiated typically by a client government approaching the Bank with a request to fund an investment (program). It is relatively rare that this request comes combined with policy and institutional elements. Typically, these are added in by the Bank in the course of project preparation, following requisite diagnostic studies (see below), in a give-and-take process of learning, debate and negotiation.

The degree of specificity as regards investment proposals and the supporting materials at the time of the initial contact varies widely from place to place, even by type of investment for the same city. It may be that all the requisite background studies had been done and to a good standard, but the opposite extreme is not rare. A desirable situation at the outset is for the city to have done a recent and reasonably comprehensive transport study, whose output includes an overall urban transport strategy, plus at least some preparatory studies focusing on investments for which funding is sought from the Bank.<sup>36</sup> Whether the background studies were done or remain to be done affects mainly the length of the subsequent process, not its contents. This process consists of: (i) a diagnostic phase; (ii) strategy development; and (iii) detailing the action program.<sup>37</sup>

The diagnostic phase of project preparation is essentially the same as stated above for urban transport reviews (Box 4-1). It starts with an evaluation of the performance of the transport system in the client city, culminating in a list of critical policy and institutional issues to be resolved and critical investments that should be made. In the next phase, this list is mapped into an action program that in essence comprises a full transport strategy for that city. The strategy is based on responses to these key questions: what acute problems need to be addressed? What travel markets should be preferred? What modes should do this job best? In the short run, what policies need to be changed to achieve immediately beneficial impacts? In the long run, how should the modal sub-systems be expanded? Where will the requisite funds come from? And who in urban and supra-urban government should be doing what?

Since the time horizon, the scope of institutional and policy changes, and the scale of investment program in such a strategy will normally be well beyond the involvement capacity of a single Bank-funded project, the latter will be put together by selecting (from the city transport strategy) a coherent, time-bound sub-program. Detailing of the program, especially of its investment components, follows well-established procedures of engineering design, economic and financial

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<sup>36</sup> Under the Santiago Urban Transport DPL (Chile), all the necessary studies had been done beforehand by local planning agencies and their consultants. At the other extreme, the preparation of the first Bank-funded urban transport project in Russia encompassed a full-fledged piece of transport sector analysis, since no prior studies were available from any source.

<sup>37</sup> Formally, the Bank uses a combined project cycle and loan processing terminology developed in its early days when infrastructure investments dominated policy and institutional dimensions of projects. A project cycle starts with identification, and continues through preparation, appraisal, loan negotiations, loan effectiveness, implementation and completion. This paper focuses on the first two of these stages.

evaluation, environmental and social impact evaluation, risk analysis and implementation arrangements.<sup>38</sup>

Since the Bank's involvement in any one city tends to be occasional rather than continuous, high selectivity is warranted when it comes to deciding what to include in the project. Policy and institutional matters chosen to be a part of the project design should be significant, if not pivotal. Investments have to pass rigorous economic and financial evaluation, with rigor not being limited to such things as cost and demand/revenue forecasts, but also to ensuring that all potentially good options have been evaluated. One of the most difficult and essential aspects of project making is a *priori* assessment of success probabilities in all three project dimensions, especially in the two "soft" ones. It is possible, using sound technical reasoning, to identify a potentially effective set of policy and institutional changes that will speed the project through the loan approval process but remain words on paper. Getting a realistic project strategy involves looking into the underlying political economy of the sector to identify winners and losers of proposed actions, and using this perspective to amend the initial (technical) strategy. As noted above, the depth and breadth of diagnostic work is of utmost essence for this aspect of project making.

The preparation process depicted in the preceding paragraph is a joint endeavor of the client government and the Bank. Since an urban transport is normally just one of many subjects dealt with by either partner, each will have criteria and procedures to ensure that what is arrived at in urban transport is also coherent with their wider economic, administrative and political feasibility. Each client government will have its own ways of evaluating projects and ensuring coherence. On the Bank side, there are three main tests that a proposed lending operation—in any sector—is expected to pass.

The first test consists of a *multi-criteria evaluation of proposed investments and policies*, organized around a hard kernel of economic and financial analysis of investments and financial analysis of project entities.<sup>39</sup> An important part of evaluation is compliance with social and environmental safeguards. The guidelines for economic and financial evaluation and the specifics of safeguards are spelled out in a series of operational policy statements, the majority of which hold for all sectors but some of which are sector or theme specific.<sup>40</sup>

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<sup>38</sup> These are covered in a set of operational policies and directives, applicable to all projects.

<sup>39</sup> Conventional urban road investments involve no revenue and require only economic evaluation. Public transport investments require a financial evaluation of the project as well as the financial evaluation of the operating company.

<sup>40</sup> None is specific to urban transport.



**Box 4-1. Importance of diagnostic work**

Since traditional urban transport planning methods were developed in relatively homogeneous economic, social and political environments in the US, the emphasis in nominally comprehensive urban transport studies was on modeling and forecasting demand and supply relations on road and public transport networks, thence deriving investment programs. Policies and institutions got much less attention. Matters are drastically different in most countries where the Bank works on urban transport projects. Diagnostic work, especially the search for explaining why burning problems have remained unresolved and identifying “binding constraints”, is essential there, because it lends realism to subsequent proposals. This activity is analytic but not predominantly quantitative in the sense that demand modeling is. It requires experience and the skill of making judgments, which of course is true for all development work (World Bank, 2005a).

The diagnostic phase of an urban transport project making starts with data collection for the city in question:

- On the demand side: demographic and spatial patterns; urban economy and household economics; correlation between incomes and location; vehicle ownership, travel patterns, modal split;
- On the supply side: extent, structure, condition, cost-efficiency and performance of transport infrastructure; traffic control systems; public transport operators and services they provide; and
- Government institutions with jurisdiction to manage the existing system and plan its development over time; their policies, regulations, finances, and other.

With data in hand, the process moves to evaluating the performance of the transport system. It is essential to distinguish between two types of evaluation: (i) from the supply side—how effective is the “output” of infrastructure and services, and how efficiently (cost-wise) was it produced; and (ii) on the demand side—how well the transport system performs for its diverse clients—the travelers, the employers, the shippers, and the wider urban community. The first, involving such items as public transport and road operating speeds, public transport waiting times, reliability, pavement condition, etc., is technical, with well-established methods and multiple uses of data (for performance evaluation but also for modeling of demand/supply relations). The second type of evaluation involves special-purpose surveys and analyses of travel markets, and requires social science expertise often difficult to find locally. Both types of evaluation are needed but, in a sector traditionally dominated by engineers, the first is common and the other is only becoming prominent with increased importance of aspects such as poverty and environment.

Many urban transport problems on either demand or supply side have simple technical answers, but the fact that they have persisted throughout the world requires some deeper understanding of how they came to be, and why the solutions are not forthcoming. The final stage of the diagnostic process involves searching for cause-effect chains leading from the observed, street-level problems to contentious issues that lie underneath. Apart from wider social and economic processes taking place in a given country and city, problems usually can be traced to specific policies, regulations and investment programs already in place (or to their absence), and/or to the structure, functioning and inter-relations of the relevant local or national institutions and interest groups. Once these cause-effect chains are understood, the planning process can move from diagnosis to generating corrective actions and estimating their impacts and probabilities of success.

The second test is the consistency of the proposed operation with the *Country Assistance Strategy (CAS)*. The CAS is a document agreed to by the client government and the Bank, updated periodically, that establishes the priority sectors, issues and directions for cooperation, and provides the size and content of the lending program. The proposed project must fit within the thematic and financial envelopes defined in the CAS.

The third test involves the harmony between the proposed project and the *Bank's global strategy* for the sector or theme to which the project belongs.<sup>41</sup>

While the relationship of any proposed project with the CAS is relatively straightforward—since they apply to the same country—the relation with the relevant global strategy is more ambiguous, especially if the strategy is intentionally project-focused, as the one proposed in this paper is. Should the Bank's urban transport strategy be seen as a blueprint for the design of all projects of this genre? The answer is negative. Only if problems in diverse cities were found to be similar and to have similar underlying causes would there be a full correspondence between the design of individual projects and the global strategy. The reality is that urban transport situations differ from one country to the next, and even vary between cities in the same country. Local contexts vary, and so do development paths, the resources available, the institutional capacity to change, and the patterns of winners and losers related to proposed changes. A project done in a given place is custom-tailored for local conditions; it is selective, specific, and linked to a time-bound course of action, to the point of being rigid. Its costs and benefits are forecast in explicit terms, even if not always in monetary units, as is their distribution. The success of this design can be tested, using pre-agreed indicators, already in the course of project implementation, and certainly at its end, and later. Finally, a project is a joint product of the client government and the Bank, a result of a give-and-take process. All these features lend the project credibility with the client government and within the Bank.

Because its domain is the entire set of client countries, the global strategy is much less specific than any one project, but much more inclusive and flexible. The cumulative experience of past Bank-funded projects is at its foundation, but it ought to reach well beyond what has already been tried, suggesting an evolutionary path for the ensemble of future projects.<sup>42</sup> The global strategy is best viewed as a strong central tendency (or multiple tendencies) in an envelope containing all promising project designs. It is meant to offer a broad starting base from which more specific designs can be developed, as well as provide an overall consistency check for individual operations. Its success cannot be tested in the same way as for individual projects, but using aggregate results of project cohorts.

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<sup>41</sup> As noted earlier in the paper, there may also exist regional and/or country-specific strategies and business plans that need to be taken into account. For an example of a regional urban transport strategy see *World Bank, 2002*. Whether or not written-down strategies are available, the review process includes participants from all related sector or thematic departments.

<sup>42</sup> Project strategy also is constrained by the Bank's strict social and environmental safeguard policies in a way that sector strategy is not.

**Box 4-2. Contrasting project design strategy and global thematic strategy for urban transport**

The multiplicity of designs seen in Bank-funded projects stems from the rich variety of urban travel markets and modes in cities and countries, themselves arising out of the widely different, underlying geographic, demographic, social, economic and political conditions, and the nature of the stimulus for reforms. This variety precludes an overall, one-size-fits-all, prescriptive approach by the Bank, though it does not affect a set of its preferred policy leanings and/or “end-states”.

The project design is a place-specific package of urban transport investments, policy changes and institutional changes meant to meet a set of explicit local objectives against which it can be tested upon completion. It is jointly developed by the client government and the Bank, and (through loan agreements) takes a contractual form.

The Bank’s urban transport thematic strategy reflects the Bank’s own position. It has the same structure as project designs, but it is an envelope of all project designs, with a discernible central tendency, perhaps multiple tendencies. It is based on cumulative experience, and should be tested accordingly, without being constrained by it; indeed, it must reach beyond experience to what has to be done differently or to what has yet to be tried.



## 5 BUILDING BLOCKS FOR URBAN TRANSPORT PROJECTS AND STRATEGIES

An operationally oriented sector strategy, as defined at the outset of this paper, should have the same *structure* as that found in individual projects from that sector, i.e. must be expressed in terms of policies, institutions and investments that together address a set of explicit objectives. Each element of the strategy is chosen from a list of options derived from local and global analysis and experience. Indeed, both project and strategy making in any sector can be seen as selecting a purposeful sample of building blocks from three “bins.”

The strategic building blocks reviewed below were drawn from appraisal documents for Bank-funded urban transport projects belonging to the cohort of the last 15 years; from urban transport reviews done by the Bank for cities, countries and regions over the same period; and from the above cited sector documents and policy reviews, especially *Cities on the Move*. The criterion for choosing these, especially those from the policy “bin,” was that each of them tended to be pivotal under a variety of oft-observed circumstances.<sup>43</sup>

### Building blocks for urban transport policy strategies

The strategic policy agenda, summarized in Box 5-1, starts with specific short-run concerns for the management of the available road space and regulating public transport services. The system expansion is addressed by focusing on funding and expenditure policies and processes.

#### Box 5-1. Strategic building blocks for urban transport policies

- Allocation of road space among transport modes
- Time and price measures to manage the use of urban roads
- Ownership and regulation of public transport services
- Roles of public and private sectors in investments and operations
- Service-price policies for public transport services
- Transport expenditure policies of city governments
- Transport system funding and finance
- Land development policies

**Allocation of road space.** Allocation of the available road space among pedestrians, non-motorized vehicles, motor vehicles, public transport vehicles, and parked vehicles, is one of the most potent but insufficiently used instruments available to governments to manage traffic and transport, and to express preferences concerning different transport modes and social groups. The power to decide is

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<sup>43</sup> In the majority of urban transport projects, the Bank’s key partners are city governments; hence these projects should focus on instruments available to the mayor and/or the city council. In the three strategic agendas presented in this chapter, especially in the policy section, some matters are under the jurisdiction of city governments and others are decided at the national level. Investments tend to be mainly a local matter. In the most important (read: strategic) policy and institutional matters, the responsibility is shared, in the sense that national governments provide the framework legislation, and local governments make detailed decisions within that frame. Even such a seemingly local matter like introducing parking charges sometimes requires changes in the national legislation. This is a sensitive aspect of project design: how to use the leverage of locally-owned investments to change a national policy.

vested entirely in the local level of government.<sup>44</sup> Some space allocation decisions have citywide or corridor-wide ramifications (e.g. assigning absolute priority to motor vehicles on designated arterial roads) and others have sub-area impacts (pedestrian-only zones). The importance of this policy category increases in built-up, older urban areas, as they experience higher rates of motorization, changes in modal split, and congestion. Objectives of street space allocations may be quite diverse, e.g. ensuring the protection of the vulnerable, non-motorized modes (walking, bicycles), maximizing people movements and the quality of service (bus-only lanes), favoring motor vehicle mobility (once popular in the United States and Western Europe, alive today in China and other places at early stages of motorization), or protecting adjacent land uses (traffic calming in residential areas).

Due to strong vested interests, re-allocation of space on existing roads tends to be a contentious matter both during its adoption, implementation, and even thereafter. It requires an exceptionally careful preparation and high-intensity, continuous enforcement. This is especially so if re-allocation involves a reduction of space available to motor vehicles, but conflicts between pedestrians and street merchants are also frequent. Policy changes in favor of non-motorized and public transport modes are often easiest to implement in projects that add road capacity, e.g. those involving major rehabilitation or new construction in urban expansion areas. Even here, this policy reform may clash with national road design standards. Conversely, working on the reform of national design standards may ease city-specific applications.

**Managing the use of urban roads through time and price instruments.** For a given allocation of street space, time controls and charging for use offer a flexible and powerful instrument to manage traffic patterns and transport demand. The most common tool in this policy category is *on-street parking management*. A gradual approach involves applying time controls first, then moving to parking charges. Similarly, it is in congested central areas where parking controls are first applied, then are gradually expanded to other activity centers and beyond, as warranted. A complementary policy tool involves parking standards for new buildings, requiring coordination between traffic management and land development wings of city government. A hike in on-street parking charges will eventually create a market for off-street parking spaces, and may lead to modal and land use shifts. Enforcement of parking controls is essential, be it time-based or price-based, and provides an opportunity to involve the private sector. Parking fee programs generate revenue, which should cover capital and operating costs at a minimum.

The second tool in this category is control of street space by *traffic and speed limitations and prohibitions*. Frequently used tools in this category include time-based entry prohibitions to downtowns and/or residential enclaves for some or all motor vehicles, and reversible lanes on major arterial roads. These measures can be effective in dampening demand and/or causing modal shifts, but it is too blunt an instrument, and produces no revenue.

The most complex tool for traffic and transport demand management is to *charge for the use of congested urban roads*. This is also a uniquely promising instrument for generating substantial revenue, with the potential to relieve or even resolve the problem of funding urban transport expenditures. Any city-based application must be coherent with the national system of road use (fuel) taxation, be treated as a user charge, include a transparent method of revenue allocation, and be coupled with a quantum jump in the provision of good-quality public transport services as an

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<sup>44</sup> Except for federal/state roads passing through urban areas. Also, geometric design standards for different road classes are issued at the national level.

alternative to driving.<sup>45</sup> The simplest way to introduce this tool is to charge tolls on urban bridges and limited-access roads, then move to cordon (entry) charges and beyond. The most complex form of road-use charging is an area-wide system sensitive to the time and place of road use.

Charging for the use of roads in congested cities has a solid theoretical basis and well-developed techniques.<sup>46</sup> Its implementation, however, is not yet widespread, due to political resistance from automotive interests, from local to global. In recent years, a number of Western European cities (Oslo, London and most recently Stockholm) introduced corridor and/or cordon charges for motorists. These developments came about long after an unusually effective early introduction of entry charges in Singapore in the 1970s, an experience that continues to evolve toward an area-wide system, sensitive to time and place of vehicle use. Except for built-up cities in Central and Eastern Europe, with sensitive historical cores to protect, the prospects for applying any form of use charges for urban roads in developing countries are still remote, not least because the requisite analytic base and institutional capacity are not available. A prudent approach in operations is to introduce progressively strict parking management, and in parallel prepare the ground for congestion charging by building a requisite data base, calibrating analytical tools, creating institutional capacity, and working on public understanding and acceptance.

**Ownership and regulation of public transport services.** A cross-section look at institutional approaches to the provision of public transport services reveals a range with a public-owned, monopoly-holding operator as one regulatory extreme, and a minimally regulated (or unregulated) market of small-scale, privately owned providers as the other extreme. In-between are various combinations of public or private provision including sub-contracting, management contracts, concessions and franchises. In some cities one regulatory set-up or the other is dominant; in many cities, several types co-exist.

What is at stake here is division of functions (who does what), ownership of fleet and infrastructure, and the scope of regulation, with different underlying allocations of cost and revenue risks, and their ultimate impact on travelers and the wider public interest. Over time, the evolutionary cycle of public transport regulation can be seen as a progression in the type of risks taken over by the private sector in a public/private partnership. The range is from a minimal involvement of the private sector as a supplier of goods and non-transport services, stepping to assumption of cost risks (as in sub-contracting, gross-costs based concessions), then gradually adding revenue risks and moving to ownership of fleets, facilities, and finally infrastructure. In parallel, the role of the public sector starts from a maximum, all-risks involvement, gradually relinquishing responsibilities to a point when only the regulatory role remains, perhaps also the ownership of some infrastructure. All regulatory arrangements in this domain tend to exhaust their potential to provide cost-efficient and quality services, with a half-life measured typically in decades. A shift from one regulatory set-up to another typically occurs when problems on the side of cost, service or external impacts lead to a crisis. The British regulatory reform in the 1980s was triggered by subsidies to bus operators threatening the finances of local authorities, while in Lahore in the 1990s the move to replace the informal market of minibus owners/operators by large concessions came when the street congestion had become intolerable. The change is not necessarily in one direction, the pendulum sometimes swinging back.<sup>47</sup>

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<sup>45</sup> Glaister and Graham (2006).

<sup>46</sup> For a concise and definitive treatment of this topic, see two papers by Hau (1992).

<sup>47</sup> A plausible and original description of evolutionary change in urban public transport regulation, using a "spiral" analogy, is in Godard (1987).

