



Megacity Challenges

A stakeholder perspective

A research project conducted by GlobeScan and MRC McLean Hazel
Sponsored by Siemens



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Megacity Challenges

At some point in 2007, humanity will reach a significant demographic milestone: for the first time in history more people will live in cities than the countryside, according to predictions by the United Nations. By 2030, over 60% of people will live in cities. The growth rate is particularly rapid in many of the so-called megacities, cities with more than 10 million inhabitants. The megacities listed by the UN already have a total population of around 280 million. They are increasingly the growth engines of their respective national economies. But as these cities and economies grow, so do the challenges. One key issue is the burden that growth is placing on urban infrastructures.

Urban residents the world over want — and deserve — a good quality of life. They need good air to breathe, good water to drink and reliable electricity to power their lives. People need healthcare. They also need to be mobile — so transportation systems must be capable of transporting millions of people while putting as little strain as possible on the environment and city budgets. In other words, a good quality of life requires a well-functioning infrastructure. Moreover, an effective infrastructure in turn

contributes to economic prosperity, further improving quality of life. Unfortunately, the infrastructure in many cities lags behind the population’s needs — a major challenge for city governments in both emerging and industrialized nations.

This report summarizes the key findings of a unique global research project undertaken by two independent research organizations with the support of Siemens, the infrastructure provider. The goal of the project was to carry out research at the individual megacity level to gather objective data as well as perspectives from mayors, city administrators and other experts on local infrastructure challenges. Over 500 public- and private-sector experts from 25 cities were interviewed for this purpose.

The result is a fascinating and, we hope, useful picture of how challenges are prioritized and what infrastructure solutions are best able to improve the local economy, environment and quality of life of megacities.

We hope you enjoy reading the report!
*Prof. George Hazel, OBE,
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New York City



Key findings

- **Megacities prioritize economic competitiveness and employment**
- **The environment matters, but may be sacrificed for growth**
- **Transport overtakes all other infrastructure concerns**
- **Better governance is a vital step towards better cities**
- **Holistic solutions are desired but difficult to achieve**
- **Cities will seek to improve services, but could do more to manage demand**
- **Technology will help deliver transparency and efficiency**
- **The private sector has a role to play in increasing efficiency**

Key Findings



2007 will be the year that, for the first time in history, more people will live in cities than in the country. For many, it is the megacity that symbolizes everything that is inspiring and troubling about this era of rapid urbanization.

Today's megacities are home to almost one in ten of the world's urban population. Like all great metropolises before them, these megacities act as magnets for trade, culture, knowl-

edge and industry, but on an unprecedented scale. In varying forms, they all face hugely complex social and environmental challenges. Achieving the opportunities for human and economic development that megacities afford, while improving their many problems, will require the development of innovative infrastructure solutions and new approaches to metropolitan governance.

This report explores the key challenges and

trends that will shape urban development in 25 global cities over the coming years. The findings are based on an in-depth survey of over 500 megacity stakeholders, including elected officials, public- and private-sector employees, and influencers such as academics, NGOs and media. This survey was supplemented with extensive secondary research, enabling us to shed light on the key challenges faced by global cities at various stages of development.



Key findings of the research include the following.

Megacities prioritize economic competitiveness and employment. When asked which issues drive decision-making, 81% of stakeholders involved in city management cite the importance of the economy and employment. There is a strong focus on creating jobs, with unemployment emerging as the top economic challenge for survey respondents from Emerging and Transitional cities. Competitiveness in the global economy is another important consideration. Six in ten stakeholders think that their cities place a high importance on making themselves competitive to attract private investment when deciding on infrastructure issues.

The environment matters, but may be sacrificed for growth. Stakeholders throughout the survey place a high importance on environmental issues. They see air pollution as the most significant environmental challenge, followed by congestion issues. Six in ten stakeholders believe their city's leadership recognizes the vital role that infrastructure decisions can play in protecting the environment. Environmental issues also feature prominently in the thinking of the infrastructure specialists in the survey: those in transport predict an emphasis on mass transit solutions, and those in the energy sector show a strong inclination for solutions based on renewables. But if a choice has to be made between the environment and economic growth, it is the latter that often wins out. This is particularly so in the developing world, where 55% of stakeholders predict that their cities will sacrifice environmental considerations for the sake of increased capacity, compared with only 14% respondents in Mature cities who believe that this will happen.

Transport overtakes all other infrastructure concerns. Transportation emerges as



the top megacity infrastructure challenge by a large margin. It is the one infrastructure area that stakeholders believe has the biggest impact on city competitiveness. They are also highly aware of its environmental impact (for example, air pollution) and are keen to move to greener mass transit solutions. It is not surprising therefore to find that transport also emerges as the top priority for investment. Stakeholders acknowledge that the four other infrastructure sectors covered by this study – water, electricity, healthcare and safety & security — are also in need of investment. Interestingly, they are less likely to see a strong link between spending in these areas and improved competitiveness, despite the fact that each has an important impact on the overall attractiveness of the city for investment.

Better governance is a vital step towards better cities. With so many areas crying out for investment in better infrastructure, it is not surprising that funding emerges as a big issue for many stakeholders in the survey. But for those involved in city management, it is improvements to governance — rather than just money — that are the top priority going forward. Over half of respondents with knowledge of urban management see improved planning as the priority to solving city problems, compared with only 12% that prioritize increased funding. In addition to more strategic planning, there is also a strong focus on managing infrastructure and services more efficiently. Both these goals will require cities to make the step from passive administration of existing services, to a more active style of managing systems that focuses on improved efficiency and more measurable outcomes.

Holistic solutions are desired, but are difficult to achieve. The main barriers to strategic management are poor coordination between

the different levels of municipal government, together with a lack of strong leadership, according to the survey. Stakeholders express a clear desire for a more holistic approach to city management, but this is rarely the reality today. Many megacities have a multitude of administrative bodies with overlapping and poorly defined responsibilities, which inevitably saps efficiency and makes strategic planning difficult. Governance structures need to balance the needs of the city with the wider metropolitan area, and also take into account the interdependencies between the various infrastructures (water and healthcare, for example). Cities and their needs are complex and the traditional, departmentally organized approach to city governance needs to be rethought to enable more holistic solutions on the one hand, and more responsiveness and accountability to citizens at a local level on the other.

Cities will seek to improve services, but could do more to manage demand. Faced by huge pressures on public services, cities tend to emphasize direct and immediate supply-side solutions. This does not always mean adding more capacity: in many cases stakeholders emphasize the need to increase the efficiency of existing infrastructure over building new roads, railways, hospitals and so on. By contrast, although it gets mentioned by a minority of respondents, demand management never emerges as a priority. Demand management approaches have been advocated in a variety of areas, but even the specialists in specific infrastructure sectors do not see managing demand as the primary solution to their challenges. Yet with consumption consistently outstripping supply in many cities and infrastructure areas, there is a strong case for the wider adoption of demand management strategies on a global basis. In

this context, the proper pricing of services could be a step forward.

Technology will help to deliver transparency and efficiency. Technology can help city governments in two major ways: by making them more efficient, and more accountable to their citizens. Eight in ten respondents think that their city will increasingly integrate advanced information technology into their administration and operations over the next five years. Moreover, city management specialists predict a strong emphasis on digitalization or e-government rather than on recruiting more staff (64% to 36%). Furthermore the value of technology is not restricted to rich cities. Cash-strapped Emerging cities place almost as much importance on e-government and digitalization as those in Transitional and Mature cities.

The private sector has a role to play in increasing efficiency. The stakeholder survey provides a mixed picture on attitudes to privatization. Most respondents predict strong public ownership and control of infrastructure sectors and services. However, the majority of stakeholders also say that they are open to public-private partnerships (PPPs). Private-sector respondents are naturally the biggest enthusiasts, but more than 70% of public-sector and elected respondents view PPPs as a viable means to implement infrastructure solutions and more than 60% believe that privatization of infrastructure would increase its efficiency. Again, it turns out that efficiency, rather than just funding, is the main perceived advantage of moving towards greater participation from the private sector. But even where cities move towards the private operation of services to improve efficiency, they want to retain strong public leadership and control.



Infrastructure highlights

Transportation: More action needed to manage demand

Congestion costs are huge for the megacity economy and environment. But despite some success with congestion charging schemes in several cities, the idea of road pricing has yet to become a major focus for city stakeholders around the world. Page 26

Electricity: Strong focus on renewables

With demand again outstripping supply, there is an emphasis on allowing electricity to be priced by the market rather than subsidized. Specialists in this sector also display a strong appetite for renewable fuels, but it is likely that surging demand will lead many growing cities to continue to rely primarily on cheaper fossil fuels in the near future. Page 32

Water and waste water: Still fighting for attention?

In many megacities, large sections of the population live without access to clean water or basic sanitation. Research indicates that the economic, not to mention social, costs of a failure to address this problem are significant.

But only 3% of stakeholders cite water as the major contributor to growth and competitiveness. Page 38

Healthcare: Increased spending must be combined with better management

Our survey indicates an emphasis on more efficiency, delivered through common shared healthcare infrastructure, ahead of simply building more facilities. Preventative approaches are desired, but external factors are sometimes overlooked: no healthcare stakeholder mentions water quality as a major issue even in Emerging cities, indicating the lack of a more holistic view to problem solving. Page 44

Safety & Security: Organized crime is a bigger threat than terrorism

Organized crime is the biggest security challenge for megacities, and is cited as such by twice as many stakeholders as those who mention terrorism, the second most prominent issue. Interestingly, surveillance is emphasized well ahead of concerns for privacy. Page 50



About this report

This report looks at the challenges facing megacities in city management and five critical infrastructure sectors: Transportation, Electricity, Water and Waste Water, Healthcare, and Safety and Security.

The conclusions are based on a survey of 522 stakeholders spread across 25 cities. Stakeholders were divided into four groups:

Elected political leaders (described in this report as electeds).

Employees of the municipality (employees).

Private sector infrastructure providers, construction company managers, and financiers (privates).

People who are in roles that influence infrastructure decision makers such as thought leaders, academics, NGOs, and media (influencers).

The survey included general questions on megacity issues that were addressed to all 522 respondents. More detailed sections on specific areas (ie. the five infrastructure sectors as well as city management and finance) were addressed to those respondents with the most relevant knowledge and experience. For the latter, we use the terms specialist or stakeholder (as in transport stakeholder, or city management specialist) as convenient shorthand throughout this report. Sample sizes range from 124 in transportation to 72 in electricity. To understand the different challenges and issues facing megacities at different levels of development, the research analyzes three categories of city: Emerging cities, Transitional cities and Mature cities. Although every city is unique, those in each of these archetypes share many characteristics and face many similar problems. Throughout this report, we highlight challenges and priorities for each of the megacity archetypes, as well as key areas where action is needed to enable cities to balance competitiveness with quality of life and environmental sustainability.