In Bank experience, the majority of client cities are found in regulatory “tails,” having either a troubled public enterprise or a weakly regulated system of numerous private providers. Sometimes both “tails” are present, with a predatory informal sector contributing to the decay of the public operator. Depending on the city-specific situation, the strategic regulatory change championed by a Bank-funded project may involve: (i) deregulating a public-owned monopoly and introducing market mechanisms to reduce costs and improve services, by choosing one of several options for public-private partnerships; and/or (ii) re-regulating (formalizing) “in-market” competition in order to improve services and reduce adverse impacts.<sup>48</sup> As used here, both terms “deregulation” and “re-regulation” indicate the direction, not the degree of change. The latter is a matter for place-specific decisions, highly dependent on the starting point, the willingness to change and the capacity to implement in perpetuity.

The desired-practice position implied by this approach consists of the private sector delivering services, based on competitively awarded, medium-to-long-term contracts. The public sector retains regulatory functions (deciding on vehicle specifications, routes, service frequencies, fares) and, most often, the ownership of infrastructure (for rapid transit modes). The government is also responsible for system expansion and other long-range planning matters. Whether the reform involves deregulation or formalization, a strong regulatory framework is needed, guaranteed by a competent and politically stable institution (i.e. a public transport authority, discussion follows below).

Programs to compensate losers from regulatory reforms are essential for their passage and success. Some losers are on the demand side, i.e. people whose services are reduced or withdrawn, or made more expensive in time and money. On the supply side, losers include the staff and managers of public-owned companies, or owners/operators of informal services, when the reform involves the shrinkage, re-orientation or cessation of their activities. Deregulation may involve as little as restructuring of existing public-sector enterprises to increase their cost-efficiency, e.g. by shedding most non-essential functions and introducing performance incentives. A further stage may involve the breakup of large companies into smaller ones and introducing bidding for service contracts, alongside new private competitors. The final stage is privatization.

The re-regulation of informal providers also can take different forms. The simplest reform involves a gradual tightening of the regulatory framework, stressing first those changes that would produce the most important results, be these related to service levels, congestion, safety or pollution. Another option involves giving formal operators (new or existing) the monopoly on major corridors, while limiting informal modes to the secondary road network, and/or to feeding/distributing functions. This approach can be usefully combined with a program to improve and/or extend major road corridors. The most ambitious reform involves the re-regulation of a hitherto dominant informal system in tandem with the provision of a new rapid transit system, as has been done in Bogotá’s *Transmilenio* project.

**Roles of the private and public sectors.** What was said in the preceding section concerning the ownership policy for public transport services can be generalized for all aspects of urban transport, from road construction and road maintenance to parking.<sup>49</sup> There is a broad consensus that public policy and the protection of the public interest should remain in the hands of city governments and their special-purpose institutional arrangements, whereas execution and operation should be

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<sup>48</sup> There has been at least one case, in Santiago de Chile, where re-regulation also aims to stop the rise in fares. See the Santiago DPL case study in Chapter 6.

<sup>49</sup> A comprehensive statement of Bank position on public/private roles is in Amos (2004).



transferred (judiciously) to the private sector using a competitive framework. Multiple options are available for the allocation of risks between public and private partners; choice depends on place-specific conditions. The speed and degree of shift from one to the other would depend on how well developed the legal system and other market institutions are in a given country and city. Also, regulatory changes in urban transport, especially in urban public transport services, are linked to and must cohere with reforms taking place in water, energy, other urban utilities, and national transport enterprises.

**Fares, subsidies and service quality of public transport services.**<sup>50</sup> This policy knot has three major dimensions, all of which tend to exert a downward pressure on fares. The first is that there are routes and time periods where passenger volumes are not sufficient to cover costs of service provision, all other things equal. The second is a sharp income polarization found within urban travel markets of many client cities, making commercially viable fares even for the lowest-quality services unaffordable for many people.<sup>51</sup> These two dimensions are often combined. The third is that prices and service quality in public transport must be seen relative to those faced by users of its major competitor—individual motor vehicles. Prices and service levels are of course the two major determinants of modal choice, if in fact a choice market exists.<sup>52</sup> Apart from modal split considerations, there is also a fairness aspect here, in the sense that motor vehicle users under congested urban circumstances may not be charged the full social costs for using urban roads.

As already noted in this paper, the concern for affordability clashes with modal split (service and environmental) objectives of local governments. The clash is best seen through two boundary cases. If high levels of public transport services are provided *and* fares are kept low (to retain/attract passengers from all income groups), the subsidy load may become unaffordable to the city government or to the nation. This problem is already serious for street-based public transport services, and critical for rapid transit modes which operate on exclusive running ways, due to the high proportion of fixed costs. Conversely, when fares are set low to ensure that urban transport services remain within reach of low-income households, while stressing high cost recovery (minimizing or eliminating subsidies), the resulting levels of service may become so low that “choice” passengers would shift to other available modes (cars in many countries, motorized two-wheelers in others), with downstream negative traffic and environmental consequences.

The clash of modal split and affordability objectives in public transport policy is becoming more and more contentious due to concurrent increase in motorization and the increase in urban poverty. There is no silver bullet to resolve this problem. Just as in the case of regulatory reform, the reform of fares policy is place-dependent, with a few good-practice pointers. In any given city, a delicate balance must be sought between service quality and fares, coupled with a system of subsidies targeted at low-

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<sup>50</sup> This text uses the term “fare” as shorthand for both fare levels and structures. Also, it may happen that diverse operators present in an urban area use different fare levels and structures. A policy of fare system unification often has a great potential to benefit travelers, achieve a rudimentary form of coordination among service providers, and provide the initial *raison d’être* of urban public transport regulatory authorities (see below).

<sup>51</sup> An additional problem may arise in this respect when there is a concurrent increase of prices in several essential goods and services, as happened in Eastern Europe and Central Asia in the 1990s.

<sup>52</sup> The conventional wisdom used to be that there is a wall between car owners and non-owners. The former would not “go back” to public transport modes. This has changed in recent years with motorization penetrating lower income strata, e.g. motorized 2-wheelers in India.

income travelers.<sup>53</sup> It is imperative to look at both demand and supply sides in this matter. This especially means that knowing household economics is as important as knowing the parameters of the operating company, the features of the regulatory framework, and the level of congestion. And, if the choice market is on the rise, it is also imperative to look beyond the confines of the public transport subsystem at charges and other aspects of managing the motor vehicle traffic.

In development lending, it is recognized that price subsidies and cross-subsidies in urban public transport services are valid instruments of social and transport policy, as long as the objectives are explicit and the subsidy itself is (a) appropriately targeted; (b) efficiently delivered; and (c) financially viable. This said, it is rare to find a subsidy arrangement that meets these conditions: objectives are often unclear or unachievable; benefits leak to non-target groups;<sup>54</sup> subsidies are delivered via service providers (public transport operators), creating perverse incentives for low cost efficiency; and subsidy payments are not sufficient or not paid on time, with negative impacts on providers' efficiency and service quality. Results measurement (actual social impact of subsidies) is practically unknown. Benefits of fare and subsidy reform under such circumstances are likely to be high.

The feasibility of targeted subsidies varies widely from country to country, depending on the formality of labor markets, and the existence of social assistance systems. The most common ones are category-based, i.e. limited to students, older people, and disabled, where eligibility is easy to check, but these do not address sufficiently either poverty or modal split considerations. Income-oriented subsidies are less frequent. Under the *vale transporte* program in Brazil, a subsidy is triggered when the transport budget exceeds 6 percent of salary. A household subsidy program, used in the Russian federation in the 1990s, was based on the sum of essential expenditures relative to wages. Unfortunately, neither is effective in the presence of informal job markets.

No matter what service/fare combination or subsidy targeting method is chosen, it is a must to reduce the subsidy load by acting on the cost side of the equation. This links the subsidy reform with that of supply regulation. From a subsidy point of view, the public provision model, with subsidies to be paid to the operator, has performed poorly both in terms of cost efficiency and financial viability. Cost efficiency suffered both because of a lack of incentives endemic to public-owned companies, and because of non-payment and/or late payments of subsidy. Accumulation of financial problems due to non-payments has in fact brought operators to near-extinction and beyond. The private provision of services within a for-the-market competitive framework is more likely to increase cost efficiency, hence produce lower subsidies, all other things equal. In addition, the contractual approach used in this framework tends to offer a better guarantee that subsidies will actually be paid in full and on time than what has been seen under the public ownership model.

The modal fairness aspect of fare policies, relative to what motorists pay, is the most difficult. The concepts of costs differ between public transport and individual motorized transport modes, and the two modal systems have limited overlap regarding organization, regulation, pricing and financing. This helps to explain why the pressure to increase cost recovery of public transport operators and scrutinize subsidized fares has yet to be matched (under Bank-funded projects) by a parallel look at what motorists pay and whether the social costs of motor vehicle traffic are recovered. This practice is likely to change, and it should change, as the search for sustainability intensifies. In urban transport development lending, as already noted above, the first corrective step in this matter is to prepare and

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<sup>53</sup> This text focuses on strategic aspects of fares and service levels. There are numerous tactical approaches, notably offering an array of services with different price/quality profiles.

<sup>54</sup> See Nicolas Estupinan et al (2007).

disseminate the analytic basis that would in time be needed to integrate modal policies regarding prices and service quality.

**Transport expenditure policies of city governments.** Experience indicates large and apparent distortions regarding the composition of transport expenditures in urban areas within and between modal sub-sectors, and in geographic terms. In urban roads, for example, the tendency is to favor capital investments over expenditures for road maintenance and traffic management. In the public transport sub-sector, especially when operators are government-owned, the pressure to invest in new, large-scale projects often co-exists with unresolved policy problems (how to finance ongoing operations, e.g. replace or expand capital stock, upgrade equipment and facilities; give them priority on-street, and others). In another dimension, low-income districts tend to receive much less money and attention than other parts of the city. While relatively simple analytical methods for budgeting and project evaluation are available, this policy area is vastly complicated by the fragmentation of planning and decision-making due to a multiplicity of governments and their agencies, as well by the general weakness of institutions. Bank-funded projects can be used as instruments to achieve better investment planning, increase (or re-align) expenditures where they are highly warranted on economic or distributional grounds, and generally strengthen the requisite structure and capacity of governments to deal with these matters.

**Urban transport funding.** Funding current, capital (equity and financial) expenditures is the most problematic and the most complex policy and institutional issue for urban transport modes in developing countries, both in scale and timing. It is also the most common binding constraint on urban transport development. Very few of the Bank's client cities have an effective and sustainable approach to funding either their roads or public transport systems.<sup>55</sup> The problem can be seen as a part of the larger subject of financing local governments, where it is intertwined with city-state relations, especially in the context of decentralization. In addition, urban transport as an economic activity has a particular structural weakness in the financial dimension. It has to do with revenue generation, and is present in both rich and poor countries. On the public transport side, the revenue-earning potential gets entangled with problems of affordability for low-income passengers and difficulties of tapping non-passenger beneficiaries of public transport infrastructure. When there is a market of "choice" travelers, fares are kept low to keep them from switching to cars, even attract them away from cars.<sup>56</sup> Many of the world's urban transport operators cannot cover their costs and, hence, require subsidies.<sup>57</sup> Some cannot even cover their direct operating costs, much less capital costs. This may already be a problem for street-based public transport modes, but is much more serious for modes with high capital costs and a high fixed element in operating costs, e.g. metros, especially if the construction of elevated rights-of-way or tunnels is involved.<sup>58</sup>

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<sup>55</sup> Santiago comes the closest, with an approach based on a maximum contribution from users, in both public transport and road traffic. Moscow in 2000s is another case, not because it has resolved the transport pricing and funding problem, but because it is a rich city.

<sup>56</sup> Because of different cost structures, moving passengers from cars to public transport decreases total social costs in congested situations. Also, common road use charges (based on fuel taxation) are lower than marginal social costs of motor vehicle transport in cities. If road use prices for cars cannot be adjusted upwards, then price for the competing mode (public transport) should be adjusted downwards to correct this bias.

<sup>57</sup> Among those (formal) operators who do not receive subsidies, most are private and provide low-level services. Exceptions include street-bus companies in Bangalore (public-owned, reasonable services), Singapore and Hong Kong (privately owned, high-quality services).

<sup>58</sup> Exceptions include metros in Santiago, Hong Kong and Singapore. *Transmilenio* BRT in Bogotá may be close to profitability, in spite of the preponderance of low-income passengers, but at the cost of very high loading factors.

On the road traffic side, a growth industry by any count, things are in some ways worse. Except in a handful of world cities—cited in the preceding section on price instruments—urban road traffic does not generate revenue directly. The most common funding source is a share of fuel tax revenue, though funding from the general budget is also common. Unfortunately, the route from the demand pressure (city traffic) to supply response (finance for road infrastructure) is a veritable obstacle course. Fuel taxes are a national fiscal instrument, and the revenue is collected normally outside the city financial system. Tax revenues may be channeled back to the city (transport system) level, but typically through a long chain of institutional intermediaries, and without relation to the local transport demand and supply situation. Even if fuel tax revenues make it to the city, a wall tends to be placed between road-generated funds and public transport modes, making cross-subsidies difficult. Similar obstacles exist because some urban roads are owned by municipalities and others by some higher-level government.

These difficulties notwithstanding, the national fuel tax may be the best option readily available in most countries. Reforming fuel taxation to improve urban road funding, or all urban transport funding, may involve a variety of formulae for allocation of revenue to cities, as well as earmarking arrangements such as road or transport funds. Such funds can be set up at the national government level, or at the city level. Funds are not necessarily limited to having fuel tax revenue as their source. Responding to a perceived funding problem in some sector, countries sometimes set up time-bound special-purpose facilities to provide capital or operating subsidies in that sector, funded from the general budget. Some, like the Capital Grants Assistance Program of the US Urban Mass Transportation Administration (UMTA), focus on public transport systems. Others, like Mega-cities Program and the more recent Nehru National Urban Renewal Mission (Fund) in India, cover a wide range of urban infrastructure. These funds are useful instruments for national government to leverage changes in city-level policies and planning methods. The UMTA grants program, for example, was influential in developing the alternatives analyses approach to evaluating public transport investments.

Locally based funding options, other than normal funding from municipal budgets, include various forms of congestion pricing (discussed above), salary-based taxes, local surtax on gasoline, sales taxes, general real estate taxes, and contributions by developers.<sup>59</sup> The French payroll-based, local transport tax is credited to have been the engine behind the renaissance of urban public transport systems in that country starting in 1973. It includes both operating and capital grants. The arrangement is that cities choose tax rates ranging from zero to a ceiling defined by a national law. This tax, however, is not suitable for economically fragile low- and mid-income countries. It is especially threatening to local employment and ineffective in the presence of a large informal sector.

The use of local surtax on gasoline—a dedicated-fund variant—is on the increase. Colombia introduced a law in 1989 permitting cities to charge such surtax and to use the proceeds for financing capital expenditures in urban transport services. Maximum rates are now 25 percent for Bogotá and 18.5 percent for other cities. This innovation is credited with having “powered” the unprecedented developments of public transport systems in Bogotá, notably the cited *TransMilenio* system (case study in Chapter 6).

Other methods cited above are less well suited to developing countries, or difficult to introduce. Sales taxes—used in some US cities to finance particular investment projects, following local referenda—tend to be regressive, thus colliding with poverty alleviation objectives. Contributions from developers

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<sup>59</sup> Bridge, tunnel and expressway tolls, though being direct user charges for specific facilities, could also be added here, especially if the revenue is not kept only for the facility in question but shared across the transport system.

are used mainly in connection with constructing metro stations and other major transport terminals. In Hong Kong, developers are said to have contributed about 15 percent of capital costs. In cities going through rapid expansion, general land taxes hold a major potential as a source of funds, not just for urban transport but for all municipal infrastructure and services. That they have not been used is due to weak markets and poorly regulated land development.<sup>60</sup>

Introducing a radical new funding approach limited to urban transport systems transcends the leverage capacity of common city-based projects, whether the instrument considered is a variant of fuel taxation, capital grant program, or one of the local approaches (especially congestion charging). Some other lending instruments of the Bank are more promising in this respect, e.g. nationally-based transport and urban projects, DPLs, or structural adjustment loans. It is even more difficult to imagine that a Bank-funded urban transport project could be used to leverage the introduction or reform of a major municipal funding source, such as land taxes.

**Land development policies.** In many client cities of the World Bank, land development patterns are not efficient in terms of transport, social and environmental objectives. This may have happened because of weak or absent planning regulations, the dominance of ideological approaches over markets, price distortions in the transport system (no direct charges for road use, free parking), or simply because the rate of urbanization overwhelmed the regulatory apparatus and infrastructure delivery systems.<sup>61</sup>

Globally, calls for integrated transport and land development planning in cities are common, based on reasonably well-established mutual dependence of land use patterns and urban travel demand, user costs and charges, and environmental impacts. Urban development itself takes place in a complicated process where the demand for residential and commercial activities confronts property laws; taxation; regulations such as floors-to-base ratios, lot size and zoning; and the features of transport infrastructure and services. Cities with well-developed land markets and low regulation develop in a markedly different pattern than those where major decisions are made by governments and/or where regulations are heavy. A strong consensus is that higher-density cities with a few large, dominant centers are best suited for traditional, fixed-route, fixed-schedule public transport modes; and low-density cities with widely dispersed, weak centers are easier to serve by individual vehicles and informal transport modes.

There is less agreement on which pattern to pursue, what instruments to use to achieve the more efficient land patterns, and how to go about it. Arguments for and against administrative and market approaches to land development continue without resolution, since at the foundation of each position lie cultural preferences. The global trend is for a blend of the two approaches, with markets getting the upper hand. Ultimately, any tangible approach to a joint transport and land use development requires an unusually strong political commitment on the city level, and its continuation over a long period of time.<sup>62</sup>

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<sup>60</sup> The absence of land taxation and/or poor land development regulations does not only block an important avenue of progress in funding, but also produces difficult travel demand patterns, e.g. low-density or even undeveloped lots in central, prime-value areas.

<sup>61</sup> Alain Bertaud produced numerous case studies on this subject, available at <http://alain-bertaud.com>.

<sup>62</sup> Alain Bertaud points out that in Curitiba, a rare and the best-known case of harmonious land use and transport development took place during 40 years of political continuity.

Looking at tangible *policy* instruments that could be used in urban transport projects, three categories stand out as most relevant:

1. Parking charges and road use pricing, where the absence of direct, locally-based charges acts to encourage long-distance driving and low-density development. The proposition to place such charges on the Bank's strategic agenda was already made above for reasons having to do with congestion management and transport funding. To these can be added potentially positive land development impacts, with a warning that these may take decades to materialize.
2. Land taxation, a powerful tool for shaping development and generating municipal revenue. The importance of land taxation, however, transcends by far the concerns over urban transport systems, requiring a multi-sector urban perspective. It follows that urban development projects are better suited to tackle this policy category than are urban transport projects.
3. A category that includes a host of land development regulations addressing density (floors-to-base ratios), lot sizes, building set-backs, parking requirements/limits, property rights, zoning, public land conversion, and others. Though a full urban perspective is also necessary to undertake a reform of these regulations, it is conceivable that urban transport projects could be used as vehicles to change them, singly or in groups.

### **Building blocks for institutions<sup>63</sup>**

Urban transport is marked by a multiplicity of functions and a plethora of institutions. The situations in client cities are often bunched around two extremes. At one end, transport-related functions are spread over too many institutions (local and/or national), with overlapping terms of reference and jurisdictions, and severe coordination problems. This situation is found even in the presence of unitary urban area governments, but is much more associated with fragmented governments. At the other end of the range, transport institutions are so weak that important functional areas are left without a caretaker. Broadly speaking, building blocks for project and strategy design may involve the setting up of particular institutions, establishing jurisdictional boundaries on national-local or intra-local scales, and creating instruments and processes needed by individual institutions to perform their functions.

The following listing (summarized in Box 5-2) focuses on those functions and related organizations considered essential complements to the strategic urban transport agendas for policies and investments, and most are seen frequently in past Bank-funded projects. The brevity of the list belies the importance and complexity of this subject. Developing urban transport policies and investments is comparatively less difficult, and can be done in a shorter time frame than developing urban transport institutions.

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<sup>63</sup> A standard, "Williamson" definition of institutions encompasses everything – organizations, laws, policies, plans, and processes (Israel, 1987). This paper defined policies (a key institutional instrument) as a separate strategic category, leaving the current chapter to cover everything else—institutions as organizations, their inter-relations, various planning instruments and decision processes.

**Box 5-2. Institutional building blocks for projects and strategies**

- Traffic management units
- Traffic law enforcement (police) departments
- Public transport regulatory authorities
- Coordinating mechanisms at the urban area level
- Multi-modal transport authorities
- National government programs and instruments for urban transport
- Transport planning departments and planning instruments.

**Traffic management.** Capacity for traffic management is essential for the introduction and durability of all policies and investments aimed at improving the performance of the existing street system in line with a selected urban transport strategy. Its purview includes the flow of people and vehicles of all types, stopping and parking, safety, and emissions. Experience from many Bank-funded projects shows that this activity—low-cost in terms of capital investments—requires considerable engineering, organizational and political skills. It is of essence that it be given an explicit institutional profile, in the form of a unit or division, within the city government structure (Cracknell, 2000). Attempts to “install” traffic management capacity under Bank projects, and to ensure its sustained functioning—with necessary legislation, funding, staffing, equipment, direct technical assistance and training—encountered great difficulties in cities as different as Cairo and Moscow.<sup>64</sup> Difficulties of one kind arise when the relevant functions are weak, or do not exist. They also arise when traffic management duties are scattered throughout city administration, or “usurped” by the traffic police, despite differences in the required skill mix.

**Traffic law enforcement.** The traffic police is the on-street, legal complement of the city traffic management division. As noted above, it is not rare to encounter a city police department having traffic management functions by statute (China) or by default (Saudi Arabia). A well-trained and effective police presence is important for controlling traffic and parking even in a stable situation, and essential for continued success of many new traffic initiatives. The difficulties of achieving this through development projects are even more formidable than those related to traffic management, given the multi-function nature of the police force and its belonging to a different branch of government.

**Public transport regulatory authorities.** When public transport services are provided by a public-sector monopoly, the operator tends also to exercise authority over planning and regulatory functions, in part or totally. At the other extreme, when informal public transport modes are dominant, there may be an institutional vacuum. Independent of the direction and the degree of regulatory reform to be introduced by a given development project, the establishment of a public transport authority is its essential institutional complement. Such authorities carry out market studies, design routes and schedules, establish service standards and price-subsidy policies, develop tender documents, manage the tendering process, pay contracted fees, and monitor performance. There are several alternative designs for such authorities, differing from each other by the degree of independence from city governments and power to generate and use funds. In large cities, with several constituent municipalities, the authority is external, with much independence. In smaller cities, most relevant functions can be carried out from within the municipal administration, i.e. a unit to do the technical work and a committee of the city council as the decision maker.

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<sup>64</sup> It succeeded in Tunis and Bogotá.

**Coordinating mechanisms at the urban area level.** In practice, large urban areas have fragmented governments and multiple, not necessarily symmetrical, institutions. Since primary and secondary transport infrastructure and services most often cross these sub-area boundaries, strategic actions require some form of integration, coordination or at least consultation. A complicating aspect is that ministries and other supra-urban authorities are also active at the local level, and need to be included. Coordination and/or consultation can be arranged around specific issues, as in a public transport fare association, or be more comprehensive. A common set-up is to have inter-agency and/or inter-governmental committees, with permanent or rotating host institutions.

**Multi-modal urban transport authorities.** Institutions with a purview over the entire urban transport system are quite rare in developing countries. In advanced cities, project-supported policy reforms sometimes involve major multi-modal issues (e.g. generation and allocation of transport funds), or the city institutions have evolved to the point of understanding the value of integrated planning and policy making. In such cases, institutional reform may evolve from supporting inter-agency coordination mechanisms to setting up area-wide, multimodal transport authorities. These may combine functions of road departments, traffic management units, public transport regulatory authorities and planning departments. The importance of this type of authority rises with the size of the urban area and the degree of fragmentation of local governments.

**Role of national governments.** Using the maxim that jurisdiction should follow the spatial extent of impacts, urban transport should be primarily a matter for local governing institutions. In practice, national governments (through ministries of transport, public works, urban development, industry, or sub-ministerial agencies like road directorates) retain many levers affecting urban transport systems, even at high levels of decentralization.

Revisiting some of the subjects discussed in preceding sections, these activities of national governments are of special and direct interest in the context of Bank-funded urban transport projects: (1) making of framework laws for transport services regulation, including organization, ownership, private/public relations; (2) imposition of nationwide fares and public service obligations for urban public transport systems; (3) vehicle and fuel standards, taxation and imports policy; (4) emissions standards for transport vehicles; (5) industrial policy, as it concerns the automotive sector; (6) framework laws for land ownership, regulation and taxation; (7) setting up and implementation of a national system of road user charges, and the rules for allocation of proceeds to intercity, rural and urban networks; (8) traffic safety laws; (9) funding, construction and maintenance of "national" highways that connect and often enter urban areas; (10) provision of financial contributions (grants or loans) toward city-based programs or individual projects; (11) making of framework laws stipulating urban transport planning processes and instruments; and (12) organization of research and development activities, and knowledge transfer to cities. When the time comes to introduce locally-based road user charges, national framework laws are likely to be needed in most countries.

The most common Bank-funded urban transport projects, focused on a single city, are too small-scale to serve as vehicles to leverage the reform of national laws and policies. Thus, the institutional change that can be introduced by such projects at the national level is limited. It may involve the creation and support of an organizational unit within an existing ministry or national directorate to focus on a new subject matter, or new skills, ultimately meant to feed into the legislative process or to help cities. Prospects are somewhat better for multi-city projects, for (national) transport projects and for policy loans with urban transport components.



**Urban transport planning departments, planning processes and instruments.** The scope of work of urban transport planning departments is to monitor and assess the performance of the transport system in their city, follow and anticipate trends in urban processes and development, and formulate policies, programs, and investments. Some of the work is done in-house, and some by external consultants. At a minimum, in-house capacity is needed to conceive strategic transport planning exercises, facilitate their production, evaluate the results, involve the public, shepherd the outcomes through public scrutiny and the decision-making process, and connect the selected strategic direction to implementation activities by other institutions.

Transport planning departments exist in most client cities, but their capacity and the degree of formalization of the planning process vary widely.<sup>65</sup> Instruments like transport and land use plans sometimes are specified in great detail within a master plan or general urban planning legislation. Development stages for individual projects (from sketch plans to detailed designs), together with requirements for public participation, may also be spelled out in detail. Unfortunately, many of these planning systems use out-of-date approaches, or methods imported from overseas (by local staff or consultants) without adjustments for local conditions. Generally, master plans focus on infrastructure investments, and are devoid of policy, economic and financial analysis content. Links from plans to action can be very weak, leaving many plans to languish on shelves.

Under these circumstances, the Bank's urban transport projects can be used to update the local planning practice and its key instruments, raise the quality bar for studies, initiate data collection, and help build the requisite staff capacity through training and other knowledge transfer programs.<sup>66</sup> When formal planning systems do not exist, efforts must be made to produce *ad hoc* approaches for the short term, and to support their further development and codification for longer-term purposes. In city-based projects, capacity building for transport planning may be organized as part of the development cycle for project-supported investments, e.g. by using project-financed studies, and subsequent steps through implementation, to demonstrate advantages of the new planning approach and provide hands-on experience. Some projects do work with national institutions (e.g. ministries of transport) to help create knowledge centers that could subsequently provide assistance to cities. In either case, these activities have long gestation periods and normally transcend the perspective of a single project.

Most Bank-funded urban transport projects support two generic transport planning instruments: a comprehensive urban transport and land use study for the urban area in question, and pre-investment studies. The comprehensive study is expected to cover all transport modes, have both short-term and long-term components, and involve all categories of instruments. As noted earlier in this paper, such a study has three stages: (1) a diagnostic phase, to collect data, evaluate current system performance, and identify problems, issues and bottlenecks; (2) scenario and vision development phase for the city and its transport system, inclusive of transport demand/supply forecasting models; and (3) evolving a resource-bound, broad-based program of investments, policies and institutional changes to reach the agreed vision, reflecting an explicit strategy.

Pre-investment studies are in principle done for all project-supported investments, with their depth and refinement increasing along with the price tag and risks. The framework for these studies is that

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<sup>65</sup> Among the Bank's client countries, the most sophisticated urban transport planning institutions and instruments are found in Latin American countries, with Chile, Brazil and Colombia in the vanguard.

<sup>66</sup> As noted above, urban transport projects are too small to leverage changes in national laws and regulations, but may help move the local practice forward in a way that ultimately may lead to national level changes.

of multi-criteria evaluation, with economic and financial tests forming its hard core. Pre-investment studies are not done only when Bank funding is sought for the investments. Clients also ask for the Bank's help with designing, monitoring and evaluation of studies done by themselves, or by third parties, under a variety of funding arrangements.

The traditional methodology for both comprehensive and pre-investment studies was focused on enhancing motorized mobility, following a predict-and-provide paradigm as it evolved in the United States and United Kingdom in the 1960s.<sup>67</sup> Over time, this paradigm was patched up to reflect diverse social concerns, e.g. local environmental quality, or poverty. Once the link between climate change and transport emissions became widely accepted in the 1990s, with its central concept of sustainability, a new transport planning approach became warranted. Elements of such a new approach are gradually emerging, but they still fall short of a dominant, widely accepted paradigm.<sup>68</sup> Contradictions remain in the current practice between the mobility-oriented approach (which, for example, underlies standard economic evaluation methods) and the current turn towards local accessibility and global sustainability.<sup>69</sup> The attention is slowly focusing on the land use and transport nexus as the weakest aspect of the traditional approach in that it justified low-density suburban development.

In Bank practice, the traditional approach was already difficult enough to apply, given limitations in data, funding and institutional capacity common to most client countries. Various shortcuts and simplifications relative to the state-of-the-art had to be introduced, especially regarding demand/supply modeling.<sup>70</sup> The heterogeneity on the demand side, based on sharp income inequalities, called for much more attention to distributional impacts of investments than in highly developed countries. In recent years, an effort has been made within the institution to adopt a multi-criteria, participatory framework capable of accommodating a wide scope of social concerns, going well beyond travel time, costs and revenues.<sup>71</sup> Where traditional transport planning studies were supply-side and investment-oriented, the new ones are much more focused on the demand side, social and environmental impacts, and the policy dimension. The process of improving this approach continues.

While the preceding remarks refer especially to urban road investments, a different set of problems has plagued pre-investment studies for rapid transit systems.<sup>72</sup> Poor conceptual design and/or the quality of execution have been common. Typical problems include overly narrow range of options examined, over-estimated revenue and other benefits, under-estimated construction and operating

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<sup>67</sup> Vigar (2002)

<sup>68</sup> See May (1991), Cervero (2001); Kane and DeMistro (2003); May et al. (2006); Bannister (2008).

<sup>69</sup> Contradictions exist also between several approaches to sustainability (Himanen et al, 2006). The "strong" sustainability school of thought would set future targets for such things as total energy consumption and quantities of various pollutants, then "backcast" them to determine necessary changes in current behavior of households, businesses and governments (Geurs and van Wee, 2004). It is widely agreed that such changes are socially and politically unacceptable at present, anywhere. See also the discussion of objectives in Chapter 3.

<sup>70</sup> The complexity of models should not exceed the capacity of local institutions to absorb them. In most client cities, this calls for creative use of simple, transparent and inexpensive models.

<sup>71</sup> Social development and (local) environmental impacts, and involving the public in the planning process are addressed through detailed safeguards applicable to all Bank-financed projects.

<sup>72</sup> Mitric (1998).

costs, and neglected risks.<sup>73</sup> Acting on the conclusions of such studies inevitably would lead to poor investment decisions with limited financial resources wasted and financial sustainability problems created. When such studies are included under Bank-funded projects, whether or not investments are to be funded in part by a Bank loan, the approach is staged, to reduce the risk of premature convergence, and the focus is on ensuring: (i) inclusion of all relevant alternatives; (ii) realistic and risk-conscious cost and demand forecasts; and (iii) financial evaluation over the life of the project.<sup>74</sup>

## Investments

Commonly, the term “strategic investments” in the urban transport context means larger-scale investments with a potential to shape urban development; an expanded meaning includes all investments with a pivotal role, independent of size. In the context of this paper, investments listed below can be large or small-scale, pivotal or merely routine. There are two reasons for this seeming inconsistency. The first has to do with the diversity found across world cities: what is routine and/or small in some cities can be pivotal and large (hence strategic) in others. The second reason has to do with project and strategy making: the criterion for inclusion is that each one of these investments, small or large, can be linked to strategic policy and/or institutional components to form coherent chains. In addition, these investments must meet all standard criteria of economic and financial attractiveness, and pass safeguard tests for social and environmental impacts.

**Improvements to existing central area and arterial roads.** When the management of the congested street space in central areas and on major arterials is considered a strategic policy initiative, as it often is in the field, then low-cost road improvements become a strategic investment category. These include pavements, sidewalks, staircases, street-crossing aids, bike paths; bus lanes and bus bays; signs and markings; and traffic and parking control systems. They may be located at intersections, along corridors, or involve specific area networks. Projects normally work within the overall right-of-way, with occasional re-alignment or minor widening. This kind of investment has been the bread-and-butter of Bank-funded urban transport projects throughout its decades of involvement in this sector, and is likely to continue being so. It is noted that the design of road improvements can vary to suit the strategic thrust of the street management programs, e.g. by favoring one mode or set of modes over others in specific corridors. Rather than “improving” roads by maximizing the space available for the passage of motor vehicles, such investments should be required to ensure a “people-first” policy, with combined service, equity, safety and environmental benefits. At its outer limit, this investment category includes the insertion of exclusive tracks for public transport vehicles (bus- and rail-based intermediate and full rapid transit).

**Equipment for environmental protection.** This is a catch-all category for equipment to be used for monitoring and modeling air quality; testing vehicle emissions; and testing fuel quality.

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<sup>73</sup> While the literature in this respect tends to focus on large-scale urban public transport systems, e.g. metros, poor cost and revenue forecasts also arise under major road projects in urban areas, especially when these projects involve tolls.

<sup>74</sup> The Bank has at times been seen as being anti-rail and pro-bus rapid transit. Much of this is due to its fiduciary insistence regarding the inclusion of lower-costs alternatives (by definition at-grade bus-based systems) and good-quality economic and financial evaluation. A serious problem in this regard is the common use of “feasibility” studies in rapid transit instead of alternatives analyses. The former tend to compare a narrow range of options against an impossible-to-verify, do-nothing scenario.

**Street networks in low-income areas.** Investing in all-weather secondary and tertiary road networks in low-income areas, most often on the urban expansion boundary, go a long way to correct the anti-poor bias in many cities. Also, given that many cities expand in a spontaneous manner, investing in these street networks may be the only land development tool available to local governments (more on this subject below).

**Arterial roads in urban expansion areas.** In many client cities, massive fringe developments are taking place in a more or less spontaneous manner and without communal infrastructure, many being a way station for rural migrants. Investing in road networks in such areas, be these green-field investments or a *post facto* attempt to add infrastructure after development has commenced, has potentially these categories of benefits: (i) direct access benefits to residents, mostly low-income households; (ii) low land and construction cost; (iii) introduction of road design standards that are friendly to non-motorized and public transport modes without having vested interests that make this initiative so difficult in built-up areas in the absence of effective land use planning; (iv) provision of a transport efficient structure (e.g. block size) inside which land markets will do the rest; and (v) use of these investments to leverage changes in land development policies.

**Transport networks serving transport activity centers.** This category of investments overlaps that of primary and secondary roads, but is cited separately because of the increased focus on the role of cities as gateways for national and international trade networks. Port, air and railway complexes may be outside the domain of city governments, but road networks around them certainly are not. The quality of service of these roads is an essential contributor to the performance of terminals.

**Public transport fleet and facilities.** Investments in fleet replacement and expansion, and related depots, workshops and terminals; track and power supply rehabilitation; and others used to be a frequent investment instrument in Bank projects, when the policy content of these projects was to restructure government-owned urban public transport companies, or create them where only an atomized, informal public transport sector existed. Downstream objectives of such projects included a combination of cost, cost recovery and service targets. Sometimes this was done in the context of continuing government ownership, or when it was planned to turn operations over to a private concessionaire. The lesson of experience is that these policy goals are difficult to achieve. An added difficulty involved the tension between rules of international competitive bidding, required for such investments under Bank-funded projects, and fleet procurement procedures common to public transport companies. The latter stressed standardization and interactive work with equipment manufacturers, and often were bound by buy-local restrictions.

These difficulties notwithstanding, investments in fleet, track and facilities for publicly owned companies should remain on the strategic agenda of the Bank, subject to standard economic/financial tests and mother companies meeting criteria regarding efficiency, subsidy design, and financial viability.<sup>75</sup> As environmental sustainability of urban transport rises in importance, being involved with engine and fleet replacement investments provides a direct way to advance a green agenda. Also, in some cities, reforming an existing public-sector operator may be part of a promising and essential regulatory reform package, especially within the framework of public-private partnerships. This applies especially to companies whose vehicles operate on exclusive infrastructure, whose ownership tends to remain in public hands even when all other elements were privatized.

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<sup>75</sup> "Public ownership remains widespread in some borrower countries. (Lending) support may be given for those that have efficient and sustainable business models, and/or in association with the implementation of credible reform plans involving staged approaches to private participation in service delivery." (Amos, 2004, p. 9).