Cities surveyed

City	Country	2003 Population in Mio.	2015 Population in Mio.	Area in km ²	Share of GDP in %
Tokyo	Japan	35.0	36.2	13100	40
New York	USA	21.2	22.8	10768	<10
Seoul-Inchon	South Korea	20.3	24.7	4400	50
Mexico-City	Mexico	18.7	20.6	4600	40
São Paulo	Brasil	17.9	20.0	4800	25
Mumbai	India	17.4	22.6	4350	15
Los Angeles	USA	16.4	17.6	14000	<10
Delhi	India	14.1	20.9	1500	<5
Manila-Quezon	Philippines	13.9	16.8	2200	30
Calcutta	India	13.8	16.8	1400	<10
Buenos Aires	Argentina	13.0	14.6	3900	45
Shanghai	China	12.8	12.7	1600	<10
Jakarta	Indonesia	12.3	17.5	1600	30
Dhaka	Bangladesh	11.6	17.9	1500	60
Rio de Janeiro	Brasil	11.2	12.4	2400	15
Karachi	Pakistan	11.1	16.2	1200	20
Ruhr Area	Germany	11.1	11.1	9800	15
Cairo	Egypt	10.8	13.1	1400	50
Beijing	China	10.8	11.1	1400	<5
Lagos	Nigeria	10.7	17.0	1100	30
Moscow	Russian Fed.	10.5	10.9	1100	20
Paris	France	9.8	10.0	2600	30
Istanbul	Turkey	9.4	11.3	2650	25
Chicago	USA	9.2	10.0	8000	<5
London	Great Britain	7.6	7.6	1600	15

Source: Munich Re, 2005

Mumbai



Key findings

- **The number of megacities has multiplied over the past 50 years, to the extent that they now provide a home to 9% of the world's urban population**
- **Their importance in the national and global economy is disproportionately high**
- **City governance is having to adapt to the challenge of delivering holistic solutions across vast metropolitan regions**
- **City managers must strike the balance between three overriding concerns: Economic competitiveness, environment and quality of life for urban residents**

Megacity Challenges



The rise of the megacity often divides observers between wonder and consternation. On one level, these super-sized cities are seen as the engines of the global economy, efficiently connecting the flow of goods, people, culture and knowledge. They offer, at least potentially, unprecedented concentrations of skills and technical resources that can bring increased wealth and improved quality of life to vast numbers of people.

But megacities also conjure up an altogether darker vision. All the cities covered by this research face huge challenges ranging from congestion and pollution to security threats and inadequate services groaning under the weight of excessive demand. Those



in the developing world also struggle to cope with the rapid growth of informal settlements. Today almost one in three of the world's urban population lives in slums, without access to good housing or basic services, according to UN-HABITAT's 2006 State of the World's Cities report.

At one level or another, all of the stakeholders surveyed as part of our research must deal with this dual reality on a daily basis. In their own areas, they hold significant responsibility for overcoming the multitude of challenges that, to greater or lesser degrees, confront the 25 megacities covered by this report. Many of them are also tasked with delivering the solutions and services that will enable their cities to compete in a globally connected economy.

This report looks at how stakeholders will balance these demands in three major areas:

namely economic competitiveness; quality of life; and the environment.

The following sections look at the key challenges faced by cities at different stages of development. We reveal the overall priorities for stakeholders in a world where resources are all too finite. The research also sheds light on trends and strategies in five critical areas of infrastructure — transportation, electricity, water, healthcare and safety & security — as well as through new approaches to metropolitan governance.

Megacities have been described as the urban phenomenon of the 21st century. Their unprecedented size and complexity, and their critical role as gateways in the global economy, pose huge challenges for sustainable urban development. We hope that this report stimulates new thinking on the solutions required to meet the Megacity challenge.



Mega-growth, mega-complexity

The megacity is a relatively new form of urban development. In 1950, there were only two cities with populations of over 10 million: New York and Tokyo. By 1975, two more locations, Shanghai and Mexico City, joined the club. But by 2004, the number of megacities had rocketed to 22* and, together, these cities now account for 9% of the world's urban population.

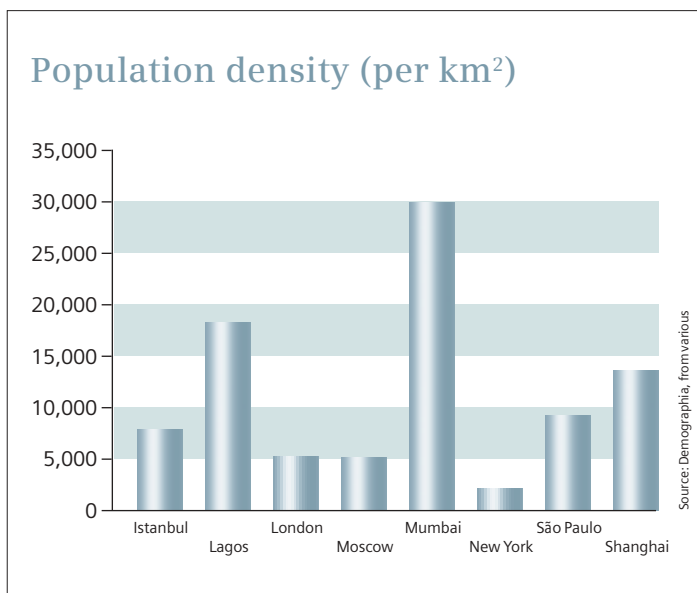
Urban growth is spread unequally around the world, and the same is true of its largest cities. Most of the megacities in the developed world are growing slowly, if at all. Tokyo remains the largest with 35 million inhabitants, but the fastest growth will be in the developing world (particularly in Asia and

Africa), placing huge pressure on infrastructure in those locations. By 2020 Mumbai, Delhi, Mexico City, São Paulo, Dhaka, Jakarta and Lagos will each have populations of over 20 million. For many Emerging cities, soaring populations are extremely difficult to manage: at current rates of growth, the number of inhabitants in Nigeria's Lagos will double by 2020, mainly through expansion of informal settlements. By contrast, most Mature cities (as well as many Transitional ones) will need to address a different kind of demographic challenge in the form of population ageing.

Today's megacities are not only bigger than the cities of the mid-20th century, they are also more complex. For one, they are

increasingly competing with, and dependent on, relationships with other cities in the global economy. At the same time, we are witnessing the emergence of new city regions — sprawling conurbations that extend far beyond the boundaries of a single city. Examples include the “BosWash stretch” (extending from Boston, MA to Washington, DC) in the US, and Chongqing in China.

These huge megacity regions create a new urban dynamic. Commuters travel large distances from densely populated suburbs. Economic activity frequently becomes deconcentrated, dissipating from the center to the periphery. Often fragmented systems of metropolitan governance have not caught up with this trend, with the result that it is difficult to deliver an efficient, holistic approach to infrastructure challenges at a metro-regional level.

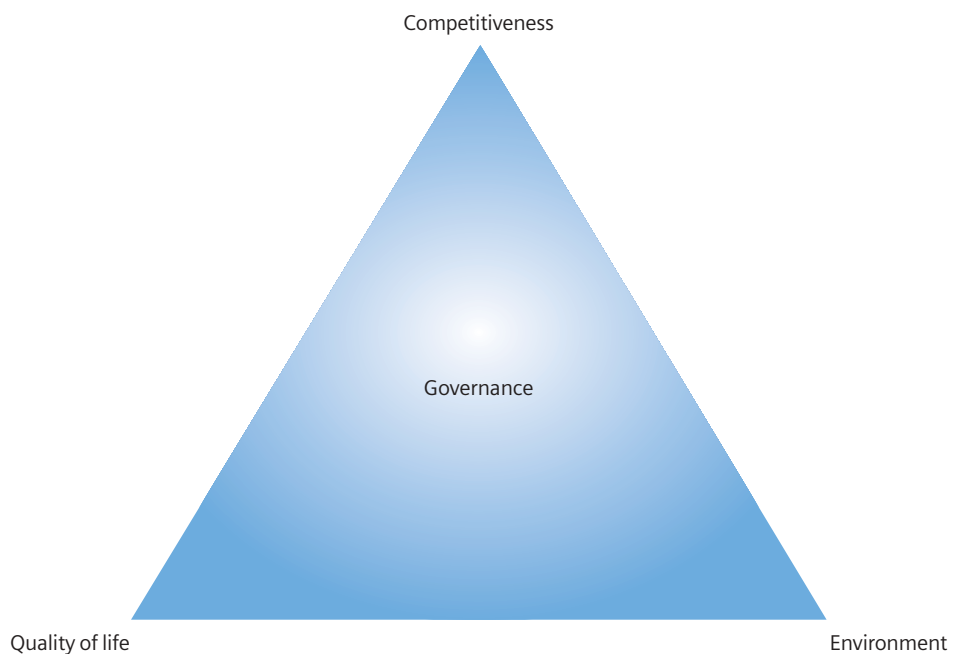


* According to UN definition of megacity



Striking a balance

In megacities, the complexity of building and maintaining infrastructures, and of meeting the needs of a huge and often growing urban population, reaches new levels. As they seek to address that challenge, those involved in the delivery of services and solutions must balance three overriding concerns.



Competitiveness

Megacities are the gateways of globalization, driving the flow of people, goods, knowledge, and money around the world. Already, one-fifth of the world's GDP is generated in the ten economically most important cities. Megacities also make a disproportionately large contribution to economic growth at a national level. According to a Munich Re study, Tokyo accounts for 28% of the Japanese population, but 40% of the country's GDP. Paris is home to 16% of the French population, but is responsible for 30% of its GDP. In the developing world, Lagos is home to 8% of Nigeria's population but contributes 30% of the country's output. In OECD countries, most

metropolitan regions have a higher GDP per capita than their national average, higher labor productivity levels, and many of them tend to have faster growth rates than their countries.

Given their weight in their respective national economies, the ability of these megacities to compete at a global level is paramount. To attract investment, these cities need modern, efficient infrastructures. Transportation is an obvious case in point, and megacity mayors are eager to improve often overloaded road and rail networks, ports and airports. Abundant (and preferably skilled) labor together with modern IT and communications technologies

are also hugely important, as evidenced by the offshoring trend that has itself fuelled the growth of cities like Bangalore in India. Another crucial (although sometimes less obvious) factor is the quality of basic services: people with access to quality housing, education and good basic services such as water and electricity are much more likely to fulfill their potential and contribute to economic growth. The wider business environment is also a key factor: research from the Economist Intelligence Unit indicates that clear, business-friendly policies and regulations is a more important factor in attracting international investment than incentives such as subsidies and tax breaks*.



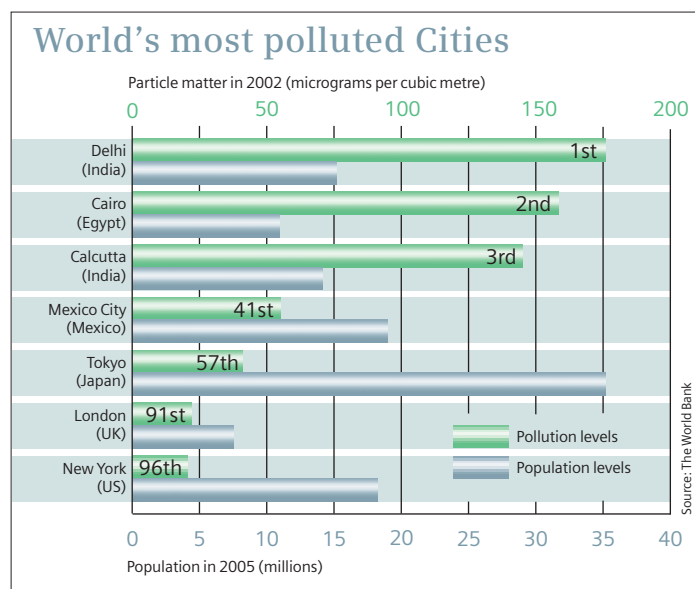
Environment

It would be wrong to assume that megacity growth is automatically bad for the environment. It is obvious that a city with 20 million people will have a large environmental impact, but it is less clear whether that impact is bigger than if the same number of people lived rurally. Certainly there are those who argue that clean, modern cities, where dense living enables resources to be consumed efficiently, provide an environmentally sustainable model for the future.

Whatever their potential, however, many of today's megacities feature a catalogue of environmental problems. Congestion, air and water pollution, waste management and degradation of green areas are familiar issues in most large cities around the world, and are particularly extreme in the megacities of the developing world. In London and Tokyo, for

example, air quality has improved over the last 50 years. In Shanghai and Kuala Lumpur, it has gone down.

Historically, cities tend to get rich first, then clean up later. Unfortunately that approach could be disastrous in the context of climate change: this is one reason for the growing focus on sustainable urban development. Sustainable solutions promote greater use of alternative energy sources and more energy-efficient buildings and transport, measures to combat congestion and CO₂ emissions, water and waste recycling, and the use of vegetation to filter pollution and capture carbon dioxide. While several cities have started implementing at least some of these measures to good effect, there will be a need for more concerted efforts if the environmental cost of urbanization is to be reduced.





São Paulo

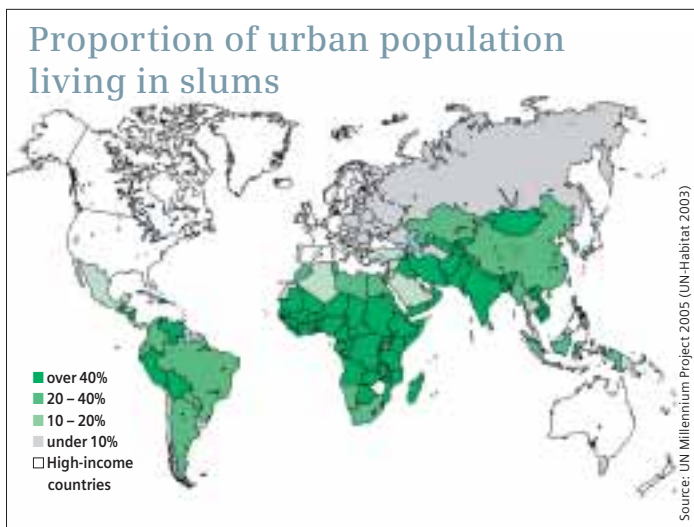
Quality of Life

Megacities may be engines of economic growth, but they feature huge inequalities in the distribution of wealth and economic opportunity. In its recent report on urbanization trends, UN-HABITAT describes cities as “the new locus of poverty”. World Bank estimates predict that while rural areas are currently home to a majority of the world’s poor, by 2035 cities will become the predominant locations of poverty.

The consequences of a failure to improve quality of life for the urban poor are huge. The UN-HABITAT research indicates that people living in slums, where a large proportion of the urban poor reside, are more likely to be affected by child mortality and acute respiratory illnesses and water-borne diseases than their non-slum counterparts. They are also more likely to live near hazardous locations, making them more vulnerable to natural disasters such as floods. Inadequate access to basic services saddles them “with heavy health and social burdens, which ultimately

affect their productivity”.* Poverty may be less extreme in the more developed cities, but social problems still abound. The OECD’s report on competitive cities notes increased socio-economic inequalities even in some of its most dynamic metropolitan regions. It points to large and persistent pockets of unemployment: about one-third of the 78 metropolitan regions covered in the OECD report have above average national unemployment rates, and between 7-25% of populations live in deprived neighborhoods that often have reduced access to public infrastructure and services. The report concludes that poverty and social exclusion lead to significant costs including high levels of criminality (on average 30% higher in urban areas than the national level). Failure to address these inequalities risks making megacities centers of deprivation and instability with a consequent negative effect on their economy.

Development decisions are often seen in terms of difficult trade-offs between growth and greenness, or growth and quality of life. But there are obvious interdependencies between the three concerns. Competitive cities are more likely to have the wealth and resources to invest in high-quality infrastructure and services, and to create economic and social opportunities for large numbers of the urban population. All things being equal, environmentally clean, modern cities create more attractive locations for a broad spectrum of business activities than those with heavy pollution. Equally, cities with a healthy, well-educated urban population are better positioned to attract investment than those where deprivation and inequality blocks large swathes of the population from participating in economic growth. This suggests that, in the long run, focusing on one of these concerns to the detriment of the others will be a recipe for failure.





Three City Archetypes

As is clear from the research, each megacity has its own unique issues that require specific, local solutions. Nevertheless, cities at similar stages of economic and social development face a number of common challenges. With this in mind, we have identified three basic “archetypes”: Emerging cities, Transitional cities and Mature cities, depending on their stage of economic and social development.

Emerging Cities: Emerging megacities tend to be characterized by high growth rates driven by migration and natural growth, much of which occurs in informal settlements not served by the installed base of infrastructure and services. Annual growth rates are on the order of between 3% and 6%. A 3.5% growth rate implies a doubling of population in 20 years. Emerging cities are typically in countries with urban populations of less than 50%.

Populations tend to be younger and more male, with a high proportion of poorly educated rural migrants. Social polarity, and the gaps in wealth, health, education, and political power between groups is generally highest in Emerging cities.

Transitional Cities: Transitional megacities have often developed mechanisms to more effectively manage dynamic growth, and may be seeing a slowing of annual growth rates. Continued population growth stems largely from migration, with lower natural population increases; several of these cities are seeing the first signs of an ageing population. Growth rates are typically of the order of 2%-3% per annum and Transitional cities are often in countries that are more than 50% urbanized. Transitional cities have similar infrastructure challenges as compared with Emerging cities but are better able to respond financially and

organizationally. Increasing affluence in these cities places additional new demands on infrastructure as growth in demand for transportation, water, energy, and services often greatly outpaces population growth.

Mature Cities: Mature megacities have much slower growth rates than both Emerging and Transitional megacities, at around 1% on average. In some of these cities, the population has stagnated or is shrinking. Mature megacities also have older population profiles. They exist in countries that are typically around 75% urban. Mature megacities have built out their basic infrastructure to serve their populations one or two generations ago. With high-quality infrastructure in place the challenge has shifted to coping with the need for renewal of ageing systems or to dealing with obsolescence where the installed infrastructure no longer meets regulatory requirements or changing service expectations. The other, growing, focus of Mature megacities is responding to the increased and changing demands for services of all types posed by their ageing populations.

Moscow



Key findings

- **Unemployment is the top economic challenge**
- **Air pollution and congestion are the principle environmental concerns**
- **Stakeholders see transportation as the main infrastructure issue and the top priority for investment**
- **Most stakeholders are optimistic that they can solve city challenges, although influencers in the survey are more skeptical**

Stakeholder Priorities



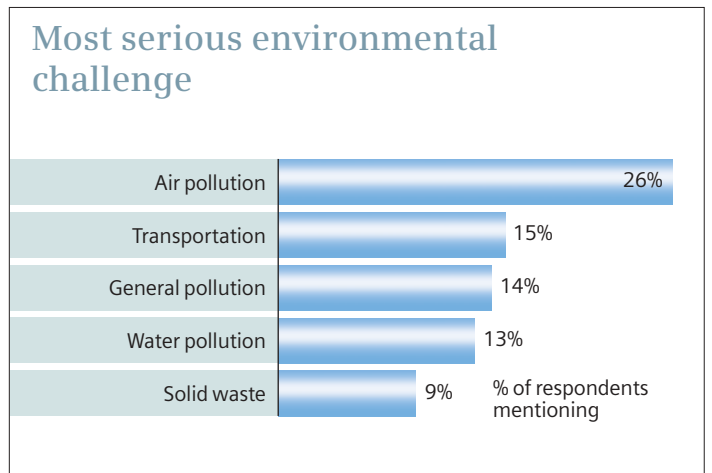
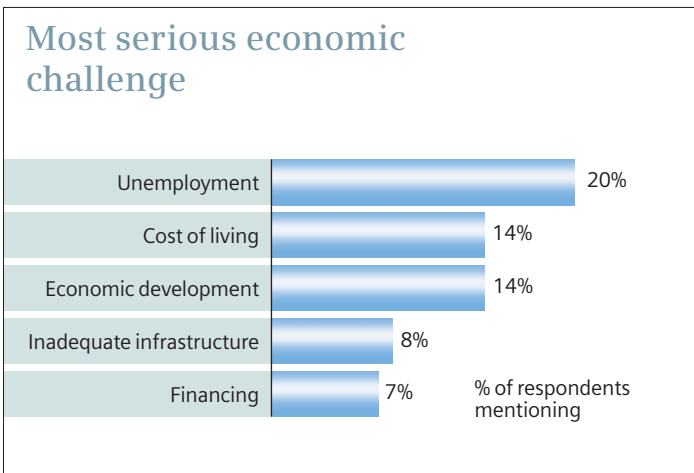
Huge cities create huge challenges, yet the money and resources to address them are distinctly finite. How will the city stakeholders responsible for delivering solutions respond? Having summarized the key characteristics and issues faced by today's megacities, we now turn to the priorities and key factors that drive decision making in the 25 cities covered by this report.

The entire sample of 522 stakeholders was asked the survey questions referred to in this section. It is immediately clear that the survey respondents are balancing a wide range of economic, social and environmental concerns. Nevertheless some clear priorities emerge.



Economy: Unemployment and underemployment emerge as the predominant economic challenge in the survey (cited by 20% of respondents overall). It is the top economic challenge according to respondents in Emerging and Transitional cities, and comes second only to economic development as a concern in Mature cities. The next most commonly cited issues are economic development and the rising cost of living (both 14%).

Environment: Air pollution is considered by far the most serious environmental challenge facing megacities (26%), especially by those in Mature cities (36%). A large proportion of stakeholders mentioning air pollution relate





the problem to transportation and vehicle emissions. General pollution and water problems are also cited, but are considered to be less of a priority.

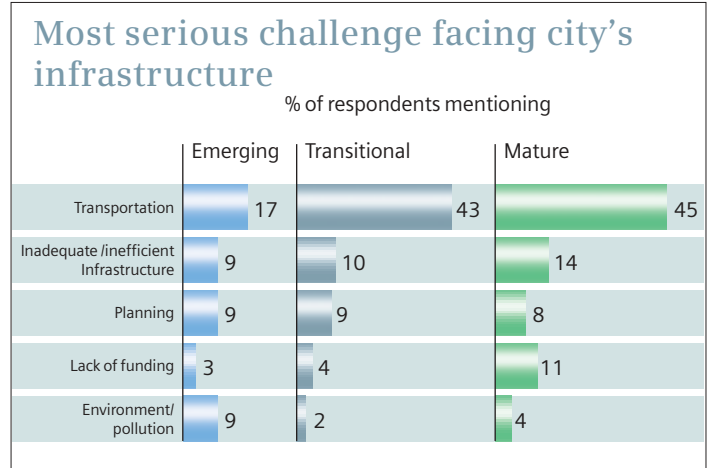
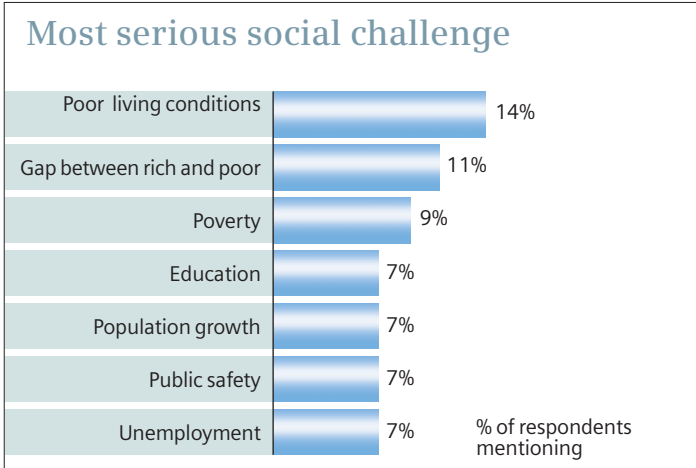
Social issues: Stakeholder respondents mention a wide range of social concerns, with no clear priority emerging. Topping the list by a small margin is poor quality housing and living conditions, cited by 14% of all respondents. This issue is particularly emphasized by stakeholders in Transitional and Emerging cities. Other key issues included the gap between rich and poor (11%) and poverty (9%). Public safety and crime also feature as a significant issue for respondents in Emerging cities.

Infrastructure: Transportation is perceived as by far the biggest infrastructure challenge by stakeholders in the survey. Responding to an open-ended question in the survey, 35% of all stakeholders mention the transport system or traffic problems as their city’s most significant infrastructure challenge. In distant second place is the inadequacy of the city’s infrastructure (10%). Surprisingly, only 6% cite finance issues as a big infrastructure challenge.