**Primary roads.** A primary road network, radial or circumferential, with partial to full control of access, is unequivocally a tool that large cities can use to tap proximity benefits and to guide land use development. Apart from its narrowly conceived user benefits, the scale of this type of investment makes it suitable for leveraging significant changes in road design standards, land development regulations, the creation of transport institutions, and the adoption of particular transport planning instruments and decision-making processes. It may even be possible to use primary road investments to leverage the introduction of exclusive running ways for rapid transit modes, or some form of locally-based road use charges. Including primary road investments in a Bank-funded project may involve difficulties in compliance with safeguards (relocation, barrier creation, environmental impacts) and contentious transport planning and land development issues. When primary roads are conceived as pay-for-use facilities, possibly in the context of a public/private partnership, they often experience problems with underestimated costs and overestimated traffic (and revenues).

In a given city, decisions on how many such roads to build, and based on which design standards, depend on the overall urban and transport strategy. Density patterns and relative roles of public transport and individual modes are pivotal factors. Too few primary roads may reduce the city's productivity, while going in the opposite direction poses difficult questions regarding economic, social and environmental sustainability. Investing large funds in primary roads in a bank-funded project can only be pursued in cities with a good record of supplying, maintaining and managing a network of secondary and tertiary roads and an explicit concern for public transport and non-motorized modes.

**Mass rapid transit systems.** This category includes bus-based and rail-based modes operating on rights-of-way with substantial exclusivity of use.<sup>76</sup> *Ceteris paribus*, bus technology is dominant for at-grade designs, while rail technology is dominant for elevated and underground locations, and very high peak passenger loads. Features of the available right-of-way and the density pattern served are pivotal factors in the choice of vehicle technology. On the technical side, these modes are capable of the highest passenger carrying capacity, combined with high operating speeds, reliability, punctuality and other quality factors. Strategically, they have a much higher potential than do the street-based modes for attracting "choice" passengers, thus contributing to "cleaner" modal split. They also have a strong potential to shape the surrounding land development. When combined with traffic restraint and pricing measures, rapid transit modes can help decongest central areas, while supporting very high land use densities therein. The downsides are finding the requisite space at grade, or facing very large construction costs (and probable operational subsidies) for elevated or underground construction.<sup>77</sup> Since high initial costs limit the extent of rapid transit networks, effective collection and distribution systems are needed to increase the catchment areas around stations.

In transport function, construction costs and potential development impacts, rapid transit systems correspond to primary, limited-access urban roads. Many cities cannot develop both primary roads and off-street public transport networks—at least not simultaneously—and the beneficiaries of the two tend to be quite different. *Limited-access roads* tend to serve freight traffic, intra-urban or regional, longer trips in passenger cars, and even longer trips in surface-based public transport. They do not serve traditional downtowns well, and their construction in urban cores commonly is out of question

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<sup>76</sup> In urban transport literature, the terms "rapid transit" and "mass rapid transit" apply strictly to modes with full exclusivity of the travel way, notably metros. Modes with partially exclusive travel way belong to the "intermediate rapid transit" category, e.g. various forms of bus or light-rail based systems where some sections and/or intersections are also used by other traffic. In this paper, for simplicity, a more inclusive definition is used.

<sup>77</sup> Difficulties with pre-investment studies in this context were discussed in the preceding chapter. For a detailed discussion of rapid transit investments within development projects, see Mitric (1997).

because of negative social and environmental impacts of construction and operation. They are very good at dispersing urban activities toward the fringes and are associated with low-density, homogeneous urban expansion, with a many-to-many travel pattern. *Per contra*, *rapid transit systems* serve passengers only, work the best in radial corridors, are excellent for serving central areas, and tend to be associated with mono-centric and poly-centric urban patterns. Having a fully developed public transport system, crowned by some form of rapid transit, tends to create a different city than if primary roads are used. Successful rapid transit projects, such as metros in Hong Kong and Santiago, bus-based rapid transit in Curitiba and Bogota, and the light-rail based system in Tunis can provide a rallying point for preserving or bringing a higher quality of life to cities. Choosing one or the other is a major strategic decision for cities, transcending ordinary cost-benefit analyses. Under lucky circumstances, joint development of the two primary networks may ease modal conflicts.

When a regulatory reform is envisaged in a city that desires to move away from total dependence on public-owned bus companies, then rapid transit modes with a dedicated infrastructure may provide a matching strategic investment component to leverage the envisaged reform. Infrastructure tends to remain in public ownership longer than all other elements of public transport systems, due to scale of investments, risks and longevity, and can be readily incorporated into a public/private venture. This was done in several Bank-funded projects, e.g. bus-based rapid transit lines in Bogotá, a major metro or suburban rail overhaul in Buenos Aires and Rio de Janeiro. In these examples, the public sector (assisted by the Bank) invested in basic infrastructure, while the private sector provided “fungible and portable” equipment, and took over the responsibility for operations and maintenance.

## 6 A SAMPLE OF URBAN TRANSPORT PROJECTS

This chapter illustrates how actual Bank-funded urban transport projects are structured—by selecting from the policy, institutional and investment building blocks reviewed in the preceding chapter. Project examples were drawn from a cohort of projects active during the last 15 years. Some of these projects are completed, while others are in early stages of implementation. The main aim of this paper being to arrive at a strategy underlying the design of operational activities using an inductive method, these 8 example projects were chosen to illustrate the diversity of the portfolio with respect to geographic location, the underlying socio-economic dynamic, and urban transport features, both in terms of *status quo* and proposed corrective actions.<sup>78</sup> An attempt was made not to miss any one important variant.

The focus is on design features of projects, signifying the *intent* of the project team and the client. Hence, project data were drawn from documents ready at appraisal stage. The paper is “blind” regarding the success or failure of these projects during the implementation period, or at its end.

### 6.1 Case 1: Budapest Urban Transport Project<sup>79</sup>

This is the oldest project in this batch. It illustrates one of the approaches that the Bank took in dealing with the difficult situation found in many cities in Eastern Europe and the former Soviet Union as they moved to change their political and economic systems.<sup>80</sup> The impetus for the Bank to get involved was not a crisis in the performance of the urban transport system. It was a crisis on the supply side, due to a severe recession. The city-owned monopoly provider of public transport services was facing serious financial problems, due to reduced subsidies. It was also losing passengers, because of increased motorization. The company, BKV, was arguably the best of its kind in Eastern Europe, with an extensive multi-modal system and a proportion of on-street and off-street exclusive tracks that can only be dreamed about elsewhere.

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<sup>78</sup> Almost all projects come from three regions with sizeable project cohorts over the last 15 years: Latin America and the Caribbean; East Asia and Pacific; and Europe and Central Asia. In this period, there have been very few Bank-funded urban transport projects in the remaining regions (Africa; Middle East and North Africa; and South Asia).

<sup>79</sup> This case study is based on World Bank (2001).

<sup>80</sup> World Bank (2002b) has a detailed account of approaches used in other projects in the same region: Kazakhstan, Kyrgyz Republic, Latvia, Russia, Turkmenistan and Uzbekistan.

**Box 6-1. Budapest in the mid 1990s**

**Population and population growth:** About 2 m people in 1990, with a mild downward trend. Urban pattern typical in all “planned” socialist cities, with high-rise housing blocks built by the government on the periphery. By the mid-1990s: internal restructuring with flight to suburbs of both residential and commercial activities.

**City economy:** The country and the city went into a recession in the late 1980s, following the breakup of the Eastern European alliance and the introduction of a market economy. At the time of conception of Budapest Urban Transport Project, the GNP was at its lowest point. The downward pressure on the public budget at both state and city level and on household budgets became quite severe, with a concurrent upward pressure on prices for hitherto inexpensive or free services. Real per capita income fell by 26% in 1988-93. Recovery started roughly as the Bank-funded transport project was approved, and proceeded with sharp income inequalities.

**Poverty:** The fall in economic output was handled by reducing salaries rather than by laying off workers. Therefore, even middle class households considered themselves poor.

**Urban government:** Municipality of Budapest, with six constituent districts.

**Motorization:** Around 215 per 1,000 population and rising, both in ownership and use.

**Transport system at project conception stage:** a fully developed road system, typical of European cities dominated by public transport, i.e. good balance of radial and ring arterial roads, but without access limitations; rudimentary development of circular and tangential motorways. An extensive, multi-modal public transport system with a tradition of a high level of service, but starved of funds for fleet and track replacement. The system included several metro lines, tramway lines largely on separate street-based tracks, and an extensive street-bus network, all operated by the city-owned Budapest Transport Company (BKV), and a three-line commuter rail network operated by the Hungarian Railways. Traditionally low fares, covering as little as 25% of total operating costs in 1980s, but climbing towards low 30% in 1990s.

**Modal split:** Public transport in decline, from a share of 90% of daily passenger trips in late 1980s to 70-80% in early 1990s, a drop of 4-5% per annum. Use of passenger cars in a corresponding ascendance. Walking about 10%; bicycles present but carry a negligible share of the travel market.

**Transport problems:** Street congestion with its usual adverse side effects. The level of service provided by BKV starting to falter under the weight of BKV’s internal problems and an acute financial crunch due to falling subsidies and falling traffic.

**City strategy:** overhaul public transport operators without deregulation; reduce subsidies; build metro extensions to improve service quality; seek balance between pro-car and restraint (build new roads but introduce parking charges).

The project aimed to preserve and enhance the level of transport services, through investment and operational improvements, while the provision efficiency was to be increased through gradual but extensive deregulation and other institutional changes. BKV was to be slimmed down, by reorganization and by spinning off its large non-transport departments. The relation between BKV and its owner, the Municipality of Budapest, was to be regulated through a quasi-contractual service agreement, the first step toward a concession-based regulation. The project also made a first step towards private provision of transport services, requiring BKV to start to sub-contract with private operators on a gross-cost basis. The delicate question of subsidies from the city and the national government to BKV was dealt with through a “contractual” increase in cost recovery. The project agreement left open whether this increase would be achieved through fare increases, cost reduction, or some combination of the two. To deal with the problem of irregular subsidy payments by both city and national governments, the project included a condition that explicit subsidy calculation principles were to be adopted, and thereafter respected. The “stretch” aspect of the project was an initiative to create the Budapest Transport (Fare) Association, so that passengers using both the BKV system and suburban rail lines would face a single, integrated fare structure. The Association was meant as a seed



for a public transport regulatory authority. Another institutional innovation involved a loan covenant requiring the City to carry out rigorous cost-benefit analyses for any large-scale transport investments. This initiative aimed for better investment planning in general, but its immediate and specific concern was to prod the City to re-examine the project to construct a third metro line, inherited from the 1980s in the form of preliminary engineering designs. The project was done in tandem with an EBRD-financed project involving rehabilitation of one metro line, the “greening” of BKV’s bus engines and parking control.

The project design is consistent and coherent, and ambitious, especially when it is seen together with the concurrent EBRD-funded operation. Behind its stated objective of improving BKV’s performance and financial health lay the wider objective of keeping public transport competitive with the private car use, already on the rise.

#### **Box 6-2. Budapest Urban Transport Project (1995-2001)**

**Borrower:** Municipality of Budapest

**Beneficiary/Implementing Agency:** Budapest Transport Company (BKV) Ltd.

**Project type and cost/loan amount:** Specific investment loan, US\$67.1/US\$38m

**Main development objectives:** (i) improve the financial position and performance of BKV; (ii) test the potential of private sector participation in the delivery of transport services; and (iii) restrain automobile traffic in the city.

**Policy components:** (i) restructure and commercialize BKV; (ii) reduce subsidies paid to BKV (by shifting the load to passengers and reducing operating costs); (iii) bring BKV financial position to balance; (iv) increase private sector role (contracting out auxiliary functions and some operations); (v) improve street space management (through parking charge program).

**Institutional components:** (i) establish a formal contractual relationship between the City of Budapest and BKV; (ii) create Budapest Transport (Fare) Association; (iii) improve planning procedures and decision-making for new metro lines.

**Investments:** replacement of 47km of tram tracks in main corridors; (ii) replacement of buses older than 12 years, 50 vehicles of the low-floor, high-performance and low-emission type; (iii) ) vehicle monitoring and communication system; maintenance equipment; (iv) training of BKV and municipal staff.

**Major indicators:** BKV’s cost recovery from fares to reach 50% (from 37% at the outset); reduction of fraud (passengers without tickets) from 12% to 7%; operating ratio to be maintained at 100 and debt coverage ratio at 1.5 or higher; 5% of operations to be subcontracted to private operators.

**Parallel operation:** an EBRD loan to the same borrower and beneficiary, for a purchase of 272 low-emission bus vehicles, replacement of another 96 bus engines with higher-performing and low-polluting engines; rehabilitation of Budapest’s historic Millennium Metro Line; and pay-and-display, on-street parking meters.

## **6.2 Case 2: Rio de Janeiro Mass Transit Project<sup>81</sup>**

The Rio project represents a recent cohort of projects in major cities of Brazil and Argentina, where urban transport systems had paid the price for economic stagnation alongside steady population growth. Public ownership of transport operators had exhausted its potential, as downward pressure on fares due to poverty of many travelers and inefficiencies on the supply side had pushed operating subsidies into an unsustainable domain. An additional complication was that, in metropolitan regions, administrative boundaries tended to differ from economic ones. The Rio project was put together after

<sup>81</sup> This section is based on World Bank, 1997.

street-bus operations had already been moved to the private sector—based on a variant of the “for-market” competitive framework—but were still hampered by street congestion and fragmentation of service networks. The hope was to introduce another wave of reforms, with suburban railways—still in public ownership but poorly run and in poor physical state—as the centerpiece.

### Box 6-3. Brazil—Rio de Janeiro

**Population:** 5.7m Rio municipality; 9.8m metropolitan region, accounting for 75% of the population of State of Rio de Janeiro; huge population increases 1970-2000; decentralized city type, high average density

**City economy:** stagnant in recent years (negative growth rates since mid-1980), but still highest per capita income in the country; informal economy more than half of total employment

**Poverty:** 1.1m people live in *favelhas*; about 15-20% of the regional population is considered poor

**Urban government:** Municipality of Rio de Janeiro, together with another 16 smaller municipalities, make up the Rio De Janeiro Metropolitan Region, constituted under the authority of the R-J state.

**Motorization:** 216 cars/1,000 people (1997 datum)

**Transport system at project conception stage:** 264-km rail network, state owned; bus companies mainly private, receive no subsidies; route licenses awarded through competitive bidding; intra-municipal companies regulated by municipalities, inter-municipal ones regulated by the State of Rio de Janeiro

**Modal split:** 67% by public transport, 11% by car, 20% walking, 2% other modes; PT trips: 77% by buses, 14.5% by combi & taxis, 3% subway, 4% suburban trains (*Flumitrens*); half of trips require a transfer

**Problems:** severe street congestion with especially bad impacts on street-based bus services; overcrowding and journeys of 2.5-4 hrs for the majority of travelers, who are low-income; high accident rates; high air pollution; *Flumitrens* serviceable fleet down to 50%; insufficient service integration between bus and rail lines, and no fare integration; subsidies paid to metro and *Flumitrens* unsustainable

**Government strategy:** public-owned bus operator (CTC) liquidated; next move: the metro and *Flumitrens* to be operated by the private sector; creation of a State Regulatory Entity with jurisdiction over all industries, incl. PT services

**Prior Bank involvement:** specifically in Brazil - Rio de Janeiro Metropolitan Transport Decentralization Project (Ln 3633-BR, 1993); supported decentralization of *Flumitrens* from the Federal Government to the State of Rio de Janeiro, elsewhere in Brazil: 3 urban transport projects 1978-91; the fourth (1987) would have had components in Rio, but was cancelled; subsequent projects in São Paulo (1992), Recife (1995) and Belo Horizonte (1995)

The project illustrates the use of direct investment, institution building and deregulation in a mixed, public/private setting, to reduce operating costs of public transport (PT) modes and improve services, with a dual concern for both captive and choice travelers. It featured the transfer of *Flumitrens* (suburban rail system) operations to the private sector, based on a long-term concession. The loan was to fund the rehabilitation and upgrading of the rolling stock and track infrastructure, both of which remained in state ownership. A parallel effort improved modal integration, specifically transfer nodes where *Flumitrens* intersected metro and street-based bus lines. Since the fragmentation of transport responsibility was among the main factors behind the sorry state of street-based and other modes, the key institutional component was the creation of a multi-modal urban transport authority. The immediate tasks of this institution included oversight of the regulatory reform and the creation of a comprehensive agenda for future actions. The latter was to be done through a study integrating transport, land use and air quality concerns.

**Box 6-4. Brazil—Rio de Janeiro Mass Transit Project**

**Borrower:** State of Rio de Janeiro with guarantee by Federal Republic of Brazil

**Implementing Agency:** *Secretaria de Transportes do Estado do Rio de Janeiro* and *Companhia Flumitrens* (suburban rail)

**Date:** December 2, 1997

**Loan type and amount:** Specific investment loan, \$186m

**Project cost:** \$372.5m, of which 96% for vehicles and infrastructure, and 4% for soft components

**Objectives:** (i) improve PT services through better integration of modal systems in Rio; (ii) improve services and reduce costs of *Flumitrens*

**Policy components:** *Flumitrens* to be operated by a private concession; create basis for air quality management

**Institutional components:** creation of a Metropolitan Urban Transport Agency (AMTU-RJ); preparation of an integrated Transport Policy, Land Use and Air Quality Management Strategy for Rio;

**Investments:** (i) rehabilitation of *Flumitrens* rolling stock, infrastructure, control systems, fare collection; (ii) rehabilitation or new construction of nodes and terminals where *Flumitrens* intersects with metro and bus lines; (iii) technical assistance and studies

**Parallel operation:** State Reform Project (creation of the State Regulatory Entity; fare study for the RJ region; *Flumitrens* concession signing is a second-*tranche* release condition).

**6.3 Case 3: Moscow Urban Transport Project<sup>82</sup>**

The circumstances under which the Moscow project was initiated resembled, in part, those found in Budapest in the sense that Moscow was an ex-socialist city with an extensive public transport system, with a metro as its jewel-in-the-crown. The apparent wealth of Moscow, however, was in stark contrast to the poverty elsewhere in Russia. Motorization in the urban area was so rapid that the modal share of cars almost doubled in 1990-97 and there was a huge increase in travel. Passenger volumes on the public transport system held steady, and (unlike in Budapest) the Moscow metro showed no signs of faltering. The response of the city government to unprecedented traffic congestion was mainly in terms of capital investment to upgrade radial arterial roads to limited-access standard and to build new ring roads. Traffic management and law enforcement to optimize the use of the available road network, improve safety, and/or protect street-based public transport modes were not high priorities, especially as this would have meant redrawing institutional boundaries and introducing new functions.

<sup>82</sup> This case study is based on World Bank (2001a)

**Box 6-5. Urban transport in Moscow**

**Population:** 8m city, 13m metropolitan area

**City economy:** booming, Moscow leading Russia's economic recovery, generates 40% of federal revenue

**Poverty:** not considered

**Urban government:** strong city government headed by a mayor; transport coordination - Transport Commission headed by a deputy mayor

**Motorization:** 2.2m cars in 2000. Car ownership increased by 250% in 1991-1998, ending at 190 cars per 1,000 people (close to EU average in 1970).