Other infrastructure areas appear to be much lower on the agenda for stakeholders as a whole. Even when added together, lack of water and water sanitation is cited as a critical

infrastructure challenge by just 6% of respondents overall and 8% in Emerging cities — this despite the fact that several cities covered in the study face severe problems with water scarcity/quality. Even lower proportions mention electricity (2%) and healthcare (1%) as the main infrastructure challenge facing their city.

Investment needs: Stakeholders were asked to rank 13 different areas according to their need for investment over the next five to ten years. Once again transportation comes out as the top priority by a significant margin, cited by 86% of respondents. In joint second place comes environmental protection and



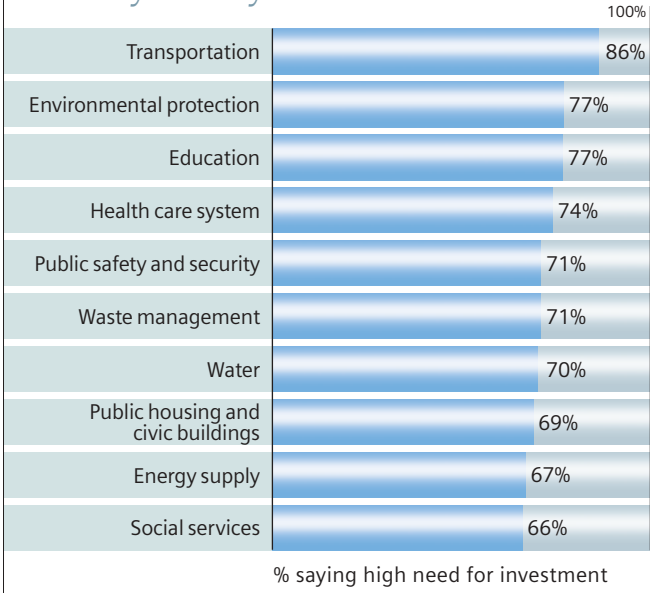


education, both cited by 77% of stakeholders. The need to invest in environmental protection is emphasized particularly highly in Transitional cities, indicating that the desire for ecologically sustainable solutions is not restricted to the rich cities.

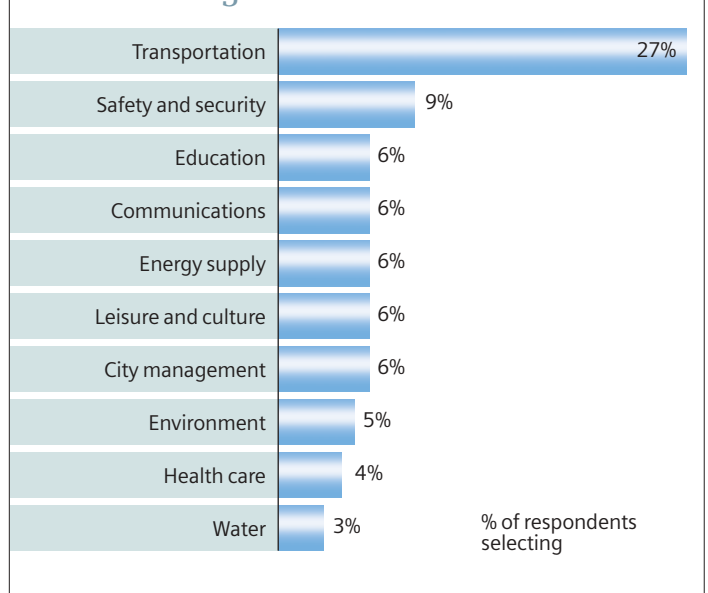
Water comes lower down the list of investment priorities overall, but is cited by many more stakeholders in Emerging cities (81%) where access to clean water and sanitation is often a major issue.

Competitive drivers: When asked, again with an open-ended question, which single area of their city's infrastructure is the most important in attracting investment versus

Need for investment over the next five to ten years by infrastructure area



Infrastructure area most important in attracting economic investment





other cities around the world, transportation is by far the most mentioned, followed distantly by safety and security. Far lower numbers of respondents cite education and healthcare as key factors in attracting investment. Communications and energy are seen as more important issues for attracting investment by respondents in Emerging cities.

Stakeholder outlook: Although stakeholders are acutely aware of the economic, social and environmental challenges faced by their cities, the majority have an upbeat outlook. For example, almost one-half of respondents (44%) rate their city’s quality of life as better than average.

Not surprisingly, respondents in the Mature cities were more likely to rate their cities as better than average, while respondents in Emerging cities were more likely to rate their cities the worst among the three archetypes; but even here, almost one-half consider their cities to be average in terms of quality of life.

When respondents were asked to rate their city’s probability of successfully managing its future over the next five years, overall, two-thirds responded positively (67%), with only slightly better odds expressed by respondents in Mature cities.

It is notable, however, that elected officials and public-sector employees are most likely to

have an optimistic outlook, while influencers in the survey tend to be more skeptical. The findings suggest that cities will attempt to juggle economic, social and environmental concerns, but when push comes to shove, the overriding issue in decision-making is economic competitiveness.

This perspective filters down to the prioritization of investment into transportation, which is seen as central to a city’s ability to generate wealth and attract investment.

High awareness of the need to invest in environmental protection, however, suggests that cities will seek to balance growth with sustainable solutions wherever this is viable and affordable.



Shanghai



Five Infrastructures



All cities need high-quality infrastructure to facilitate the movement of people and goods, and the delivery of basic services to their populations. But the challenge of delivering these infrastructures and services in today's megacity regions is immense. This is true for Mature cities where, for example, roads, rail networks, sewers and hospitals were often built decades or even centuries ago and in some cases are now becoming

increasingly unfit for purpose. It is also true of the Transitional cities, which are struggling to cope with demographic change, and Emerging cities where even basic services are badly lacking, particularly in the rapidly expanding informal settlements. Moreover, in all three city archetypes there are complex issues to be resolved over the funding, management, maintenance and efficient running of services, as well as the need to find infrastruc-

ture solutions that are environmentally sustainable.

The following section of the report deals with five major infrastructure areas: transportation, electricity, water and waste water, healthcare, and safety and security. For each infrastructure sector, survey questions were answered primarily by those stakeholders with the most relevant knowledge and influence, unless otherwise noted in the text.



Key findings

- **Transportation is seen as the single biggest infrastructure challenge by a large margin, and is a key factor in city competitiveness**
- **With air pollution and congestion emerging as the two top environmental challenges, stakeholders predict a strong emphasis on mass transit solutions**
- **Cities are more likely to focus on incremental improvements to existing infrastructure, rather than new systems**
- **Demand management is rarely mentioned as a major strategy for addressing the cities' transport problems**

Transportation

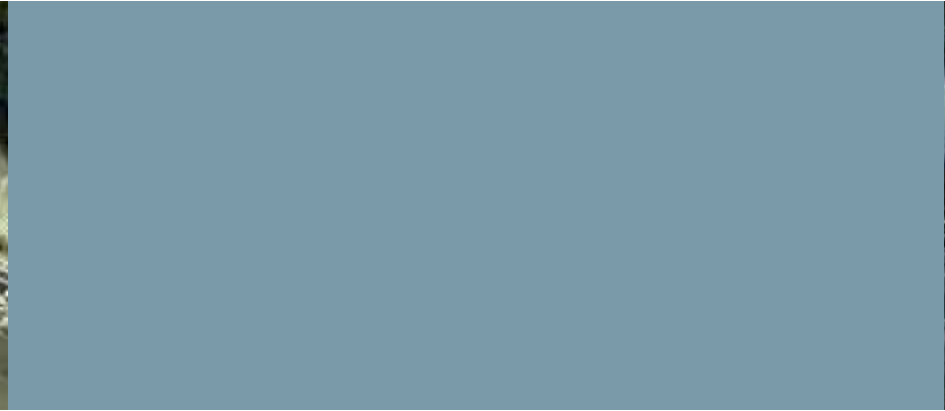
Transport preoccupies the stakeholders like no other infrastructure issue. As noted above, the general survey marks transport out as the single biggest infrastructure challenge faced by their cities, and by a large margin*. That focus is particularly high in Mature cities (45%) and Transitional cities (43%) and in Europe (52%), where car ownership in the EU has risen ten times more quickly than the population over the past ten years. In Emerging cities, the emphasis on transport is less pronounced, but at 17% is still far ahead of the other infrastructure mentioned such as water (8%) and electricity (5%). Transport is also the priority for spending, with 86% of stakeholders overall citing this as an impor-

tant area for investment. Transportation is top of the pile for a number of reasons. Whereas some infrastructure problems, such as lack of water, primarily affect the poorer areas of the city, congestion, crowded trains and traffic-linked pollution are very visible at all levels of society. But there is also a clear and direct link with city competitiveness. If megacities are the engines of the global economy, it is the transport network that keeps those engines working efficiently. When roads and railways seize up, or when ports and airports become overloaded, the cost to the economy is high. In the UK, where many cities including London are struggling to keep up with travel demand, the Confederation of British Industry

(CBI) estimates that the cost of congestion is £20 billion (US\$38 billion) a year**. Stakeholders in the overall survey are acutely aware of the importance of transport networks in driving the economy: 27% mention transport as the one area of the city's infrastructure that is most critical in attracting investment, far ahead of the second most cited issue (safety and security, 9%).

Coping with growth: As well as cutting across all levels of civic society, transport problems affect cities at all levels of development, although they manifest themselves in different ways across our three archetypes. For Mature cities, the primary problem is old

* Transport questions in the survey encompass mass transit, individual motorized transit, air and surface transport, and people as well as freight transit
** "Running out of Road", The Economist, 2 December 2006



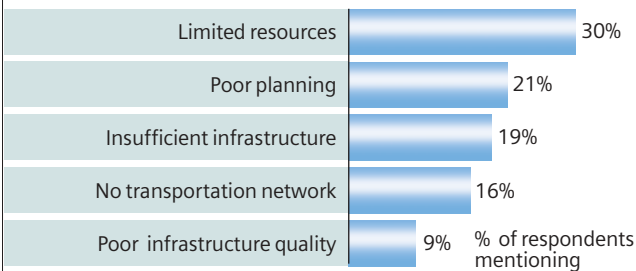
or obsolete systems (40%), then system capacity (35%), according to respondents with specialist knowledge of transport in their city. With its ageing rail and underground systems, London is a prime example. In a metropolitan area where an estimated 30 million journeys take place every day, transport investment over the past two decades has barely been sufficient to maintain the system, let alone to increase capacity to cope with soaring demand. As a result, congestion and overcrowding is already acute on all of London's transport networks, according to a recent report from Transport for London (TfL).

In Emerging and Transitional cities, stakeholders with specialist knowledge of transport tend to be more concerned about inadequate system capacity than ageing infrastructure. Indeed, sometimes basic infrastructure is non-existent. For example, Karachi is the only megacity in the world without a mass transit system such as a metro system or

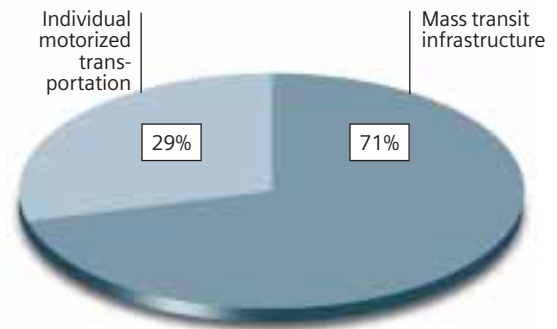
monorail, despite the fact that the idea for one was floated as far back as 1952. Meanwhile the number of public transport vehicles is insufficient for the population of the city, forcing commuters to travel on the rooftops of buses with all the inherent safety issues that this implies.

Istanbul, a Transitional city according to our methodology, faces both problems. The city's geography poses its own problems, with many of its residents commuting daily across the Bosphorus from one part of the city to the other. With its many hills and narrow streets, Istanbul has a major problem with traffic congestion, particularly at peak travel times. There is also a serious lack of public transport capacity on the Asian side of the city. Istanbul is having to make major investments to address these problems. A 22km light metro line is currently under construction, and further lines are planned. In total, Istanbul plans to invest a further US\$4.9 billion in tram and

Main cause of transportation problems



Predicted approach of transport experts



% = predicted emphasis



metro projects over the coming ten years, over and above the US\$1.6 billion on current schemes*. The main cause of these problems, according to stakeholders in transport, is lack of resources, which usually means lack of money (although skills and technology limitations are also noted). The second most cited underlying cause, however, is governance-related: poor planning is selected by 21% of transport specialists overall, and is especially emphasized by those in Transitional cities. Again, this is a significant challenge in Istanbul's case. The city has varying administrative bodies that have similar and sometimes overlapping responsibilities. The result, a recent report concluded, is that the city lacks any form of holistic transportation planning**.

Incremental improvements over new investments: Stakeholders are split over whether they will invest in new transport capacity as the primary solution to the chal-

lenges outlined above, or seek to increase efficiency of existing infrastructure. Even where new investment is made available, however, it will most often be used to deliver incremental improvements to the transport system (for example, adding new lines to an existing metro or new bus services) rather than outright spending on new transport projects. The most frequently mentioned solution to transport problems is to reorganize or revitalize the existing infrastructure (33%), whereas building new roads and facilities gets mentioned by only 12% of respondents. This finding seems to reflect a growing trend. In the UK, for example, the recent review of UK transport policy by Rod Eddington emphasized the need for incremental improvements to existing systems rather than new, showcase infrastructure projects.

Problems with congestion have, of course, major environmental as well as economic costs. As noted in the previous section, air

pollution and traffic problems came hand-in-hand as the top two environmental problems in the survey. Travel by road or air is a major source of pollution: road transport alone is responsible for over 40% of discharges of suspended particles into the atmosphere***.

Although decisions on transport investments are first and foremost driven by economic and employment considerations, according to our transport specialists, environmental impacts are also deemed important by three-quarters of respondents. This is probably a key reason why the vast majority of the transport specialists predict that their cities will emphasize the development of mass transit infrastructure over cars and motorbikes by a margin of 71 to 29. This is usually borne out in practice. An analysis of planned capital expenditures for 2005-10 for eight of the cities under study generally shows an emphasis of investment on mass transit (that is, rail) over roads, with two



notable exceptions. Moscow has a world-class mass transit system, with high rail investment levels that are comparable with London, but current planned expenditure shows an emphasis on road over rail that is driven by a rise in vehicle ownership. Lagos shows high-levels of investment in roads because urban rail is virtually nonexistent and the city therefore relies heavily on buses.

Mass transit may be favored, but there is no doubt that the pace of demand growth in many of these cities makes delivering sustainable solutions a huge challenge. Shanghai alone is expected to see a quadrupling of cars and trucks by 2020. The very dense urban area and lack of parking and road space for vehicles has pushed growth outside the city, thus setting in motion a spatial development pattern that will be increasingly difficult to serve by more sustainable modes of trans-

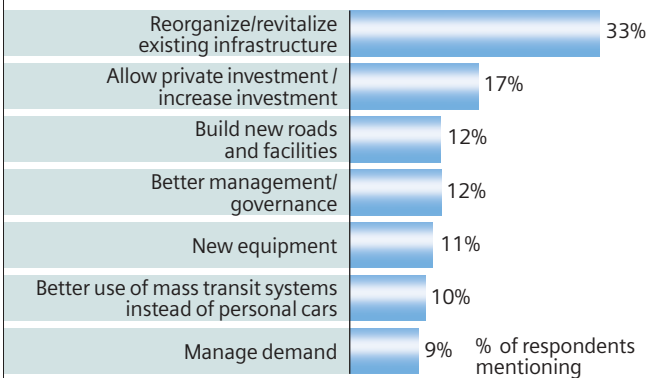
port. In Shanghai and other Transitional cities where car ownership is set to soar, there are no easy answers to the issues posed by congestion.

Putting demand management on the map:

In recent years demand management solutions have been posited as a way to promote more sustainable modes of transport over cars, but — somewhat surprisingly — this emerges as a low priority in this part of the survey. Only 9% of stakeholders involved in transport mention demand management solutions as the best approach to resolving transportation issues.

This is despite a variety of schemes in global cities that indicate a role for demand management in reducing congestion. Such solutions generally divide into two categories: “pull” measures that focus on providing

The best solution to transportation problems





motorists with alternatives to using their cars, primarily by increasing the attractiveness of public transport; and “push” measures that increase the cost or difficulty of using a car to reach a specific area. Various cities have experimented with demand management in the form of road pricing or congestion charging, including London, Stockholm and Oslo. Singapore introduced the world’s first significant road pricing initiative to control entry into its central business district in 1975. The city today has electronic road pricing based on a system that uses on-board tags to identify vehicles.

Road pricing in Singapore runs in parallel with a more radical “push” solution: a massive tax of over 100% on new car purchases. Where it has been implemented, there is evidence that demand management in the form of road pricing has delivered significant bene-

fits. In London and Stockholm, congestion has been reduced by approximately 30%. Both cities have experienced a reduction of between 10-20% in fuel emissions and road accidents*. The economic impact has been more difficult to assess — TfL, for example, found no evidence of either a positive or negative impact of congestion charging on aggregate business performance in central London**. But the London transport authority says that congestion charging brought in net revenue of €174m in 2005-06. TfL now plans to extend the scheme in 2007, a move that will roughly double the charging area.

Projects like London’s are high profile, but only a handful of cities currently have such schemes in place. There are only a couple of current examples in the US, such as the SR 91 Toll Lanes in Orange County, California. In many cities, the cost of car use in cities is actually falling. In Shanghai, car ownership was historically suppressed through high fees and limited permits. In recent years, however, this has been reduced (partly as a result of the presence of vehicle manufacturing), and incomes are rising. In Mumbai, despite the congestion and pollution caused by private motorized transport, road taxes and parking fees remain low (demand management is now being discussed). One would have to conclude that, globally, demand management as a solution to congestion remains an emerging concept that has yet to become a priority in many of the cities under study.

The public and private sectors: For transport and other infrastructure sectors, the survey also explored survey respondents’ views on the involvement of the private sector in delivering solutions. Here, transportation is primarily seen as a public rather than a private task by respondents to the survey (59% versus 41%). Mature cities in particular are inclined

to predict an emphasis on public ownership rather than private (72% versus 28%). Analysis of eight of the cities in the study supports the view that transportation in general remains firmly within the realm of public responsibility, with high-levels of ownership and control through regulation and relatively low levels of private-sector participation in operations, with occasional exceptions.

However, when asked to predict whether their cities would emphasize public or private operation of transportation infrastructure in the future, there was more of an equal split (53% public versus 47% private). Compared with current levels of private operation of transport, which is low on a global basis, this may indicate growing openness to private-sector management of services. Currently, the rail sector is almost entirely publicly controlled and operated, with the notable exception being London where private operators exist in a climate of regulatory control and government involvement in infrastructure provision.

Globally, the road sector is largely public with occasional examples of toll facilities/road pricing. Airports retain a surprising degree of public control despite trends to privatization and increasing evidence of private-sector operations. Ports are almost entirely publicly controlled and typically take the form of state-controlled companies that operate in a quasi-private fashion. Overall, private-sector participation in operations remains rare except in a few cities.

For those that predict a greater role for private-sector operation, surprisingly the major advantages of this approach are not financial, according to the survey, but rather improved efficiency and better management. Perceived disadvantages of private operation are primarily higher user costs, inability to meet demand, and a profit-seeking mentality.



Key findings

- Cities at all levels of development face a challenge in keeping up with rapidly rising demand for electricity
- The impact on the environment is a major consideration in decision making on energy issues
- Stakeholders will emphasize renewable energy sources in the future as much as fossil fuels
- More stakeholders predict a leading role for the private sector in electricity than in any other infrastructure sector in the survey

Electricity

Any discussion of electricity infrastructure has to take place against the backdrop of rapidly escalating world demand. Simply put, expanding cities need additional electricity to live and economies need it to grow. Between 1972 and 2002, world GDP increased at 3.3% per annum while electricity consumption more than kept pace at 3.6%. Even with expected efficiency gains, the International Energy Agency predicts that between 2002 and 2030 worldwide electricity demand will double. Most of this increase will come in the developing world, especially the rapidly growing economies of India and China. The IEA further foresees that OECD countries will need to make nearly US\$4 trillion in investment on

generation, transmission and distribution during those years, while developing countries will require some US\$5.2 trillion*.

Only 2% of those questioned described electricity supply as their most serious infrastructure challenge. Moreover, the importance of investment in this area ranks below fields such as transportation, water, education, public housing and security. Not surprisingly, Emerging cities see the issue as much more important.

Demand outstrips supply: The three city archetypes face different difficulties, but they all revolve around the fact that demand growth is outstripping supply. According to

electricity stakeholders in Transitional and Mature cities, old or obsolete infrastructure is the main problem. Then comes efficiency, followed close behind by lack of capacity. An example of the tight constraints weak infrastructure can place on the power system even in the richest places comes from New York. There, 80% of power must by law be generated in the city because the transmission lines to bring electricity from outside simply cannot cope with the higher load. Companies are trying to build small generating plants but there is little land available on which to do so. Without a solution, maximum capacity will equal maximum demand by 2008**.

In Emerging cities, on the other hand, the

* International Energy Agency, World Energy Report 2004

** New York City Energy Policy Task Force, New York City Energy Policy: An Electricity Resource Roadmap, January 2004

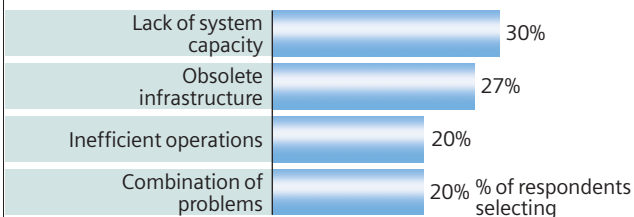


lack of sufficient generating capacity is by far the most pressing concern, according to the survey. Old infrastructure and inefficient operations are lesser problems because there is relatively little of it anyway. This is a particular issue in India and China where half the stakeholders cited difficulties arising from lack of capacity. Shanghai, for example, has frequent brown-outs in summer. Businesses have had to shut down completely or shift production to night time when more electricity is available.

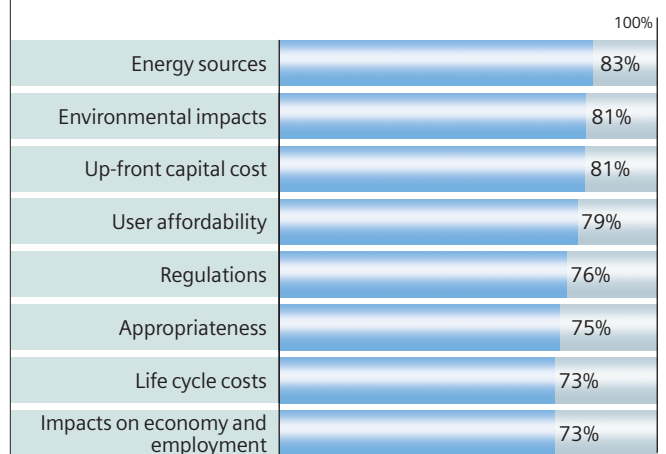
Stakeholders in each type of city also analyze the underlying causes of their problems differently. For Emerging, and even more for Transitional cities, unexpected load on the

infrastructure is the biggest difficulty. This can describe both average and peak load. Mumbai, for example, has seen hard to meet demand growth of 12.4% over the last four years*. Meanwhile the power system in its state, Maharashtra, suffered its highest demand peak in January 2006 which exceeded supply by 4,500 MW** more than one-third over the average requirement for all of Mumbai. As the next most important problem, Emerging city stakeholders point to late maintenance and lack of planning. Those in Transitional cities blame lack of investment. Lagos is an excellent example of how all these problems work together. There, because of little investment since 1990, the 6,000 MW

The most serious problem of electricity infrastructure



Factors influencing the city's decision making on electricity supply



% saying important impact



maximum generation capacity cannot meet the 8,500 MW that the city requires on average before even considering repressed demand of 5,000 MW. Worse still, poor maintenance means actual output averages 3,000 MW. All this before 45% of power is lost in the poorly maintained and frequently vandalized transmission system*.