**Transport system at project conception stage:** a highly developed metro network and a less developed street-based system of buses and trolley-buses; inherited street system with low differentiation, with two recent, limited-access ring roads (inner "garden" ring closed to center and outer-area ring)

**Modal split:** High individual mobility at 3.3 trips/person/day (1997) and traditionally a high modal share of PT modes (more than 85%, 1/3 by metro). Passenger volume on public transport system steady in 1990s, but modal share of cars increased from 11.7% in 1990 to 21.6% in 1997.

**Problems:** congestion increasing over longer hours and more routes; street-based PT services losing quality; decline in safety, with pedestrians accounting for 2/3 of deaths; 80% of air pollution attributable to motor vehicles; low-level traffic management and traffic law enforcement; the former fragmented over many agencies; neglect of street-based PT; capital bias in transport planning; explosion of PT subsidies and road expenditures.

**Government strategy:** building-out of congestion through road-oriented capital investment program, focusing on ring roads, including large projects conceived without economic, social and environmental analyses; a start of realization that a different approach is necessary, following a Transport Strategy Study, done by external consultants, financed by UNDP.

**Prior Bank involvement:** Russia Urban Transport Project (1995) dealt with PT services in cities other than Moscow; Bridge Rehabilitation Project (1996) included \$50m for rehabilitation of several major bridges (including overpasses) in Moscow.

The project's main focus was to create a Traffic Management Center—an institutional focus on traffic management in the city administration—and to build up its capacity, working in tandem to do the same with traffic police. This would not involve just a new organization with hitherto missing functions, but also taking functions (powers and budgets) away from a plethora of existing departments. To leverage these institutional changes, the investment element of the project was of an unusually large scale for a traffic management project. This was due to adding the structural and geometric overhaul of a major bridge/overpass complex (a third of estimated project costs) to a program of classic, smaller-scale traffic management improvements on radial corridors and central area street network. On the public transport side, the project included support to develop a strategy for street-based modes, with a strong emphasis on regulatory reform (towards deregulation). Better investment planning and better project execution are also cited, but this involved merely the provision of funding for studies. In essence, the policy "box" of the project was left empty.

**Box 6-6. RUSSIA—Moscow Urban Transport Project (2001)**

**Borrower:** Russian Federation (funds on-lent to the City of Moscow)

**Implementing Agency:** Moscow Foundation for Project Implementation Unit (set up for Bridge Rehabilitation project) gradually to shift oversight to Traffic Management Center

**Loan type and amount:** Specific investment loan; \$60m

**Project cost estimate:** \$123m, of which \$48m for corridors; \$6m for central area; \$39m for the Donbasky Bridge complex (on radial Varshovskoye corridor); and about \$10m each for traffic management and traffic police units.

**Appraisal report date:** January 12, 2001

**Objectives:** Improve the institutional capacity of the City of Moscow to use traffic management methods and enforcement; improve “traffic processing” capacity of the road system of Moscow; prepare PT reform; introduce better investment planning and project execution

**Policy components:** development of a surface PT strategy with a regulatory thrust;

**Institutional components:** Establishment of a permanent, staffed and empowered Traffic Management Center in the Moscow City Government, with at least 20 professional staff by July 2001; capacity building of Traffic Police

**Investments:** traffic control systems; equipment and training for traffic police; road improvements in corridors, including widening, traffic control, intersection geometry, pedestrian crossings (at-grade and underpasses), bus lanes; bridge rehabilitation; central area traffic studies, major surface transit study (i.e. non-metro parts of the public transport system) oriented to service improvements and higher cost recovery.

**6.4 Case 4: Lagos Urban Transport Project<sup>83</sup>**

Lagos is a mega-city, a demographic avalanche gathering size in spite of low-rate economic growth. Poverty is overpowering. Service provision by various levels of government could not keep up with urban growth in spite of the considerable oil wealth of the country. Lagos became known as a “self-service” city, referring to private or micro-communal attempts to organize in the vacuum at the municipal and state levels.<sup>84</sup> The public-sector bus company failed under the weight of low fares and unsustainable subsidies, its role taken over by a market of informal operators. These provide low-quality services, compete “on-the-street” with each other, with the common adverse side effects accumulating towards critical levels. Institutions and financing arrangements for urban transport were in disarray.

<sup>83</sup> Information for this project was drawn from World Bank (2002b).

<sup>84</sup> Gandy (2006)

**Box 6-7. Lagos, Nigeria in early 2000s**

**Population:** 12.8m-15m, growing at 6% per annum, expected to double in the next 15 years

**City economy:** GDP per capita US\$317 (country); GDP per capita growth 1.2% per annum; Lagos employs 45% of the skilled manpower nationally

**Poverty:** estimated at 9.6m in Lagos; deeper and more severe than in the country as a whole; mostly self-employed in street trading and unskilled tasks in the informal sector

**Urban government:** 18 local governments (out of 21 in the Lagos State), each with its own public works department, some with Traffic Management Units (TMUs); transport matters handled by Lagos State Ministry of Transport

**Motorization:** boomed in 1970-80s at the then peak of oil revenues, then decayed; vehicle fleet aged and poorly maintained;

**Transport system:** road-based, with an entry-level development of primary (limited-access) roads; the rest of the network not differentiated functionally, and poorly connected to primary roads; overall low road density (0.4km per 1,000 population); many areas poorly served by roads; road space used for trade; unregulated on-street parking.

**Public transport:** informal, small-scale private operators dominant: they run 75,000 vehicles, mostly minibuses (role increasing), medium-size buses (role diminishing), and passenger-carrying motorcycles (*okadas*); mixed-traffic operation with poor stop and terminal facilities; fares set by government; profit margins low;

**Modal split:** public transport share of motorized trips circa 77%;

**Traveler problems:** poor and poorly protected street space for non-motorized travel; highest accident rate in the world; low-quality and unsafe UPT services; transport (fares) amount to 20% of budget for poor households; congestion; air/noise pollution and oil dumping; transport infrastructure and services considered a major constraint to the city's productivity;

**Underlying problems:** fragmentation and weakness of institutions; area revenue from road user fees accounts for merely 13% of area spending (mostly for roads); major revenue source (fuel tax) in federal hands;

**Government strategy:** (i) build transport institutions on state level; (ii) increase cost recovery (for roads); (iii) promote affordable UPT services; (iv) focus on reducing air pollution; (v) create business environment conducive to private provision of services; (vi) make best use of available road capacity.

The project focused on a gradual re-regulation of the informal sector, using massive road rehabilitation as a lever and as a direct instrument to reduce poverty, through employment on road works. Public transport service franchises would be introduced on roads improved by the project. Other (non-franchise) operators would be prohibited from using these roads. On the institutional side, the project assisted in the creation of a regulatory authority (the Lagos Area Metropolitan Transport Authority, LAMATA) and gave it the threshold financial capacity through a new Transport Fund. The Fund is fed by budget transfers from the Lagos state government, and a share of road user charges. No provision was made to seek street space exclusivity for public transport vehicles, reflecting a sober assessment of what was politically feasible.<sup>85</sup> The project design is atypical in that investments in one mode (road infrastructure) are used to leverage regulatory changes for another mode (public transport services). This was possible because the client government (Lagos State) has jurisdiction over both modal systems.

<sup>85</sup> But exclusive bus lanes were investigated to prepare for future activities and planning of the Lagos' first BRT line is underway.

**Box 6-8. Lagos Urban Transport Project (2002)**

**Borrower:** Federal Republic of Nigeria

**Implementing agency:** Lagos Metropolitan Area Transport Authority (LAMATA)

**Appraisal Report date:** October 25, 2002

**Project type and credit amount:** Specific investment project, US\$100m

**Bank project objectives:** (i) improved and sustained institutional capacity to manage the UT system; (ii) increased efficiency of the public transport network, mapped into better services (see indicators); and (iii) poverty reduction.

**Institutional components:** (i) establishment of LAMATA with regulatory, planning and expenditure powers over 600 km road network and public transport services; (ii) establishment of Transport Fund, to finance LAMATA's administrative and road expenditures; (iii) setting up of traffic management units in all key local governments, with enhanced links to and performance by the traffic police; (iv) development of multi-modal transport master plan for the urban area; (v) studies for further institutional restructuring; (vi) studies concerning the introduction of rapid transit modes.

**Policy components:** (i) LAMATA funding from a combination of state government transfers and share of revenue from road user charges; (ii) new regulatory framework for street-bus public transport services, based on franchises, with incentives to improve quality, including some minor on-street privileges; (iii) some NMT-oriented improvements; (iv) building information & awareness base for subsequent environmental action;

**Main investment components:** (i) maintenance and rehabilitation (including TM measures) of 400 km of the road network, amounting to 63% of main roads, carrying core bus services (costing US\$98.5m); (ii) bus services enhancements (US\$0.73m); (iii) capacity building (US\$27.6m)

**Major indicators:** reduction of accidents; reduction of time and money costs spent on travel by low-income households; percent of bus operations governed by the new regulatory framework; employment creation (through road construction); setting up of LAMATA and TMUs; proportion of LAMATA budget coming from the federal level.

## 6.5 Case 5: Wuhan Urban Transport Project<sup>86</sup>

The city of Wuhan is an economic success story, growing faster than average in China, against a background of moderate (controlled) population growth and a low level of poverty. When the project was put together, car-based motorization was at a low level and accounted for a mere 12 percent of daily trips. Bikes and walking retained dominance, but the road network was so poorly developed that even at this level of car use the street congestion was judged severe. The city government pursued the usual route of major road construction, made plans for numerous metro lines and was leaning towards involving private operators for street-based bus services.

<sup>86</sup> This case is based on World Bank, 2004b.

**Box 6-9. City of Wuhan (Hubei, China)**

**Population:** 3.9m in 1998, projected to increase to 4.5m in 2020 (demographic patterns still based on the Hukou system for restraining rural-to-urban migration)

**City economy:** growing much faster than the national average, expected to continue at 7-9% per annum

**Poverty:** estimated at 5%, excluding “visiting population”

**Urban government:** Municipality of Wuhan responsible for all aspects of urban transport; minor roles for provincial and state governments

**Motorization:** car ownership increased from 56 cars/1,000 people in 1998 to 99 per 1,000 in 2001; expected to rise to 167/1,000 in 2020.

**Transport system at project conception stage:** road network poorly developed with a few arterial roads and key road links missing; public transport services based on street buses operated by an umbrella organization of 7 poorly-equipped, state-owned companies (6 using buses and 1 using trolley-buses) and 1 public/private joint venture; fares cover 90% of direct operating costs; poor or missing physical infrastructure (terminals, garages)

**Modal split:** 37% walk, 29% bicycles, 22% buses, 12% motor vehicles (cars and motorcycles)

**Problems:** increase in motor vehicle traffic is overwhelming Wuhan’s road system and mobility in trips per person is declining; both traffic management and road maintenance (by public agencies) efforts are weak and weakly funded; pedestrians and bicyclists increasingly endangered; transport funding not assured; land use and transport planning proceed independent of each other; air pollution still not serious except on arterial roads (lead-free fuel introduced in 1998; national emission standards enforced through testing since 2000)

**Government strategy:** Ambitious road construction program plus 6 planned metro lines; openings towards private sector involvement in the provision of PT services

The Wuhan project pursues an integrated approach to transport planning, by trying to water-down the vehicle-first inclination of the government, in favor of public transport services and traditionally strong habits of walking and biking. The project is notable for the number of diverse elements it included, but it avoids falling into a Christmas-tree category because of a conscious balance between policy and institutional aspects on the one hand and investments on the other. Given the large size of the loan (and total project cost), the non-investment agenda is considerable. The key feature in the policy dimension is public transport deregulation, coupled with the establishment of a bus route tendering agency (a budding public transport authority). Beyond this agency, innovation on the institutional side is mainly in terms of instruments, e.g. a transport strategy study expected to pioneer a new approach to investment planning, preparatory studies for vehicle emissions control, and a new road management (maintenance) system. Investments are heavily focused on roads (network development, road maintenance), followed by traffic management and smaller, but non-trivial amounts for public transport and environmental regulation.<sup>87</sup> The emphasis on walking and non-motorized modes—clear in the project objectives—is not explicit in the description of project elements, but is likely to be contained in design details of both road and traffic management components.

<sup>87</sup> A \$24m loan amount reserved for traffic management would be considered enough for a solid, free-standing traffic management project in most regions.



**Box 6-10. China—Wuhan Urban Transport Project**

**Borrower:** People's Republic of China, involves on-lending to Hubei Provincial government, on-lending to Wuhan MG, on-lending to Wuhan Municipal Capital Investment Management Office (WMCIMO)

**Implementing Agency:** Wuhan Municipal Government through WMCIMO, this last to set up a Wuhan UTP Office (project unit); plus several sub-implementing agencies for different components, e.g. Traffic Police for the TM component; overall guidance provided by a consultative Wuhan UTP Leading Group composed of government officials;

**Appraisal document date:** February 12, 2004

**Loan type and amount:** Specific investment loan, \$200m (\$132.3m for road network development; \$20m for road maintenance; \$24m for traffic management; \$11.1m for public transport; \$3.4m for environmental management; and \$7.2m for studies, training and technical assistance. Counterpart funds will require 2/3 of the city's total capital budget in first two years;

**Project cost estimate:** \$598.2m

**Complementary operations:** none listed

**Objectives:** promote the development of an integrated, efficient, and sustainable transport system in Wuhan, with emphasis on mobility of low-income people (indirectly by improving conditions for walking, biking and PT)

**Policy components:** introduction of bus route tendering on competitive basis; fare/subsidy policy; preparation/adoption of vehicle emission control strategy

**Institutional components and instruments:** establishment of a bus route tendering agency; formulation of transport strategy, incl. transport policy white paper and a 5-year investment program, then use of strategy as a vehicle for integrated approach to the change agenda; new investment planning approaches; separation of PT operations from regulatory role; introduction of a Road Maintenance Management System;

**Investments:** road improvements on through- and cross-town traffic routes; improvements on bridges; central area roads and traffic improvement program; new roads in development areas; and pedestrian facilities' improvements; road maintenance equipment; upgrading pollution measurement, vehicle inspection and maintenance systems

**6.6 Case 6: Colombia—Integrated Mass Transit Systems Project<sup>88</sup>**

This project is the latest in a sequence of Bank-funded operations in support of a remarkable evolution of urban transport matters in Colombia. In the 1990s, Colombia experienced accelerated urbanization, fed in part by people from the countryside and smaller cities escaping to a few larger cities to avoid the ravages of the long-lasting civil war. This also meant a shift of poverty to cities. Most migrants settled in peri-urban *barrios*, needing long commutes to centrally located jobs. Three quarters of daily trips in large cities used public transport services (and still do). These were provided by private operators with route licenses and fare ceilings, apparently with slim profit margins. This led to an oversupply of aged, high-polluting buses and mini-buses, competing on-street for passengers. By the mid-1990s, the streets of Bogotá and other cities were congested, polluted and had a high incidence of accidents involving buses. The on-going process of decentralization removed the national government as an active participant in urban transport matters, while local governments lacked both institutions and funds to do this on their own. Common responses included building roads and planning metros. After a very disappointing cost and traffic experience with the Medellín metro, and accepting that at that time a metro in Bogota was unaffordable, a corner was turned in the mid-1990s

<sup>88</sup> The source of data for this project is World Bank (2004b)

when the city of Bogota started to construct the first corridor of a bus rapid transit network that would become the *Transmilenio*, the most successful such program since the one in Curitiba many years earlier.

**Box 6-11. Three cities in Colombia (late 1990s)**

**Population:** Bogotá 6.6m; Cartagena 0.7m; Pereira 0.5m; the country is 75% urbanized.

**City economy:** Recession in the late 1990s, followed by recovery; fiscal situation still tight, locally and nationally.

**Poverty:** Two-thirds of population under poverty line live in cities, due in part to 2.5m people moving there to escape the civil war

**Urban government:** Municipal governments whose powers increased during decentralization implemented in 1990s, still working on securing adequate local finance. Central government re-involving itself with urban issues, given cities' role in economic growth.

**Motorization:** 25% of households own cars

**Transport system at project conception stage:** road network

**Modal split:** public transport carries 75% of all trips; 14% commute by car.

**Transport problems:** Street congestion (peak period speeds less than 10 km/h) and poor public transport services, the latter due to a weakly regulated system of licensed bus operators with in-market competition for passengers ("penny war"); oversupply (50%) of both mini and standard-size buses and dangerous driving practices contribute to congestion, accidents and pollution. Poor families spend about 25% of their income on public transport, generating a massive political problem. Peri-urban areas especially affected. Institutional capacity to deal with urban transport problems still weak at both city and national level.

**Government strategy:** Prior strategy consisted of building roads to accommodate traffic growth and planning metro systems. Following several attempts to build a metro system in Bogota, and learning from a problem-laden metro project in Medellín, the City of Bogotá opted for a bus rapid transit concept, with public-owned infrastructure and privately provided, profit-making services based on for-market competitive tendering. The initial success of the first phase led to its expansion (under the now-famous name of *Transmilenio*) in Bogota and replication of the concept in other cities. In the early 2000s, the Government of Colombia adopted a National Transport Program, featuring annual fund transfers to major cities, on a regular basis through 2016, to help them finance infrastructure investments (up to 70% share) and provide technical assistance. A total of \$1.6bn is envisaged, drawn from a surtax on gasoline.

The main development objective of the Integrated Mass Transit Systems Project, on the demand side, is to improve the performance of the transport system for the majority of the population, 70 percent of which have low incomes. The essence of the policy reform, whose middle phase is supported by this third-in-line Bank-funded project, was to turn an inferior, weakly regulated public transport system into one based on concessions, moving trunk lines from mixed traffic city streets onto an exclusive running way, re-organizing the street-based public transport route network into a system of feeders and distributors, developing interchanges and terminals, and introducing an integrated fare system. As in preceding projects, vehicle specifications call for articulated, high-capacity and low-emission buses. The main investment "twin" of these reforms is the exclusive busway infrastructure. Busways are to be constructed on city streets, reducing the space remaining for other traffic in major corridors. In addition to busways and associated structures, the project finances the paving of feeder/distributor streets in *barrios*, road paving of lanes adjacent to the busway, and other street improvements reclaiming the city for non-motorized transport. All infrastructure is financed from public funds, and transport services are provided privately, without subsidies. While the first project in the sequence (Bogotá Urban Transport project, 1996) was limited to the capital city, the current project is expanding to other large and medium-size cities (Cartagena, Pereira and others). Its loan size is modest for a rapid mass transit project (\$250m), but an additional loan of \$207m is being processed at the time of this writing, signifying the success of the initial stage of the project. In total cost terms,

the program is approaching one billion dollars, and even more if parallel projects funded by other multilateral banks are included.

**Box 6-12. Colombia—Integrated Mass Transit Systems Project**

**Borrower:** Republic of Colombia (National Urban Transport Program)

**Implementing Agency:** National Planning Department (secretariat of the Technical Committee of the National Urban Transport Program) and Ministry of Transport; at city level, Bus Rapid Transit System agencies and/or specialized municipal agencies

**Appraisal document date:** May 14, 2004

**Beneficiary cities:** initially Bogotá, Cartagena, Pereira; in a later phase: Medellín, Barranquilla, Bucaramanga and Soacha.

**Loan type and amount:** Specific investment loan, \$250m (additional \$207m sought in 2007) to finance the national government's participation, except direct finance of the Bogotá component.

**Project cost estimate:** \$464m

**Complementary operations:** The project is the third in a series commenced by Bogotá Urban Transport Project (Loan 4021-CO, 1996-2001); the Bogotá Urban Services Project (Loan 7162-CO, 2003, ongoing); the Regulatory Reform technical Assistance Project (Loan 4138-CO). Parallel loans by the Inter-American Development Bank (Cali) and the Andean Finance Corporation (Suba corridor in Bogotá)

**Objectives:** improve performance (travel times, safety, fare levels, emissions) of the transport system for 75% of travelers and in particular increasing access for low-income populations from peri-urban areas and disabled travelers; and enhance the participation of the private sector; continuing involvement in Bogotá and expanding to medium-size cities; build-up institutional capacity at national level within the national Urban Transport Program framework.

**Policy components:** introduction/enhancement of the concession system for public transport services based on competitively awarded contracts between municipalities and private operators for both trunk lines and feeder-distributor services, using high-capacity, low-polluting buses, with integrated system of fares set by public authorities; reforms include route reorganization and programs to scrap/replace aged bus vehicles owned by current operators, and re-integration of displaced operators.

**Institutional components:** creation of public transport regulatory agencies in participating cities; signing of agreements between the National Urban Transport program and each participating city.

**Investments:** expansion of the *Transmilenio* in Bogotá by 15 km plus improvements on parallel roads (*barrio* feeder roads improved under the Bogotá Urban Services Project); 57 km of bus rapid transit corridors in other participating cities, including stations and terminals; and improvements on parallel roads and in feeder areas.

On the institutional side, each participating city would create a Bus Rapid Transit System Agency to carry out the requisite regulatory functions. Importantly, the national government is re-engaging in the sector through an increasingly ambitious and refined National Urban Transport Program. The Program will finance up to 70 percent of infrastructure costs, drawing on funds generated by a fuel tax surcharge, and will also provide technical assistance to cities.<sup>89</sup> The Bank's project will fund technical assistance for institution building on both city and national level.

<sup>89</sup> The project will in fact finance the national contribution to cities other than Bogotá.

## 6.7 Case 7: Santiago—Programmatic Urban Transport Policy Development Loan<sup>90</sup>

This complex, risky project was prepared in a socio-economic context diametrically opposite to that of Budapest and Rio. Chile is one of the world's most deregulated economies, with years of sustained growth, but with increasing income inequality. Paradoxically, it is the state that is the major player on the urban transport scene. Santiago is widely known for its for-profit, free-wheeling private street-bus services and its public-owned metro. Bus service deregulation was done as a matter of deliberate government policy, not because of an absence of policy, as is the case in Lagos (below). No capital or operating subsidies to bus operators are involved. The metro is one of the few in the world where fare revenue covers more than direct operating costs. Transport planning, traffic management and regulatory capacity in Santiago are second to none in the world, though fragmented due to the small size of the Santiago Municipality relative to the metropolitan area.<sup>91</sup> The impetus for reform comes from the realization that street-bus deregulation did not result in good service quality, nor did fares come down. Moreover, the deregulated market produced unacceptable side effects in terms of congestion, accidents and air quality.

In the history of the World Bank's involvement with urban transport, this project is the first DPL. The strategy behind the project design is to re-regulate street buses moving closer to a "for-the-market" competitive model, with the following elements:

- A metropolitan area-wide hierarchical trunk-feeder service pattern;
- An overall industry organizational arrangement featuring separate trunk and feeder transport service companies, plus an independent fare collection and revenue allocation company;
- Tighter public service and environmental requirements and regulation;
- A new, "greener" bus fleet;
- On-street, exclusive transit-ways for the trunk bus line network;
- All IC (smart card) fare collection.

The project indicates that Santiago finally decided to adopt a bus rapid transit orientation that has done wonders for other Latin American cities, but with complex risk-allocation arrangements not seen elsewhere. The key constraint (and a risk) in re-regulation of public transport services is that fares must remain at the current level. On the institutional side, the project aims to provide a single body to regulate and plan the public transport system, an Urban Public Transport Authority. Congestion charging is mentioned as a possible option should the bus-based system fail to provide sufficient revenue to cover the costs of franchise operations, but is not an explicit commitment.

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<sup>90</sup> The sources of data for this project are World Bank (2004d, 2005c and 2005d)

<sup>91</sup> The national government is the *de facto* metropolitan area government.

**Box 6-13. Santiago de Chile in the mid-2000s**

**Population and population growth:** Population is 5.3m, close to 40% of the country. It grew by 28% between 1991 and 2001, with decreasing densities and increasing spatial extent. The growth rate is now modest at 1.4% per annum.

**Economics:** Sustained economic growth in the country, to which Santiago contributes 47%. Sharp income inequalities, with corresponding spatial patterns.

**Urban government:** 34 municipalities without a strong overall government.

**Motorization:** The motorization rate in 2001 was high at 560 cars per 1,000 population (up from 320 in 1977). Trips by car increased 223% between 1991 and 2001.

**Transport system at project conception stage:** Santiago is served by an extensive road system, a 40-km, public-owned metro, and 7,700 privately owned and operated buses. The metro serves 0.75m passengers a day, provides a high quality of service and covers its operating costs from fare revenue. Bus services run on city streets (without priority) and carry 4.5m trips a day. 77% of services are franchises based on competitive awards (and further sub-contracting to small operators), the rest being essentially free-entry, with considerable route overlap. Bus services receive no subsidies.

**Modal split:** Public transport is in decline, carrying 52% of motorized trips, or less (down from 83% in 1977 and 69% in 1991)

**Transport problems:** Pervasive traffic congestion on all arterial roads. Oversupply of bus and taxi services, with low quality of service, high noise/pollution and poor safety (one death every three days involving PT passengers). In spite of competition, fares did not decline and pose affordability problems to low-income travelers, especially those who need to transfer. High-quality components of the public transport system too limited in size, and not well connected to the rest of the system. Constrained access of low-income communities to jobs and other opportunities, especially for passengers not having simple radial itineraries. Fine particulates concentrations are twice European norms. Buses responsible for 50% of all transport-generated emissions.

**Transport strategy\*:** The approach is to lift the quality of service for both car and public transport users, with major improvements in air quality, and to improve the institutional setup and processes. The program involves: (i) the development of a 300-km system of segregated busways and corresponding facilities, over 15 years, taking space from major urban arteries; busways to be constructed using a combination of private and public funding, and managed based on concessions; (ii) construction of new metro lines to double the current length (public investment); (iii) construction of seven new toll roads, with combined private/public funding; (iv) functional unification of metro and bus trunk routes, and bus-based feeder/distributor networks into a public transport system; (v) new service standards, many ensuring fair treatment of vulnerable populations; (vi) new public transport emission standards, enforcement and monitoring; (vii) re-regulation of the public transport (bus) sector, use of gross-cost contracting with some demand risk, aiming for better services, larger and lower-emission vehicles; (viii) concessions for revenue collection management; (ix) fare integration using IC or "smart" cards, revenue sharing; (x) financial self-sufficiency of the system, including safety mechanisms to ensure gap coverage; (xi) mechanisms for coordination of transport and land use development; (xii) increased citizen participation in system management and planning; and (xiii) creation of an umbrella, multi-modal urban transport authority for the metropolitan area. The investment program includes US\$1.6bn for the metro extension (public investment), US\$1.8bn for toll roads (mostly private investment) and US\$900m for busway infrastructure and the remaining public transport improvements; of this last item, US\$103 will be public investment, the rest private.

\*The Transantiago plan as presented (excluding toll roads) was developed by Santiago's transport planners and endorsed by the Committee of Ministers on Urban Transport for Santiago. Only some of the propositions were formally adopted and budgeted for by the Government. Notably, the scope of item (i) beyond the first 20 km, and items (x) and (xii) are considered "stretch" categories.

**Box 6-14. Programmatic Development Policy Loan for Santiago de Chile (2005)**

**Borrower:** Republic of Chile

**Implementing agency:** Ministry of Finance

**Program Document date:** May 11, 2005

**Project type and loan amount:** a set of two Programmatic Development Policy Loans (DPL) for US\$30.16m and US\$100m, respectively. The implementation period is 1 year for the first and 3 years for the second loan. The second DPL was cancelled after approval.

**Project cost estimate:** not applicable to DPLs

**Complementary operations:** GEF-funded, US\$7m technical assistance grant, approved in 2003; and a Bank-funded US\$4.8m technical assistance loan (approved 2005). The national government is again the borrower, whereas Ministry of Construction is the implementing agency.

**Objectives:** (i) raising the quality of urban public transport services for bus system passengers; (ii) improving air quality; (iii) strengthening regulatory institutions for public transport services; (iv) refining the allocation of risk between private and public sectors, while maintaining full cost recovery. The ulterior objectives of the Government of Chile are to increase the (global) competitiveness of the capital, reduce environmental deterioration, and improve equity.

**Policy components:** (i) permanent dedication of at-grade street space on major corridors to trunk bus route operation (a total length of 20 km); (ii) regulatory reform of the bus-based public transport operations, based on for-market competition, involving gross-cost contracts, larger size contractors, and higher-comfort, low-emission buses; (iii) setting up a concession system for revenue administration; (iv) overhaul of the bus-based route network into a system of trunk and feeder/distributor lines, integrated with the metro network; (v) fare association (eliminating multiple payments of fares). Triggers for the first loan include awards of 14 main service concessions and award of the revenue administration concession. Implementation of the restructured service network and the integrated fare system will trigger the second loan.

**Institutional components:** setting up a Public Transport Regulatory Authority

**Investments:** not applicable for policy loans

## 6.8 Case 8: Hanoi Urban Transport Development Project<sup>92</sup>

This project represents a fusion of ideas present in Bank-funded projects in China and various Latin-American countries, while also being pioneering in its own way. Hanoi's population and spatial increases take place against the backdrop of a vibrant, growing urban economy. The pressure on the performance of the transport system for travelers and shippers comes from motorcycle-led motorization, with a residual but still strong presence of once-dominant bicycles. A low-profile, government-owned transport operator, carrying only 8 percent of the market, competes with two-wheelers for the same street space.

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<sup>92</sup> This case study is based on World Bank (2007a and 2007b)

**Box 6-15. Hanoi, Vietnam in 2000s**

**Population:** 3.2 million people and growing at about 3%; projected to double by 2020, much of it fueled by urban migration. High-density settlement (272 people per hectare, 404 in the central area), with recent wave of lower density developments at the periphery, including both industry and residential land uses.

**City economy:** national economy has grown steadily at 6% per annum since 2000. National per capita income US\$635 in 2005. Hanoi's economy is currently growing at 10% per annum; it produces 8.4% of national GDP (2005 data).

**Poverty:** Falling in line with economic growth, from 37% in 1998 to 20% in 2004.

**Urban government:** Hanoi People's Committee (equivalent to a city council).

**Motorization:** increasing, led by motorcycles, of which there are 1.5m, compared to 0.15m cars; the latter are increasing at 10% per annum, many vehicles are business-owned; per capita incomes are rising so fast that car ownership is expected to take off in 2010.

**Transport system at project conception stage:** The road network quite constrained, being less than 7% of the area; primary roads not well developed. Buses are operated in mixed traffic by a single government-owned company, a monopoly until 2005; now two private operators have won gross-cost contracts on six routes.

**Modal split:** Non-walk trips have doubled over 10 years, reaching 6.5m in 2005. Motorcycles carry 60% of trips; bicycles carry 24.4%; buses carry only 8%; and cars/trucks carry 4.5%.

**Problems:** congestion on arterial roads, high accident rates.

**Government strategy:** to increase public transport mode share to 25% now and 50% by 2015, through a combination of bus system improvements and new rail-based rapid transit lines. Bus company improvements already implemented, including 700 new vehicles, restructured routes and schedules, system-fares, and higher punctuality have already led to a major jump in patronage (from near zero to over 700,000 per day, in just 5 years), but with unsustainable subsidies and difficult on-street operating environment. Introduction of private operators will be followed by providing incentives for a higher involvement of the private sector as investor and operator.

**Prior Bank involvement:** Urban Transport Improvement Project, financed by a credit of about US\$40m; it focused on traffic management investments and institutions in Hanoi and Ho Chi Minh City.

The project aims to increase the modal share of public transport modes relative to motorcycles. It incorporates a two-corridor BRT program, which will bring high-quality, concession-based public transport services. Exclusive bus ways (financed by the loan) will be constructed at grade, on road space taken from general traffic. Just like in Wuhan, Santiago, Rio, Lagos and Budapest, the project aims to create a multi-modal, integrated Urban Public Transport Authority. In addition, road investment is conceived as a vehicle to increase equity, through geographic extent and public transport supportive design features. Unique in the Bank's urban transport lending, road investments in this project will be used to guide land development.



**Box 6-16. Hanoi Urban Transport Project (2007)**

**Borrower:** The Republic of Vietnam, on-lent to the City of Hanoi

**Implementing Agency:** Hanoi People's Committee through a Project Management Unit located in Hanoi Transport and Urban Public Works Service

**Appraisal Report date:** May 17, 2007

**Project type and credit amount:** Specific investment operation, financed by a credit of about US\$155.

**Project cost estimate:** US\$305m, of which US\$100m for the BRT component; US\$194m for road improvements; and US\$ 10.5m for institutional improvements

**Complementary operation:** Hanoi Urban Transport Development Project GEF component, with a grant of US\$ 9.8m

**Objectives:** (i) achieve a major "jump" in service levels of the public transport system through dedication of on-street area to its exclusive use; (ii) improve the lot of non-motorized travelers; (iii) promote urban growth patterns and infrastructure design standards compatible with good transport system performance; (iv) strengthen the city's capacity to manage, regulate and plan public transport; (v) promote a shift to environmentally sustainable transport modes and urban development patterns (GEF project objective);

**Policy components:** BRT operations to be awarded through competitive tendering

**Institutional components:** establishment of a Public Transport (Regulatory) Authority

**Investments:** (i) 24.5 km long Bus Rapid Transit (BRT) line in two corridors, with supporting facilities and special amenities for non-motorized modes near stations; (ii) section of a Second Ring Road, 7 km long, in urban expansion area, with resettlement housing site for households displaced by the road construction; and (iii) institutional investments for air quality management, traffic management, the setting up of a new Public Transport Authority, and transport planning activities.



## 7 FROM PROJECTS TO A STRATEGY

### 7.1 Two strands in project designs

The sector strategy was defined earlier in this paper (Box 4-1) as a central tendency in an envelope containing all project designs, allowing for the possibility that there would be more than one such tendency *and* that the strategy could extend beyond past and current experiences. The sample of projects reviewed in the preceding chapter illustrates a considerable variety in designs. This could be expected, given the very different local contexts in which these projects were put together, especially the interplay between demographic and economic forces, and the change processes underway at the time when the projects were put together. The variety can be reduced by identifying a small number of project types, or design strands, each represented by a cluster of projects.

Two strategic strands, quite different from each other, are evident in the sample. Box 7-1 presents one of these, depicting projects focused on public transport services.

<p><b>Box 7-1. Public transport strand</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>- Improved performance of public transport (improved services, reduced operating costs) to maintain/nurture competitiveness with individual motor vehicles;</li> <li>- Greater efficiency/effectiveness of public expenditures;</li> <li>- Improve public transport planning;</li> </ul> <p><b>Policies:</b></p> <ul style="list-style-type: none"> <li>- Deregulation of public-sector monopolies in the direction of for-market competition and re-regulation of the informal sector in the same direction;</li> <li>- Reform of price/subsidy policies for public transport services;</li> <li>- Re-allocation of street space to exclusive use of public transport vehicles and protection of non-motorized modes;</li> </ul> <p><b>Institutions and instruments:</b></p> <ul style="list-style-type: none"> <li>- Public transport regulatory authorities;</li> <li>- Urban transport integrated strategies and plans;</li> </ul> <p><b>Investments:</b></p> <ul style="list-style-type: none"> <li>- Rehabilitation of existing public transport infrastructure (bus- and rail-based rapid transit; suburban railways);</li> <li>- Engine and vehicle replacement and other investment needs of public operators;</li> <li>- Infrastructure and rolling stock for the expansion of intermediate and full-scale rapid transit systems (bus- and rail-based)</li> </ul>
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The projects for Rio de Janeiro, Santiago and Budapest belong in this group, as do numerous other projects in the cohort reviewed for this paper. The Rio project proposed to deregulate the suburban railway company, turning operations over to a private concessionaire; invest in the rehabilitation of infrastructure, which was to remain in public ownership; and create a metropolitan regulatory authority. The Santiago project proposed to re-regulate private street-bus operators to improve services, take over the street space for exclusive use of buses, and also support the creation of a regulatory authority.

The Budapest project moved the erstwhile monopoly provider of public transport services in the direction of market-based operations, with a major reform of price and subsidy policy, and an

investment program focused on rehabilitation. This project also proposed, however indirectly, to create a public transport authority.<sup>93</sup>

The list of features in Box 7-1 goes beyond the work on existing public transport systems—seen in most projects in the sample—to projects involving network expansion. Apart from the projects in Colombia and Vietnam reviewed here, the Bank has financed these in Brazil (metro in São Paulo), in Korea (metro in Pusan), and elsewhere.

Box 7-2 depicts the second strand—a project type focused on traffic and roads. For convenience, the presentation fuses three distinct project types: low-cost traffic management and safety projects, road maintenance projects, and higher-cost road upgrading and expansion projects.

#### **Box 7-2. Traffic- and road-focused strand**

##### **Objectives:**

- Improved traffic flow and safety on the urban road network;
- Improved accessibility to urban development areas;
- Improve traffic planning;

##### **Policies:**

- Traffic restraint
- Parking management (time- and price-based)
- Traffic law enforcement;
- Market-based road maintenance;

##### **Institutions and instruments:**

- Traffic management institutions;
- Traffic police;
- Municipal road departments;
- Integrated urban transport plans and strategies;

##### **Investments:**

- Traffic signs and markings;
- Traffic and parking control systems in central areas, activity centers and corridors;
- Intersection and black spot improvements;
- Road rehabilitation and class upgrade in areas and corridors;
- Basic roads in urban expansion areas;
- Primary roads.