The problems of Mature cities seems a world away: the chief culprit is monopoly regulation — such as a ten-year price freeze on Chicago’s domestic electricity prices that sometimes leaves the private utility there forced to pay more on the open market for electricity than it can charge. Such a structure allowed unscrupulous power producers to

create the great California energy crisis of 2000-01. Like their colleagues in Transitional cities, for Mature cities stakeholders underinvestment is the second most frequently cited concern.

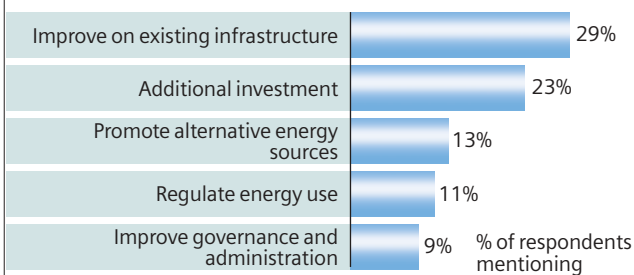
Pricing power: Electricity stakeholders expect to address the energy needs of their cities mainly by putting money into power generation. When asked the single thing that they could do to solve problems in this area, the most frequent response was to improve on existing infrastructure or build new (cited by 29%) followed by general investment in the system (23%).

The regulation of energy use — a heavy-

handed version of demand management — came fourth (11%), but had no takers in Mature cities where it would doubtless appear draconian. Mumbai does not have the luxury. The local utility has resorted to “load shedding” — stopping provision to certain areas and restricting the use of neon signs and even cable TV transmission — to help maintain a service that already experiences power loss of one to two hours per day in urban areas and more in rural ones**.

This does not mean efforts to affect demand will have no role. When asked how much their cities would emphasize the creation of new capacity compared with demand management, responses were split fairly

The best solution to electricity problems



*Nigerian Electric Power Supply Nigerian Electric Power Supply Industry, <http://www.bpeng.org/CGI-BIN/news/reform%20electricity.pdf>, "You're going to feel a jolt, Chicago Tribune, 19 June 2006, ** Prayas submission on CII proposal for Pune Load Shedding, Dec 5, 2005,



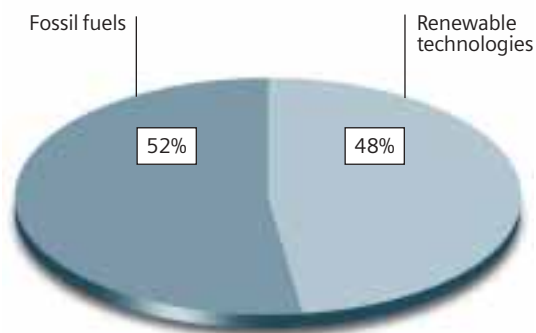
evenly (53% versus 47%). If this played out in practice, and nearly half of cities placed as much emphasis on demand management as on new capacity, this would be a significant trend.

The potential value of demand management initiatives is certainly great. Studies in India indicate that they could eliminate 20% to 30% of demand growth*. To reach the effectiveness foreseen this sort of demand management will require a dramatic ramping up. Probably the most effective way to affect demand quickly will be market pricing of electricity. Electricity specialists expect the emphasis to be on selling power in their cities at market prices rather than be subsidized (57% versus 43%). Denmark took this one step further by heavily taxing use of fossil

fuels. The biggest outliers in the survey are India and China, where the combined equivalent figures are 36% at market prices and 64% subsidized.

Energy and the city environment: If energy stakeholders aspire to modify demand, they also show a marked concern for environmental issues. On average, they thought that over the next five to ten years their cities would emphasize fossil fuels and renewable technologies to nearly the same degree (52% to 48%), an understandable result as the broader survey lists air pollution as the single largest environmental problem cities face, and global warming as the sixth (third among Mature city respondents). Only North America still seems wedded to fossil fuels (73% ver-

Predicted approach of electricity experts



% = predicted emphasis



sus 27%). Environmental issues also figure prominently as key factors driving decision making in the survey, along side financial concerns.

The aspiration to move toward renewables is clear, but there is a long way to go in practice. London, for example, uses 39% gas, 35% coal, and 20% nuclear to power its generators, but only 4% comes from renewable sources. Moscow uses Russia's relatively cheap gas for 95% of its fuel mix; China and India both use readily available local coal supplies for 75% of theirs despite the detrimental effect on the already bad air pollution. Even after several decades of probably the most active state measures in the world to promote use of renewables, by 2004 Denmark produced only 25% of its power this way*. It is

therefore unlikely that renewables will provide a major contribution to megacity power needs in the near future. Nuclear power — a long proven technology — is another option that has been advanced as the best short-term solution to global warming by people as diverse as British Prime Minister Tony Blair and the environmentalist Professor James Lovelock**. Despite its low CO₂ footprint, however, nuclear power's other drawbacks keep it far less popular among all energy stakeholders than even traditional power sources (40% versus 60%).

The public and private sectors: If, as noted above, those responding to the larger survey put the importance of investment in electricity behind many other infrastructure areas, one reason may be that cities are looking more to the private sector in this field than in others discussed in this study. When asked about the relative emphasis of reliance on private firms versus public bodies, electricity stakeholders expected to look 54% to the former and 46% to the latter. Figures for private or public operation of generation and distribution facilities, as well as private or public financing, were nearly identical.

The vast level of new generating capacity and money needed in the coming years is leading governments worldwide to consider how best to use the private sector and competitive market forces. Those surveyed who advocate private ownership or operation, indicate that greater efficiency is the major advantage, with access to funding mentioned less frequently. The disadvantages are primarily seen as higher user costs, which suggests that if privatization is to work there needs to be strong competition to keep prices down.

A number of Mature cities, including London and New York, already have largely private, if highly regulated, power industries

serving their needs. Places as diverse as Shanghai, Mumbai, and São Paulo have significant private activity in a mixed system. The first of these in particular has private participation in power generation, while in São Paulo nine separate companies compete in power distribution.

Meanwhile, Turkey, Russia, and Nigeria have reached different stages of restructuring their state power sectors as a precursor to privatization of, and the introduction of competition in, various functions. In the latter cases, the need for investment and greater efficiency is driving the process.

Regional differences: Given their varying levels of economic development, the different city archetypes have understandably different needs and responses in the field of electricity supply.

The responses from continental Europe are particularly interesting. This region seems to combine a much more traditional view of the role of the state in power generation and provision with a far greater concern for environmental issues. Contrary to overall opinion, electricity stakeholders in Europe expect a slightly greater emphasis on subsidized pricing than the free market (53% versus 47%), and by far the greatest focus on public over private ownership of any region (62% versus 38%). In making decisions about electricity supply issues, they put far more emphasis on environmental impact. This may be the reason why European stakeholders are the only group in the survey that expects to look more to demand management than new capacity (60% versus 40%).

These figures should serve as a reminder that even though megacities worldwide face similar difficulties across diverse fields, their responses will be profoundly affected by their political and cultural contexts.

* IEA, Energy Policies of IEA Countries – Denmark, 2006, **PM 'convinced' on nuclear future, 29 November 2005, 'Only nuclear power can now halt global warming', The Independent, 24 May 2004



Key findings

- **Water and sanitation is seen as an important issue by specialists in this sector, but comes lower down the list of priorities in the survey overall**
- **Even in Emerging cities, the importance of water issues for their economic development is not widely recognized**
- **Solutions that focus on water reuse emerge as a significant trend for the future**
- **There is some movement towards private sector management of publicly-owned water provision as a way to improve efficiency**

Water and Waste Water

One of the Tokyo-based respondents told this survey, “Recently there are often rainfalls of more than 100mm. Rain water is stored in underground rivers to avoid flooding. Most people do not know. Real infrastructure should be working in the background without being noticed.” For Mature cities, “working and unnoticed” is usually a good description of the water infrastructure: the presence of good drinking water, sanitation, and drainage are simply assumed. Any problems, such as the recent drought restrictions imposed in London, provoke annoyance. Catastrophic failures, such as in the wake of hurricane Katrina, provoke outrage. As in both these cases, the public insists that those responsible should have had

proper infrastructure in place – the problem is certainly not nature. For Transitional, and especially for Emerging cities, the situation is profoundly different. The UNDP estimates that in 2004 some 1.1 billion people lived more than 1km from the nearest safe water source. Worse still, 2.6 billion people, roughly 40% of the world’s population, had no access to improved sanitation. These figures, UNDP suspects, probably underestimate the scale of the problem. Official data for Jakarta and Nairobi, for example, both indicate 90% coverage for clean water and sanitation. These figures apparently leave out huge slum areas, in the former accounting for some 7.6 million people without such facilities. The roughly 1

million residents of Nairobi’s notorious Kibera slum rely on putting human waste in plastic bags and throwing it into the street*.

A growing challenge for the emerging world: Our overall survey data reflects the different experience of respondents across the archetype cities. When survey respondents were asked about the most serious infrastructure challenges facing their cities, water related issues were split into separate categories: water supply and wastewater management. If added together, the combination constitutes the third most frequently cited issue (8%), a figure that nevertheless puts it far behind transport as a perceived challenge



(35%). In Emerging cities, water issues come second (13%), but in Mature ones they appear well down the list (3%). Similarly, overall water pollution/water quality is listed as the fourth largest environmental challenge (13%), but comes second in Transitional cities (22%).

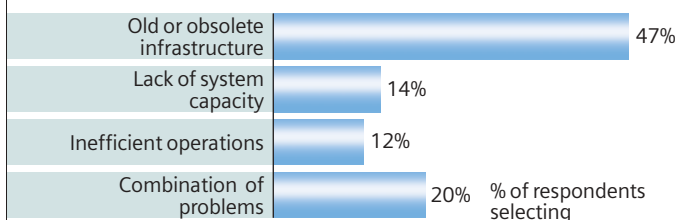
Shanghai is one Transitional city facing huge challenges in this area. Its main water source — the River Huangpu — is so contaminated by industrial and agricultural pollutants that it has been devoid of aquatic life for over 20 years. The River Yangtze, the alternative water source, faces increased salination in its lower reaches resulting from lower water levels brought about by the Three Gorges Dam. Meanwhile, ground water is facing increasing contamination from sea-water. Little wonder that the UN named Shanghai one of six major cities likely to face

serious drinking water problems in the 21st century*.

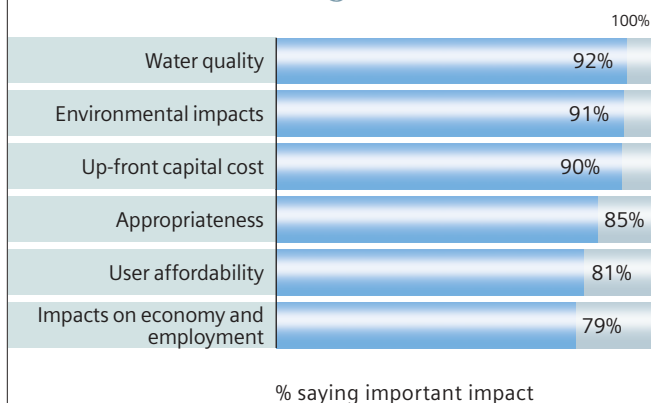
Investment priorities also reflect a higher focus on water issues in Emerging cities. Overall, 70% of respondents believe that there is a high need for investment in water and waste water infrastructure, placing it sixth out of 13 infrastructure areas. In Emerging cities, however, the figure was much greater (81%).