In the sample, the Moscow project is unusual in that it uses the leverage of substantial road and bridge investments to create a traffic management institution inside the Moscow City government. Historically, this institutional objective was coupled with small-scale investments in intersection and corridor improvements. Because of their traditionally small scale, traffic management and safety projects were often included as components of larger urban transport or municipal development projects (e.g. in Greater Cairo, Amman, Lahore, and Chennai).<sup>94</sup>

<sup>93</sup> The Budapest Transport Association cited in the write-up of this project in Chapter 6.

<sup>94</sup> In the 1980s, the traffic management and safety approach was considered *the* urban transport strategy of the Bank. The underlying idea was that cities in low-income countries should do everything they could to maximize the use of the available road networks before considering expansion. The key policy paper of that decade (World Bank, 1987) could be read as arguing for a strategy where traffic management and the informal private sector take-over of public transport services were favored, while major urban roads and rapid transit lines (especially metros) were

## 7.2 The core urban transport strategy

Could a global urban transport strategy be derived by combining the main elements of the two project design strands identified above? The answer is affirmative.

The traffic-and-roads project design structure was presented above, on purpose, as if it disregarded the diversity of participants (human groups and vehicle types) in the traffic stream, as well as the presence of traffic-generated air pollution and other negative impacts. Similarly, the public transport strand was presented almost without noting a key difference between modes operating in mixed traffic on city streets and those on exclusive tracks, or mentioning poverty or environment.

The original traffic management approach, as pioneered in the United States, had the objective of increasing the speed and flow of car-dominated motor vehicle traffic, but—as noted in Chapter 5—the approach is in fact flexible in terms of key Bank concerns. By opting for measures friendly to public transport vehicles, pedestrians, and other non-motorized modes, traffic-and-roads projects (across the entire range of sub-types) can be given strong pro-public transport content. “Can” ought to be replaced by “must”, since the vast majority of public transport and non-motorized modes operate on city streets, in mixed traffic. For the very same reason, the design focused on public transport modes must encompass concern for road traffic as well.

By opting for measures friendly to public transport vehicles, pedestrians, and other non-motorized modes, traffic-and-roads projects (across the entire range sub-types) can be made consistent with the public transport focused project design. Since the majority of public transport services operate on city streets, in mixed traffic, project designs focused on public transport also must encompass concern for road traffic as well.

Going a step further, features focusing on poverty alleviation, local environmental quality and land development can be readily added to either public transport or roads-and-traffic design strands. For example, air quality management is facilitated by a feature of the for-market regulatory arrangement whereby engine standards remain in the jurisdiction of public authorities. Or, an entire project can be built by focusing on roads and public transport lines serving a low-income area. Such a project would acquire a land development dimension when the area is at the urban-rural frontier.

Box 7-3 fuses the public transport-oriented strand in project design and the traffic-and-roads strand, after the latter was modified to reflect equity, environmental and land development objectives. The result is a stable and coherent operational approach that confidently could be said to represent a central tendency for Bank-funded urban transport projects. Hereafter this approach is called the “core” strategy.

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discouraged. While the evidence that traffic management and safety are of critical importance is abundant in most client cities, the approach has several key limitations *as a strategy*: (i) it is quite difficult to implement; (ii) it is focused on existing transport systems, while cities experiencing unprecedented rates of demographic and spatial expansion must also expand these systems; (iii) its policy and institutional scope is much too narrow; and (iv) its investments are too small to be used for leveraging pivotal policy actions even on existing networks, much less across a full range of daunting urban transport issues.

**Box 7-3. The core urban transport strategy****Objectives:**

- Improve performance of public transport modes (better services, reduced operating costs) and non-motorized modes to increase access for all, as well as maintain/nurture competitiveness with individual motor vehicles;
- Increase equity and inclusiveness;
- Reduce environmental impacts;
- Increase safety
- Increase efficiency/effectiveness of public expenditures;
- Improve transport planning processes;

**Policies:**

- Deregulation of public-sector monopolies in the direction of "for-the-market" competition and re-regulation of the informal sector in the same direction;
- Reform of price/subsidy policies for urban public transport services;
- Re-allocation of street space (on the basis of people moved) to preferential/exclusive use of public transport vehicles and non-motorized modes;
- Revision of road designs in both rehabilitation and network expansion projects that are friendly to public transport and non-motorized modes;
- Market-based road maintenance;
- Traffic law enforcement;
- Parking charges;
- Introducing air quality management;

**Institutions and instruments:**

- Public transport regulatory authorities;
- Traffic management units and traffic police units
- Air quality management units;
- Multi-modal urban transport authorities;
- Integrated urban transport and land use plans and strategies;

**Investments:**

- Rehabilitation of existing public transport infrastructure (bus- and rail-based rapid transit; suburban railways);
- Engine and vehicle replacement for existing public transport fleets and other investment needs of public operators;
- Infrastructure and rolling stock for (expansion of) intermediate and full-scale rapid transit systems (bus- and rail-based);
- Bike lanes; sidewalks, staircases, pedestrian-only areas;
- Traffic and parking control systems in central areas, activity centers and corridors;
- Equipment related to traffic law enforcement;
- Air quality monitoring equipment; emissions testing equipment;
- Road rehabilitation and class upgrades (intersections, black spots, corridors, areas);
- Basic roads in expansion areas;
- Primary roads.<sup>95</sup>

<sup>95</sup> Is it consistent to include the financing of primary roads (limited-access urban expressways) in a strategy favoring public transport and non-motorized modes? The answer is yes. The list of investments in the core strategy is comprehensive. It is quite conceivable to use investment in primary roads to leverage some aspect of crucial import for the performance of public transport modes; investing in primary roads may actually be highly warranted

The core strategy has a good fit with sample projects from Chapter 6 (and, by extension, with the entire project cohort of last 15 years), as well as with the set of Bank objectives presented in Chapter 3. The Hanoi project is the closest example of a multi-modal approach and objectives included in the core strategy. It features a conversion of street space to exclusive use of public transport operations, combined with a for-market regulatory approach in this space. This is linked to setting up an urban public transport regulatory authority. In addition, the project proposes to invest in basic road networks in urban expansion areas, ensuring infrastructure for basic (mixed) traffic operations.<sup>96</sup> The multi-city Colombian project and the Santiago project approach the same desired regulatory state from the opposite (unregulated) side. Under very different conditions, the Lagos project also provides an example of using a road improvement project to reach public transport objectives: a large-scale rehabilitation is focused on key public transport corridors, for which the project also includes re-regulation of public transport services (replacing in-market with for-market competition).<sup>97</sup> The project in Wuhan also has a good fit with the strategy: though the majority of investments are for road network development, the majority of policy and institutional elements are for public transport and non-motorized modes. The projects in Santiago, Wuhan and Hanoi illustrate how some simple air quality management aspects can be readily added to diverse project designs.<sup>98</sup>

The Budapest project, cited above as an example of a public transport focused design strand, also steps outside the confines of the public transport subsystem. First, it includes a parking charging system for the central area that was financed through a parallel loan by the European Bank for Reconstruction and Development. Second, also in parallel, the Municipality of Budapest carried out an effective and widely popular traffic management program for all corridors, where the Bank project financed the rehabilitation of tram tracks. Together, this three-way partnership covered most key elements of the core strategy.

Nine features of the core strategy should be highlighted. *First*, the strategy is derived entirely from recent project experience.<sup>99</sup> *Second*, it touches all modes, both infrastructure and services. *Third*, the strategy shows a clear preference for using improved public transport modes as a response to motorization, even when project investments are mainly for road improvements. The *fourth* feature is

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in a given city. It is not the type of investment but the overall strategy that matters, and the role of any given element within it.

<sup>96</sup> A preceding Bank project in Hanoi, a first in that city, focused on traffic management. This illustrates a common evolution of Bank involvement: a limited-scope entry operation and a subsequent expansion to a full strategic space.

<sup>97</sup> It was judged premature to go for exclusive tracks for bus operations, though this option will be examined within project-financed studies. It remains to be seen in practice how public transport vehicles will be protected from the onslaught of other vehicles attracted by improved roads.

<sup>98</sup> "Simple" air quality elements include producing air quality management plans, making arrangements for air quality monitoring, and—subject to an already accepted policy—setting up vehicle testing stations. Road and traffic management projects for individual cities cannot be expected to include national policy on air quality, vehicle emission standards and testing requirements. The write-up for the Mexico City Air Quality in Chapter 6 illustrates the complexity of such endeavors.

<sup>99</sup> Some elements included are common to many past projects, whereas others are rare or included in a weak form. Parking charges, for example, are rarely included, as is the "take" of street space in favor of public transport and non-motorized modes (for very different reasons, having to do with scarcity of street space and the political economy of space re-allocation). Attempts to create multi-modal urban transport authorities are rare, while public transport regulatory authorities and traffic management units are common. Funding of roads in urban expansion areas has been included, but (to the best of this writer's knowledge) land development regulatory policy has not.

the attention paid to those aspects of transport infrastructure and services that are of special concern for lower-income and poor travelers and communities. The *fifth* feature is the importance given to the provision of at-grade (and on-street) exclusive space for high-volume public transport operations, *conditio sine qua non* for high-performance of this mode when urban road systems are congested.<sup>100</sup> The *sixth* feature is a strong stand in favor of public-private partnerships, based on the for-market competitive model in the provision of public transport services. This is equally evident in approaching problems of street-based (bus) modes, as well as various forms of intermediate and full rapid transit modes where infrastructure tends to remain in public ownership. *Seventh*, by being in favor of for-the-market competitive provision, the strategy has an “entry” into the environmental dimension through specifications for public transport vehicles. *Eighth*, the inclusion of charges for on-street parking, a precursor of more drastic congestion management techniques. *Ninth*, the focus on institutions: the creation and/or strengthening of public transport regulatory authorities and traffic management units, with integrated urban transport authorities included as a “stretch” item.

**Box 7-4. Main features of the core strategy:**

- The strategy is derived from experience;
- All transport modes are within the strategy reach;
- Preference for public transport modes as the main response to motorization, even when road investments are involved;
- Explicit concern for low-income and poor travelers and communities in both policy and investment dimensions;
- Emphasis on exclusive on-street space for public transport trunk lines;
- Preference for public-private partnership (competition-for-the-market regulatory model), with service levels, fares and environmental parameters in public hands;
- Inclusion of parking charging as a congestion management tool;
- Inclusion of land development standards;
- Focused institutional capacity to regulate the public transport supply and manage traffic.

### 7.3 The poverty alleviation content of the core strategy

The core strategy permits such a selection of project elements that many or most of them have strong poverty alleviation content.<sup>101</sup> Amplifying on the fourth point in the preceding paragraph, Box 7-5 sums up various ways in which this can be done.

<sup>100</sup> This aspect is most clearly seen in the Bogotá, Hanoi and Santiago project designs, involving a new “take” of street space from the regular traffic. A whole batch of new projects in the pipeline involves bus-based rapid transit: in China, India and diverse Latin American and African cities.

<sup>101</sup> Adverse poverty and environmental impacts of urban transport projects are handled through safeguards applicable to all Bank-funded projects, therefore not repeated in sector and thematic strategies.



**Box 7-5. Poverty alleviation content of the core strategy**

- Improvements in the street environment for public transport operations in major corridors, with a direct positive impact on the mobility of low-income travelers, with indirect and direct impact on employment opportunities.
- Improving roads and/or public transport route networks in the off-corridor, collection/distribution areas, whenever poverty is location-specific.<sup>102</sup>
- Design features in road improvement components, to benefit specifically walking and other non-motorized transport modes.
- Explicit inclusion of fare/subsidy issues among strategic concerns, featuring subsidy targeting.
- Regulatory reform of informal transport modes conscious of preserving their role in the provision of services affordable to low-income passengers.
- Supporting fare associations and other forms of service integration, to assist those who have to make one or more line transfers, typically low-income travelers from urban fringes.
- Favoring the construction of intermediate rapid transit modes on at-grade tracks. The relatively modest construction cost of these modes allows higher-quality services, while staying within a financial envelope affordable to both low-income travelers and local authorities.<sup>103</sup>

**7.4 The environment-related content of the strategy**

Of the eight projects in the sample reviewed in the preceding chapter, most projects included some aspect of air quality management and, by extension, of climate change. Box 7-6 lists the ways in which this is done, essentially through a combination of cleaner modal split, public jurisdiction over vehicle standards for transport services, and implementing national emission standards for road vehicles.<sup>104</sup>

**Box 7-6. Environmental content of the core strategy**

- Nurturing and enhancing the role of public transport and non-motorized modes in the passenger travel market, through both on-street interventions and the provision of exclusive tracks, thus aiming for a potentially “cleaner” modal split.
- Support for-market regulatory design for public transport operations, which places vehicle standards, specifically emission standards, in the hands of public authorities.
- Investment in vehicle and engine replacement for public transport operators, with both efficiency and environmental objectives in mind.
- Investment in emission monitoring and testing equipment; and
- Support of corresponding institutions and instruments (air quality management plans and units).

<sup>102</sup> This is the case in most regions, except in Europe and Central Asia, where many high-rise apartment buildings and blocks contain the entire income range. In Indian cities, in addition to peri-urban slums, low-income settlements also permeate high-income areas, being close to job markets.

<sup>103</sup> The complementary strategy also includes the first three options listed in this paragraph.

<sup>104</sup> It is recognized that good-quality, off-street public transport systems are a necessary but not sufficient condition for a “cleaner” modal split, even in cities with large “choice” markets. Ultimately, the street congestion needs stronger medicine, e.g. traffic restraint measures and, ultimately, congestion charges.

The cohort of projects reviewed for this paper actually included one operation dedicated entirely to air quality. This is the project done in Mexico City.<sup>105</sup> Why were there not many more such projects? Why is this approach not a part of the strategy? The answer is that, in essence, the Mexico City project is not a mainstream urban transport project. Though focused on transport vehicles, it has no other transport content. It is an environmental project that happened to be prepared by the Bank's urban transport staff. Many similar projects have been done by the Bank, in Mexico and elsewhere, but they are a part of the Bank's environmental strategy.<sup>106</sup>

Within the cohort of urban transport projects funded over the last 15 years, there is actually a "product line" focused on the environment. These are small-scale grants funded through the UN's Global Environmental Facility (GEF) and other emerging funding windows, to support policy and institutional developments relevant to climate change, and prepare specific investment projects for subsequent funding by the World Bank and diverse partners.<sup>107</sup> Interventions contained in GEF-funded projects match those listed in Box 7-6. The proliferation of this type of arrangements in Bank operations reflects both the growing importance of this subject matter and a welcome increase in partnering between the Bank and institutions with narrower concerns.

## 7.5 Expanding the core strategy

The core strategy, being derived from project experience, is backwards looking. The Bank experience has had its successes, but it would be difficult to substantiate the claim that it was a resounding success even referring to yesterday's transport-functional, social and environmental criteria. The claim would be even more difficult to maintain relative to as-yet vague, but probably much more severe criteria linked to global environmental sustainability. Even a simple comparison of the core strategy (and the project experience) with the full range of critical urban transport issues listed as building blocks for policies and institutions in Chapter 5 reveals that at least three major issues have not been tackled: urban transport funding, congestion management and land development. The first holds the key to traditional transport improvements, while the last two loom large on the sustainability agenda.

*Funding.* The essential and difficult nature of funding urban transport infrastructure, operations and services has been stressed elsewhere in this paper. The Bank's past projects, therefore also the core strategy, have stayed away from a genuine involvement in this matter, though some honorable mentions are in order.<sup>108</sup>

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<sup>105</sup> World Bank (1992).

<sup>106</sup> Since the environment is a major thematic concern of the World Bank, it has a separate institutional focus, but with many links to other thematic groups, such as water, agriculture, energy, urban and transport. In addition to the already cited document containing the Bank's environmental strategy (World Bank, 2001c), all the other thematic groups have their own take on the subject. The most recent document dealing with urban transport and environment is *Reducing Air Pollution from Urban Transport* (Gwilliam et al, 2004). Boundaries between thematic takes on the subject of environment are fuzzy. Fuel pricing and quality are addressed by several sectors, as are vehicle emission standards. This paper tries to stick to those aspects that are firmly established as being within the range of "normal" urban transport concerns.

<sup>107</sup> A GEF-funded urban transport project in Santiago (World Bank, 2003b) preceded the Santiago DPL highlighted in this paper, and paved the way for the latter's environment-friendly aspects.

<sup>108</sup> The Lagos project included an arrangement to provide the new transport authority with an assured stream of funds for road works for the duration of the loan, but did not (and probably could not) go the full distance of a stable and continuing arrangement in this matter. The effort to rationalize the funding of public transport services

Apart from the normal, non-dedicated, approach to government budgeting, which evidently does not work in most countries as far as urban transport is concerned, there are mainly four realistic ways to secure urban transport funding: (i) through a legislated link to fuel taxes, be it done nationally or locally; (ii) through a national program of grants and loans, fed from the budget; (iii) through land taxation; and (iv) through locally based road use (congestion) charges. No matter which approach—or combination of approaches—is adopted, it is imperative to address the funding issue in project development on routine basis.<sup>109</sup> A good place to start is to include the funding theme in each city- or country-based urban transport planning study that the Bank is involved in, within project preparation or project-funded activities, or within advisory assistance activities.

*Congestion management.* The core strategy places faith in traffic management measures to tame street congestion, and in the development of off-street public transport modes to escape congestion and attract some users to off-street modes.<sup>110</sup> Unfortunately, both of these have only limited use as congestion (and air quality) management tools. Modest-scale traffic control and road improvements in built-up areas can do very well in improving road network capacity to absorb traffic growth, but only up to a point. Major road construction in built up areas has been tried in many places. Ultimately, this has not “cured” congestion in central areas, and cannot be a part of Bank strategy—on a combination of functional, equity and environmental grounds. The approach featuring intermediate rapid transit public transport modes is constrained by the availability of at-grade space, be it taken from street traffic or from other uses. Money is another limitation. Many cities cannot afford even at-grade public transport systems, whether bus-based or LRT-based, much less metros.

There is only one other city-based approach that holds much promise for congestion management, in fact, promises a joint resolution of the funding and congestion issues. This is road (congestion) pricing. The subject was addressed and supported in each of the Bank’s urban transport policy and strategy reviews over the last 30 years, but never made it to an approved project.<sup>111</sup> The level of political support and technical skills required went well beyond that available in most places where the Bank has worked.<sup>112</sup> Now, after successful applications in European cities have multiplied, and climate change has passed from being a distant and uncertain threat to something much more real and imminent, it is time to renew the effort. As suggested with regard to funding, the way forward is to include road use pricing up-front in the Bank strategy, then start with building the analytic base, through studies for specific cities.

*Land development.* Given the likely acceleration of urbanization in India, China and many African countries, there is little doubt that land development patterns will be one of the pivotal parameters for transport demand and diverse environmental impacts. The hope lies in more compact and multi-use

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in the Budapest project, through a combination of fares and explicit-source subsidies, was also a limited effort. In the Santiago project, under incomparably more favorable circumstances than in either Budapest or Lagos, a weak clause was included that the government would consider direct road use charging if the revenue from the bus-based public transport sub-system could not cover costs. Favorable circumstances include the fact that bus operators receive no subsidy (at the current, low levels of service) and the metro covers more than direct operating costs from fare revenue.

<sup>109</sup> It is assumed here that all effort is exerted to ensure good performance of already-in-place activities to generate revenue and make expenditures.

<sup>110</sup> Raising the price of fuel is another way to manage congestion, but this is not a city-based instrument.

<sup>111</sup> It was tried in an aborted project in Kuala Lumpur in the 1980s.

<sup>112</sup> Witness the delicate way that the subject of congestion charges is approached in the Santiago Development Policy Loan, in a city with top-level technical expertise.

development. Hitherto, Bank-funded urban transport projects touched land development only in the context of designing integrated transport and land use studies, occasionally also helping create institutional links between transport and land use planners. How could this involvement be ratcheted upwards? If an urban transport investment was large and important enough to leverage a change in land related policies, which ones would one want to change? Probably land taxation first, but it is difficult to expect that any urban transport project would have sufficient “weight” to leverage such a major policy change. The matter is best left to more-inclusive urban projects. Likewise, it is not realistic to expect that urban transport projects could leverage joint land use and transport development *à la Curitiba* (if that were agreed as desirable in a given client city). What may be realistic is to look at land development regulations, such as density and lot size standards, that affect urban expansion and in-fill activities, thence transport demand patterns.<sup>113</sup> Some recent urban transport projects have included road investments in urban expansion areas (e.g. the Hanoi project reviewed above), using innovative design standards along the lines presented in the core strategy. If this is done on a large-enough scale, it may be possible to create a link from transport projects to land regulations.

In line with the preceding discussion, Box 7-7 summarizes the additions needed to strengthen the core strategy. Box 7-8 depicts the expanded strategy.

**Box 7-7. Additions to experience-based core strategy for urban transport**

**Objectives:**

- Manage congestion
- Reduce air pollution (local and global impacts on health and climate)
- Reduce inefficiencies in urban growth patterns;

**Policy initiatives:**

- An urban “complement” to national systems of road user charges;
- locally-based road use (congestion) charging;
- land regulatory policies affecting densities, lot sizes;

**Investments:** no change, but a possible increase in scale

**Institutions and instruments:**

- Urban transport funding studies
- Congestion pricing (background) studies
- Urban transport planning studies (and training) with strengthened land development content

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<sup>113</sup> Bertaud (2002)

**Box 7-8. The expanded core urban transport strategy****Objectives:**

- Improve performance of public transport (better services, reduced operating costs) and non-motorized modes to provide access for all and maintain/nurture competitiveness with individual motor vehicles;
- Increase equity and inclusiveness;
- Reduce environmental impacts;
- Increase safety;
- Increase efficiency/effectiveness of public expenditures;
- Reduce inefficiencies in urban growth patterns;

**Policies:**

- Deregulation of public-sector monopolies in the direction of for-market competition and re-regulation of the informal sector in the same direction;
- Reform of price/subsidy policies in urban public transport services;
- Re-allocation of street space to exclusive use of public transport vehicles and protection of non-motorized modes;
- Traffic restraint;
- Revision of road designs in both rehabilitation and network expansion projects that are friendly to public transport and non-motorized modes, and have positive impacts on land development;
- Parking charges;
- Locally-based road use (congestion) charges;
- Reform of national road use charging systems to fund urban transport;
- Land regulatory policies
- Introducing air quality management;

**Institutions and instruments:**

- Public transport regulatory authorities;
- Traffic management units and traffic police units
- Air quality management units;
- Urban transport authorities;
- Integrated urban transport and land use plans and strategies, with greater land development content;
- Transport funding studies
- Congestion pricing studies

**Investments:**

- Rehabilitation of existing public transport infrastructure (bus- and rail-based);
- Engine and vehicle replacement for existing public transport fleets and other investment needs of public operators;
- Infrastructure for (expansion of) intermediate and full-scale rapid transit systems (bus- and rail-based);
- Bike lanes; sidewalks, staircases, pedestrian-only areas;
- Traffic and parking control systems;
- Equipment related to traffic law enforcement;
- Air quality control equipment; emissions testing equipment;
- Road improvements at intersections, in corridors and central areas;
- Basic roads in expansion areas;
- Primary roads.



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## **ANNEX A: FACTORS AFFECTING TRAVEL DEMAND IN CITIES OF DEVELOPING COUNTRIES**

*Urbanization.* Between 1990 and 2003, the total urban population of the world increased by a third. It is forecast to pass the 50 percent mark in about 30 years and, in developing countries, to double over the same period. These trends involve a combination of natural population growth of urban residents, incorporation of hitherto rural settlements, and migration from the countryside.

Among the developing countries, Latin America is already heavily urbanized at 73 percent (Argentina 89 percent, Brazil 81 percent, Chile 87 percent), followed by Europe and Central Asia at 64 percent. The growth continues but at low rates (around 1 percent), and with large intra-urban variations, due to suburbanization of activities. China, where policies constraining internal migration were relaxed somewhat over the last 15 years, added almost 250 million people to its cities during this period, and is now almost 40 percent urbanized (World Bank, 2006). Another 300m city dwellers are expected in China over the next 15 years. The fastest rates of growth are in the least urbanized regions, in Asia and Africa, but also in smaller and medium-size cities of urbanized countries. Lagos is one extreme case, growing at 6 percent per annum. India is only 28 percent urbanized, but it is expected to add 250m urban residents in 20 years and already has several very large urban areas: Mumbai 14m; Delhi 11m; Chennai 7.5m; Bangalore 5.7m; and Kolkata 4.6m.

A special urbanization phenomenon is the development of mega-cities, in fact urban mega-regions, with populations of 10m and above, larger than most countries. The majority are in the developing world: Mexico City 25m; São Paulo about 20m; Lagos 13-15m; Cairo 12-15m; Rio de Janeiro 11m; and Bangkok 10m. Assisting such cities to become more productive, more livable and less polluted is equivalent to assisting entire countries in pursuit of such goals.

The rise of large cities is often followed by *decentralization*, involving a shift of powers, resources and responsibilities away from national governments to provinces/states and cities. This may be evident in legislative changes, or it may be a *de facto* practice waiting to be formalized.

Population increases are accompanied more than proportionally by spatial expansion. A tripling of the area within cities is forecast by 2030 (Angel et al, 2005). The push outward in Chinese cities follows the introduction of land markets, and is fed by rising incomes, motorization and the desire of local governments to lower core densities, reduce congestion and attract foreign investors. Shanghai, for example, doubled its size in the 1990s (Gakenheimer and Zegras, 2004). Expansion is also taking place in cities with little population growth, involving internal restructuring of residential and business activities made possible by the rise in motorization and incomes (e.g. Moscow, Warsaw and Budapest in the 1990s). A concurrent reduction in urban densities, especially in the form of sprawl, has major investment and operating cost implications for municipal infrastructure and services. By far the most troubling form of sprawl is that of informal communities at urban fringes, common in Latin America, Africa and South and South-East Asia, inhabited by the lowest-income citizens, typically the most recent migrants.

In terms of *economic activities*, the importance of cities leaps with increasing urbanization, output per capita being significantly higher in cities than in non-urban locations. For example, Budapest has 18 percent of Hungary's population and produces 35 percent of the national income; the numbers are 14.2 percent and 33.6 percent for Mexico City, 10.9 percent and 37.4 for Bangkok, 8.6 percent and 36.1 percent for São Paulo; and 4 percent and 20 percent for Addis Ababa. In terms of sheer size,

China's case is the most striking: the country's urbanization rate is 40 percent, while its urban sector contributes 80 percent of GDP.

The efficiency of cities in terms of infrastructure and services is therefore a major concern and priority from both a local and national point of view. Good intra-urban mobility, in particular, does not cause growth directly, but enables an urban economy to tap the benefits of proximity. This holds true for households, where transport means access to jobs and services; and for businesses, in terms of access to labor, suppliers and markets. Very large cities with low levels of mobility operate as a set of isolated communities and cannot reap the full economic agglomeration benefits.

*Urbanization of poverty* proceeds alongside economic, demographic and spatial growth of cities. On the whole, there is a well-established positive correlation between urbanization and incomes (Kessides, 2005). In many cases, though, newly generated urban wealth cannot match the population growth, especially when the latter is dominated by waves of rural migrants. Moreover, population growth sometimes proceeds in parallel with economic contraction. The highest incidence of urban poverty, 50-60 percent in Sub-Saharan Africa and Latin America, takes place at low or negative rates of economic growth and (mainly in Africa) at high urbanization rates. At the other extreme, the lowest incidence of urban poverty is in China (2 percent), helped by controlled migration to cities and a steady per annum GDP growth rate for 20 years of more than 8 percent.

An unusual case of a rise in urban poverty at low rates of urbanization occurred in Eastern Europe and the former Soviet Union. About 1990, as some countries in that region fragmented, and some went to war, various economic arrangements within the eastern block broke down. The region began a fitful transition towards market-based, liberal economies, leading to a severe and long-lasting contraction of economic output. The GDP fell for 7 consecutive years in Russia and 10 years in Ukraine. In 2001, Russia's GDP was 65 percent of its 1989 level, and Ukraine's was just above 40 percent. The incidence of urban poverty at present varies between 10 percent and 25 percent, depending on the depth of the recession, recovery patterns, and wage and employment policies (World Bank, 2006b).

*Motorization*, a term combining the ownership and use of motor vehicles, is on the rise in developing countries, especially in cities, especially in large cities. It is driven by economic, demographic and spatial urban growth. Car ownership rates in these cities are still modest relative to those seen in higher-income countries, and rarely exceed 100 cars per 1,000 people in most cities, and 200 cars per 1,000 people in large cities.<sup>114</sup> Countrywide data indicate that, on the whole, these rates tend to follow per capita income growth, but with large deviations (Willoughby, 2000). Each "outlier" case is of interest, but the rise of motorization at low, even negative levels of economic growth poses the most difficult policy and investment problems. An extreme case is Moscow, where car ownership increased by 250 percent during the 1991-98 period, concurrent with a severe economic downturn that surpassed even that of the Great Depression. At the end of that period, motorization in Moscow reached a level of 190 cars per 1,000 people, imposing a heavy load on the road network where public transport carried 80-90 percent of passenger trips.<sup>115</sup> At the other extreme, Singapore and Hong Kong, both high-income cities, have low ownership rates: 100 and 50 cars per 1,000 population, respectively. Both cities are known for their extensive, multi-modal public transport networks, and

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<sup>114</sup>The motorization rate is about 300 cars per 1,000 people in São Paulo and 250 in Bangkok. Compare to 300-500 cars per 1,000 people in Western European cities and 700-800 in the US.

<sup>115</sup> Compare Beijing at about 100 cars per 1,000 people; other Chinese cities are much below 50 cars per 1,000 people. In sharp contrast to Russia's experience, China's GDP grew at an average annual rate of 8.2% in the 1980-2002 period (World Bank 2005)

profitable services, though they also have extensive and high-quality road networks. Singapore is also known for pioneering a system of restraints on car ownership and use.<sup>116</sup>

The rates of car ownership cited above are relevant for those countries and cities where motorization is car-based and largely a middle- and higher-income phenomenon. In Asia, especially India, Vietnam, and some Chinese cities, with a strong tradition of bicycle riding, motorization is led by motorcycle-buying. It therefore penetrates much deeper into the lower-income population. In Chennai (7.5m population), for example, of the 1.5m vehicles, 1.1m are two-wheelers and only 0.25m are cars; the proportions in Bangalore are almost the same (Mitric, 2004). In Ho Chi Minh City, 80-90 percent of households had at least one motorcycle (1996 data collected by MVA Consultants cited by Barter, 1998).

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<sup>116</sup> High vehicle ownership does not necessarily mean a high vehicle use. Cities at similar levels of vehicle ownership can have quite different modal split patterns.





## **ANNEX B: MANIFESTATIONS OF THE TRANSPORT PROBLEM**

A simple depiction of the urban transport problem is when demand in terms of desired trips by various travelers and shippers, using diverse transport modes, collides with an urban transport system whose physical size and structure, operational features, and services are not adequate for that load, are not provided efficiently, or are too expensive. The results may be seen as falling into four main categories: (i) congestion-related deficiencies; (ii) other cost and service problems; (iii) inequities and exclusion; and (iv) negative side effects, notably degradation of the environment, traffic accidents, and land consumption.

Service deficiencies due to congestion, from traveler/shipper point of view involve excessive waiting and travel times (average and deviations), poor comfort and convenience, high vehicle operating costs on the road network and high fares on public transport modes.<sup>117</sup> Persistent congestion reduces city efficiency, in terms of production and transaction costs for businesses, and—in more comprehensive life terms—from the point of view of households. Also, from a supra-urban point of view, cities are nodes in national transport networks. Likewise, in an era of growing international trade, many cities are gateways through which their countries exchange goods, people and information with the world. Urban transport congestion therefore may become a constraint to economic growth, making city and national products less competitive, and the city (even the country) itself a less desirable location for new economic activities.

Non-congestion deficiencies can be viewed also in terms of excessive cost and/or poor services, but their source lies deeper in the system that delivers transport infrastructure and services. For example, total costs per place-km of transport services may be too high, or service quality too low, because the operator has no incentive to be more efficient and effective. Depending on how operations are financed, this may become a problem of affordability to travelers (when fares cover costs) or affordability to the public treasury, (when the services are subsidized). Another significant case involves over-investment or uneconomic investment in large-scale urban roads or rapid transit facilities. This is even more damaging than operating inefficiencies, since it typically involves irreversible decisions and high opportunity costs.

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<sup>117</sup> It is common to describe congestion in terms of general traffic travel speeds or intersection delays, rather than use traveler-oriented indicators. For example, speeds in central areas can be cited to have fallen under 15 km/h (or some similar number), without clarifying how this information was gathered or its significance to various types of travelers. This flaw is inherited from a time when the attention of transport planners was focused on the road supply side (infrastructure and services) and data were collected not as a part of demand-side diagnostic efforts, but as inputs for transport model calibration and forecasting. The profession has yet to settle on good demand-oriented indicators for urban road networks. A slightly better set of measures are available for public transport services, i.e. access times or distances, service headways (related to waiting times), commercial speeds, hours of service, and fare schedules, all or most of which are available from (formal) operators. Altogether, meaningful and reliable diagnostic data needed to assess the performance of urban transport systems are scarce in developing countries. This lack is an obstacle to strategy, project identification and analysis. Considerable efforts and funds will have to be used to correct this.

Transport inequity refers to situations where some groups, defined by income, gender, age, physical handicap and/or as captives of a specific transport mode are not well served by the urban transport system, making it difficult or costly for them to find and hold jobs, get to school or medical facilities, go shopping, get government services and recreate. The most common example is the road infrastructure inside and/or leading to peripherally located low-income communities, and public transport services that serve them—inclusive of route networks, schedules, fares and fare structures. A different form of inequity involves insufficient or poorly equipped street space for the use of pedestrians and other non-motorized transport modes. This is a failure of truly grand proportions. Walking—the most basic urban transport mode for all short-to-medium length trips— as well as bicycling and bicycle-derived modes play an essential role in urban transport in most low- and middle-income countries of the world. For people on the lowest rung of the income ladder, walking and bicycling may mean survival. In countries like China and India, until very recently, walking and bicycling were principal transport modes for the majority of the population. In an entirely different dimension—the quality of urban air—a shift to non-motorized modes is always a net gain. Without continuous, good-quality, all-season and secure infrastructure networks, people face great risks in walking and bicycle travel. Despite these facts, the interests of non-motorized travelers tend to be systematically neglected in investment programs, infrastructure maintenance and traffic management. Apart from the all too real pressure of motorization, and the overwhelming objective of serving carriers of economic growth, the fault lies in the pro-motorization bias common to transport planning techniques, developed in the highly industrialized countries.

Exclusion is simply an extreme form of inequity, arising when transport services and infrastructure are so expensive, inconvenient or absent that the desired travel is not made at all, or is made less frequently than needed or desired. A different form of exclusion arises in the context of preparation and decision-making for policies, programs and investments. Barriers to public participation apply not only to low-income groups but to urban populations at large.

Adverse side effects include air and noise pollution; death, injury and property destruction due to traffic accidents; and land consumption.

Air pollution from motor vehicles, in local terms, is damaging to human health, natural resources (e.g. vegetation), buildings and the overall quality of life. It may lead to disabilities, behavioral change and premature death. The main pollutants in this category are lead, small particulate matter, carbon monoxide and ozone. In global terms, greenhouse gas emissions (carbon-dioxide, nitrous oxide and others), some produced in vehicle manufacture and others in operations, contribute to climate changes. It is estimated that 0.5m to 1m people die each year because of respiratory and other illnesses caused or aggravated by vehicle-generated pollution, imposing an economic cost of up to 2 percent of GDP in some countries, and up to 10 percent in the most heavily polluted cities (World Bank, 2002a and 2004). Potential economic costs from greenhouse gas emissions are forecast to be in the order of 5-9 percent of GDP in developing countries. Emissions depend on an array of vehicle and fuel characteristics, both in manufacture and use, and also on traffic flow parameters, such as composition by vehicle type, speeds and stopped delays. Low-income households tend to be the most vulnerable to air pollution because of where and how they live, but also most vulnerable to economic impacts of measures taken to reduce it, e.g. fuel quality requirements, emission controls, and fuel taxes.

*Urban traffic accidents* in client countries involve about 0.5m deaths and up to 15m people injured each year (World Bank, 2002a). A direct economic cost of these accidents (excluding grief and suffering) is estimated at 1-2 percent of these countries' GDP. In a worldwide ranking of causes of

death, road traffic accidents rank ninth and are on the rise. The makeup of victim categories varies between countries and cities, but a common feature is that the most endangered are pedestrians, bicycle and motorcycle riders, the young and the elderly, and passengers of public transport modes. Low-income people commonly account for the majority of users of these modes. Low traffic safety is related to road design features (absence of sidewalks and protected street crossings), road maintenance, traffic management (control of passage at intersections, presence of parked vehicles), mechanical state of vehicles, behavior, traffic flow features, and the presence or absence of law enforcement activities.

*Land consumption* as a problem does not arise directly from short-term interaction between transport demands and the supplied infrastructure and services, but from location decisions made over the longer-term by businesses, developers and households. Location decisions in turn depend on the degrees of (market) freedom allowed by land regulations and taxation, and the enforcement capacity. Poorly designed regulations, in terms of minimum lot sizes and maximum floor-to-base ratios, tend to produce inefficient development patterns, including an outward push. All other things being equal, patterns emerging in an urban area with an unstructured and congested arterial transport system are likely to be of the sprawl type. As such, they are difficult to serve by public transport, and lead to “leap-frogging” of closer-in parcels and an excessive take of agricultural land.