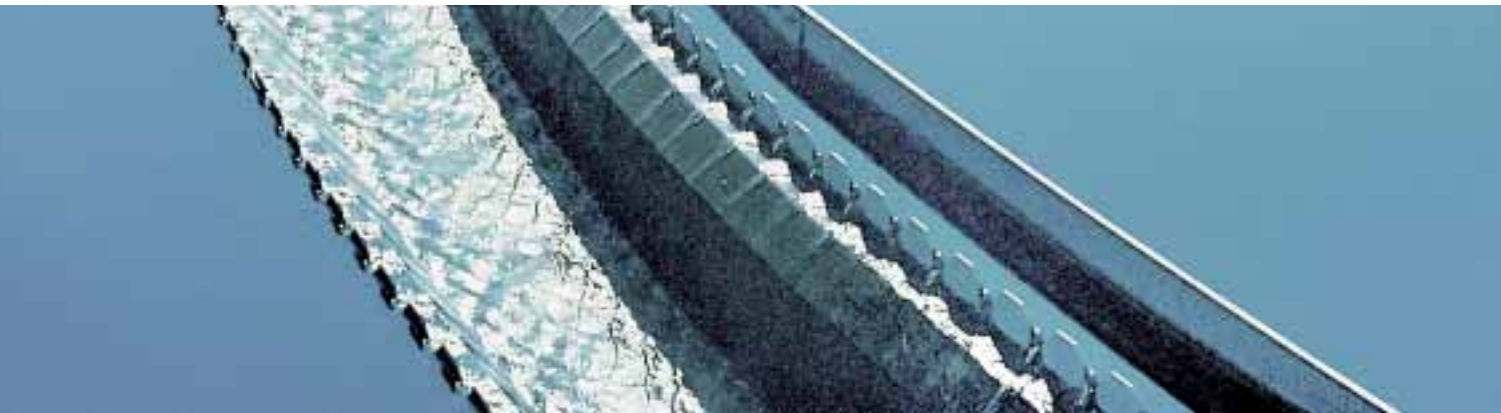
Hidden costs: The link between public health and clean water and sanitation is clear: the UNDP estimates that a lack of these services results in about half the developing world suffering from a health problem at any given time, and accounts for 1.8 million annual child deaths from diarrhea alone. Conversely, introduction of safe water supplies and sanitation in London and various American cities about a

The most serious problem of water supply and wastewater management



Factors influencing the city's decision making on water supply and waste water management





century ago coincided with the largest drops in infant mortality and increases in life expectancy those locations have ever seen. Cholera, of only historic interest there, is a frequent visitor to Lagos where water treatment is effectively nonexistent*. Nevertheless, health-care stakeholders make no mention of the role of water infrastructure in improving healthcare outcomes, which may reveal a lack of holistic thinking.

In the same way, when all survey respondents were asked about factors enhancing economic competitiveness, only 3% placed water supply and sanitation first, even in Emerging cities where water is such a big issue. Noticed or not, water and sanitation are in reality crucial for economic development. The WHO estimates roughly that lack of access to them costs developing countries US\$170

billion per year, or 2.6% of their GDP**. Sub-Saharan Africa loses about 5% of GDP, or some US\$28.4 billion annually, a figure that exceeded total aid flows and debt relief to the region in 2003. Conversely, investment in water can generate a high return. The UNDP estimates that every US\$1 spent in the sector creates on average US\$8 in costs averted and productivity gained.

According to water stakeholders, the primary difficulty this under-appreciated area faces overall is older, obsolete infrastructure (cited by 47% of respondents). This figure is even higher in Mature cities (59%), and especially Europe (63%) and North America (66%). These cities, having benefited from safe water for over one 100 years, face the difficulties of maintaining or upgrading century-old facilities. London's water company,

even after substantial upgrading efforts, still loses one-third of water to leaky pipes, 90% of which occurs in London's Victorian-era system***. New York, meanwhile, which has always had a clean water source so clean as not to require filtration, now may have to spend US\$8 billion to filter suspended particles****. Transitional and Emerging cities also face obsolete infrastructure: Moscow's water system rivals that of London and New York in age and urgently needs modernization.

A bigger role for water reuse: Despite the varying intensity of challenges to water infrastructure in the different city archetypes, stakeholders overall had a similar approach to solving these problems. Asked which strategy would have the biggest impact, the most commonly cited choice was renovation/improvement of the infrastructure (42%), followed by the more general one of increased investment (29%). Respondents did not see much value in raising the low political profile of water — 5% suggested making it a priority — which is interesting in light of the UNDP's recent call to do so in its 2006 Human Development Report.

Any renovation and investment is unlikely to revolutionize how cities address water needs. Water stakeholders expect that the emphasis in their cities in the next five to ten years will be slightly more on improved efficiency than new plants and facilities (52% versus 48%). This is even more likely to be the case in Mature cities (62% versus 38%). Such an approach makes sense in a city like Paris, where ongoing investment and judicious expansion over a century and a half have left a sound basis for future water provision. The still relatively low emphasis on new plants in Emerging cities (52% versus 48%) may arise from widespread denial about the extent of the problem. Mumbai, for example, claims its

* UNDP 2006, ProMED-mail 6 January 2006, **WHO (World Health Organization), "Economic and Health Effects of Increasing Coverage of Low Cost Water and Sanitation Interventions"; UNHCR Occasional Paper, http://hdr.undp.org/hdr2006/pdfs/background-docs/Thematic_Papers/WHO.pdf, ****"Drought in London", London Assembly Committee, July 2006, *****New York's Water Supply May Need Filtering". New York Times, 20 July 2006.



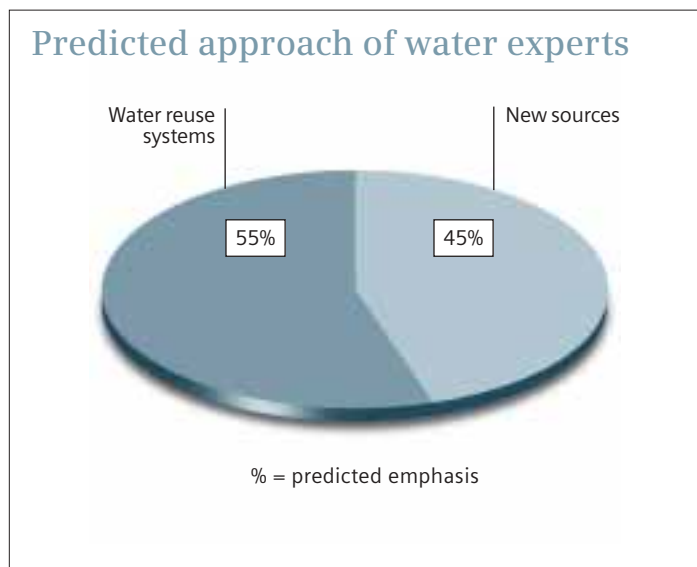
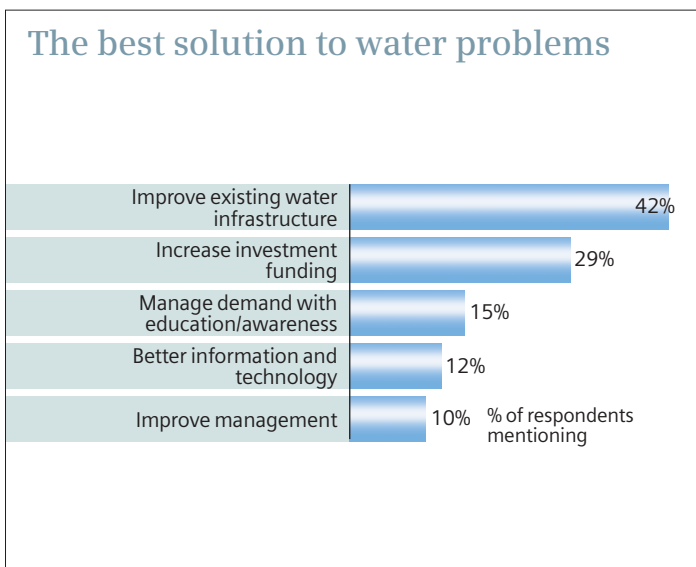
water provision covers 95-100% of its population: the UNDP suspects the number is close to half of that*.

One surprising finding is the emphasis in the future on water reuse rather than the tapping of new sources (55% versus 45%). Such an approach need not solely involve water for industrial use. Beijing's Bei Xiaohe Wastewater Treatment Plant currently provides drinking water for 400,000 people and is undergoing an expansion — the largest such project in the world — to more than double capacity. It will provide drinking water at the coming Olympic Games. Singapore, meanwhile, hopes to get 20% of its water requirements from a recycling plant: the Prime Minister proudly serves its output at state dinners.

Market forces and conservation: Focused on investment, water stakeholders see a smaller role for demand management: only

15% cited it as the best strategy to address their problems. Simple expedients in this area can have a great impact. Shanghai's recent requirement that families replace 13-litre toilets with 9-litre ones will save the city US\$189 million annually in water treatment costs**. Rather than focusing on education programs, however, water stakeholders expect to manage demand and encourage conservation through market forces. Overall, they foresee the emphasis for water revenue to be more on user fees than on taxes (67% versus 33%). In Mature cities the former figure rises to 80%. The constraint in Emerging and Transitional cities is more likely to be the technological one of installing metering equipment than anything ideological.

Lagos, for example, is happy to privatize its bankrupt Lagos State Water Corporation but has no idea where 90% of the company's water goes*.





The public and private sectors: Although market mechanisms will apply in water provision, water stakeholders still expect the emphasis on the public sector to predominate over the private in operating facilities (57% versus 43%). North Americans seem particularly attached to public operation (78% versus 22%), this being one of the few areas where Europeans are happier to contemplate private sector participation (52% versus 48%).

Such an emphasis could involve a remarkable increase in private participation. Currently, the UNDP estimates that public utilities provide 90% of the developing world's water; Veolia Environment, the world's biggest provider of water and waste recycling services, puts the world figure at 95%**.

Recent trends suggest, however, that although private-sector involvement in water will increase, it will do so in specific areas and take on very specific forms. In the 1990s, the

World Bank encouraged greater private participation in water provision. A number of high-profile grants of concessions to companies to provide municipal water failed dramatically, for reasons ranging from the political difficulty of raising prices to cover costs through to currency exchange-rate fluctuations. Although there have been success stories in this field – notably in Chile and parts of Manila – this history and the high upfront investment costs involved with water have increased corporate reluctance to take on such concessions***.

Instead, a variety of World Bank and OECD publications**** indicate that the private sector is moving more into the management of publicly owned water provision to improve efficiency, and especially the building and operation of waste treatment plants. Private operation in particular involves lower risk – as the state or the public utility, not the end user,

is the customer – and are less politically sensitive. A typical example is a new water plant set to open in Moscow in 2007 constructed by a German company under the BOOT model (Build, Operate, Own, Transfer). The company will operate and receive revenues from the facility for ten years before it slowly transfers it to the municipality*****.

Private contracts also now tend to be smaller than the huge concessions of the 1990s, although there are more of them, with 54 countries having opened the door to, and continued on with, private participation in water infrastructure in the last 15 years. As time goes on, smaller domestic companies are taking a larger share of the market from the handful of transnational operators, increasing competition.

In areas with reasonable levels of risk and return, private-sector participation will likely grow as the survey results indicate. It will, however, have only limited ability to help Emerging cities, as companies are avoiding not only politically sensitive business models but also locations unlikely to be profitable, however welcoming.

The vast majority of new private investment in water projects is currently going into China (56% of the world total) and Algeria (34%). If Lagos finds a purchaser, it will be an exception to the trend. Emerging city water stakeholders expect the split of public and private emphasis in the operation of new facilities to be 57% versus 43%. Most will likely need the state to contribute far more than this.

The biggest advantages cited by the advocates of privatization are increased efficiency, better funding, better quality management and a higher-quality service.

Those who are more skeptical about private-sector involvement cite high costs to users, profit seeking and inadequate supply as major impediments.



08

Key findings

- **City healthcare systems around the world will struggle to cope with the effect of an ageing population**
- **There is a high emphasis on increasing the efficiency of the system to contain costs while improving quality**
- **Stakeholders predict an emphasis on preventative solutions and integrated healthcare**
- **Healthcare is mainly seen as a public task, but significant proportions are open to private sector involvement — with quality of service and efficiency cited as key advantages**

Healthcare

Around the world, healthcare systems are coming under increasing pressure. The rising cost of prescription drugs and private health insurance is one challenge. Huge inefficiency in the delivery of healthcare is another. But it is arguably the phenomenon of population ageing that creates the biggest long-term problem for many countries, particularly in Europe and East Asia.

Increased life expectancy means that healthcare systems face an increase in the proportion of older patients. Ageing also plays a role in the occurrence of chronic diseases, which in turn leads to greater demand for long-term care. That people live longer has much to do with the achievements

of medical science, but it comes at considerable financial cost. People over the age of 75 incur per capita health expenditures that are five times higher than people aged 25 to 34. Ageing is currently estimated to account for 6%-7% of the increase in healthcare costs per year.

Costs rising fastest in developed world:

Spiraling healthcare costs are particularly marked in the developed countries with their extended health systems. Between 1990 and 2004, health spending has been growing faster than total output in all OECD countries except Finland. In the US, which has the most expensive healthcare system in the world,

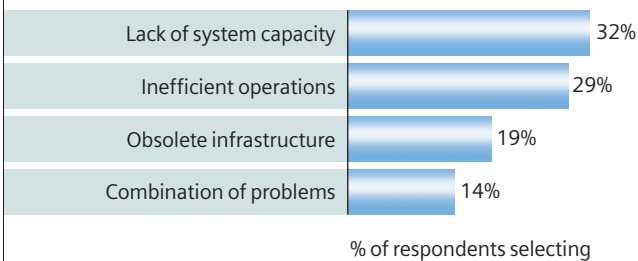
health expenditure as a percentage of production has increased from 13.1% to 15.2% in six years*. In contrast, developing countries cannot afford to spend anywhere near as much on healthcare, and access to treatments is often non-existent or inadequate. According to the World Bank, developing countries have 90% of the world's disease load but only 12% of its health spending. More dramatically, the poorest countries have 56% of that load but only 2% of spending**.

Healthcare in megacities reflects their broader national environments. Emerging cities have basic infrastructures and, except for privately funded care for the elite, can often provide only rudimentary service.



Lagos’s health system cannot even provide basic needs in the face of serious AIDS, tuberculosis, and malaria problems*. Mumbai, although India’s richest municipality and spending 25% of its budget on health, can still care for only 20% of the population, leaving large slum areas poorly served**. Transitional cities are doing better, with places like Istanbul and São Paulo seeing good improvements in recent years***. This city archetype is now beginning to face medical problems associated with more developed societies: whether the effects of pollution arising from industrialization in Shanghai, or the need for specialized facilities for Seoul’s ageing population as Korea undergoes the demographic transition typical of mature economic development. Mature cities such as New York, which boasts one of the world’s highest concentrations of hospitals, are

The most serious problem in the healthcare sector





troubled by healthcare inflation and diseases of affluence, such as obesity-induced diabetes and cardiovascular problems.

Given the scale of these challenges, it is surprising that healthcare is not more of a priority for respondents in the overall survey. It comes well down the list of social challenges (mentioned by only 4%) and infrastructure challenges (1%). Of the 4% who think it the leading area for determining a city's competitiveness, most are in the health field. The combination of underinvestment and lack of focus can prove dangerous. As one survey participant from Beijing noted, the outbreak of SARS had a pronounced effect on the Chinese Government's attention to healthcare.

The biggest problem facing city healthcare systems is lack of capacity followed closely by inefficient operations, according to the

survey. Concerns about inefficiency were particularly marked among stakeholders from the Emerging cities. Overall, it appears that health stakeholders think that it is not enough simply to pump money into current systems. Far more important is the need to put city health infrastructures in order so that they can use what they have more efficiently.

Improving healthcare efficiency: When asked about solutions to these problems, most stakeholders again offer a combination of greater efficiency and increased capacity. Those in Mature cities expect to emphasize efficiency gains by a wide margin (61% versus 39%). Emerging cities also had a greater focus on measures to improve efficiency, with stakeholders prioritizing the need for better governance of healthcare, a more integrated healthcare system, and only then more staff.

Stakeholders in Transitional cities have a different order of priorities, in that they expect to emphasize new capacity over increased efficiency. Their preferred strategy is more money, so greater investment (41%) comes well ahead of the need for an integrated system (17%) in their view.

The desire to control costs and increase efficiency also informs two other trends in the survey: towards preventative and away from acute medical care (67% versus 33%) and – particularly in Transitional and Mature cities – toward common healthcare infrastructures with shared services as against independent individual institutions (63% versus 37%).

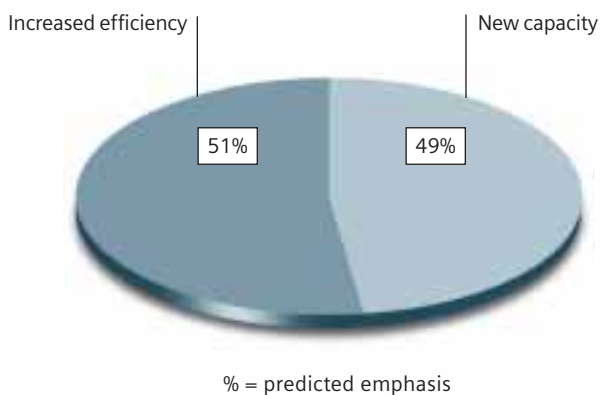
One universal point worth noting across all city archetypes is that stakeholders focused so much more on their systems as the providers of health, rather than on patient behavior and living conditions. When naming the most



effective single strategy to address the challenges outlined above, health promotion and education came well down the list, cited by only 5% of respondents. Getting the patient to avoid anything from unsafe practices that spread HIV/AIDS to the excessive drinking devastating Russian health would have a profound effect. So too would addressing significant air or water pollution issues, such as those in Transitional cities like Shanghai and Mexico City, with even Mature cities like Tokyo, London and New York exceeding WHO-recommended nitrogen dioxide levels.

IT in healthcare: IT has a major role to play in healthcare, supporting both treatment and administration. The shift towards electronic patient records is one example. São Paulo has a medical smartcard that lets patients take their medical record between hospitals on

Predicted approach of health care experts





wallet sized pieces of plastic. IT can also save money: for example, a new system linking hospitals in Copenhagen is expected to bring savings of approximately US\$46 million annually. These are attractive benefits, but implementing IT systems is not just a matter of finding suitable technology. Specialists argue that the problems experienced by the UK's National Health Service in implementing electronic patient systems are more to do with the difficulty of achieving cooperation on a huge project between a multitude of stakeholders than the technology itself. These challenges indicate that organizational innovation will be just as important as technological advances when it comes to improving the performance of megacity healthcare systems.

The public and private sectors: Stakeholders in the survey believe that public health infrastructures will be the path for the future.

In terms of public or private ownership or operation of facilities, they expected the emphasis to be for the former (58% versus 42%). They also believe that there will be a greater emphasis on free-to-user medical services as opposed to healthcare models where patients pay for treatment (59% versus 41%).

Attitudes do vary by city archetype, however. Transitional cities are especially likely to emphasize public ownership (63%), operation (63%) and free health care (70%). However, Mature city stakeholders expect fee-paying services to be emphasized slightly more than free ones in the coming years, and split roughly evenly on public or private ownership and operation. Currently the public sector is dominant in healthcare in the developed world, with the state covering 70% of health spending in OECD countries, so this may constitute a relatively high degree of openness to private-sector involvement.

Emerging cities stakeholders predict greater emphasis on public ownership (56%) and operation (59%) in the future. This must be viewed in the context of low public spending on healthcare in these countries (only 29% of health spending comes from the public purse, and in India the figure is just 19%, according to the World Bank). Where the money will come from to move this beyond aspiration is unclear.

The one certainty is that Emerging cities, faced with pressing health problems, will need to use whatever resources they can muster, public or private, in as efficient a way as possible.

In this context it is worth noting that, as in other infrastructure sectors in the survey, quality of service and efficiency are cited as major benefits of privatization. High user costs and profit-seeking are perceived as the main disadvantages.



Key findings

- **Safety and security comes second only to transport as a factor contributing to city competitiveness**
- **Organized crime emerges as the biggest problem, followed some distance behind by terrorism**
- **Cities are attempting to shift to a more proactive approach to security**
- **Although open communities are the favored as the route forward for most, gated communities will also be emphasized by many — especially in Emerging cities**
- **Public surveillance is deemed more important than protecting privacy**

Safety and Security

Security has one important qualitative difference from other infrastructure areas in this study: whereas water or transport provide something tangible, the ultimate goal of safety efforts is to create a subjective state of mind. Statistical success is not enough. In 2005, the FBI reported that violent crime has been decreasing in America for a decade, but a Gallup poll showed that two thirds of the population believed the complete opposite. Worries have real world implications: flying after September 11, 2001 was objectively safer because of enhanced security, but passenger numbers suffered nonetheless.

Whatever the difficulties, urban specialists understand that security is a crucial infra-

structure element. The complete survey population ranked public safety and security as the second most important infrastructure area in determining competitiveness with 9% of respondents. It is also the sixth-biggest social challenge, while crime/corruption comes in tenth.

Threats against the city: The more detailed survey answers by security stakeholders fleshes out their more informed concerns. Organized crime, including by armed gangs, is their biggest challenge — named by 36% of those questioned and by even higher numbers in the Emerging and Transitional cities. Next, a surprising distance behind, comes

terrorism (18%), a particular concern in Emerging and Mature cities.

Although distinct threats, the two overlap in important ways. Terrorists use organized violence to weaken the state: criminal gangs do so to gain wealth. This frequently becomes a distinction without a difference: to further their ends, the IRA robbed banks and the Cali cartel undermined the Colombian state. In practice, the main problem facing security professionals is organized groups that challenge the rule of law, and that increasingly cooperate with each other whatever their final goals. A recent study, *Illicit* by Moses Naim, shows that globalization has allowed organized crime and terrorism to cooperate



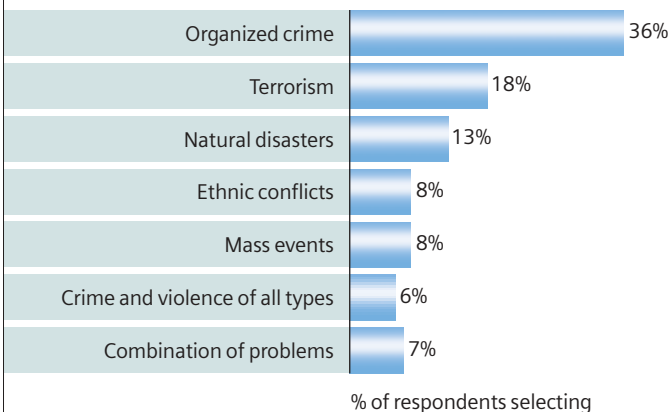
and thrive. For example, from 1990 to 2005 money-laundering expanded five times more quickly than global trade.

The next most pressing safety concern, potential natural disasters, shows the importance of context in risk perception. Overall, 13% name this as their city's leading security challenge. Mature city respondents, however, rank it almost as high as anything else, while Emerging city respondents do not mention it. The latter are not exempt from potential disasters. Lagos will lose significant territory if global warming raises sea levels. With a barely functioning security apparatus, however, it cannot even properly address current annual floods. Shanghai, though, with a low crime rate and greater resources, can invest in preparation for potential earthquakes and flooding. Security stakeholders are perhaps focusing on where they have the capacity to make a difference.

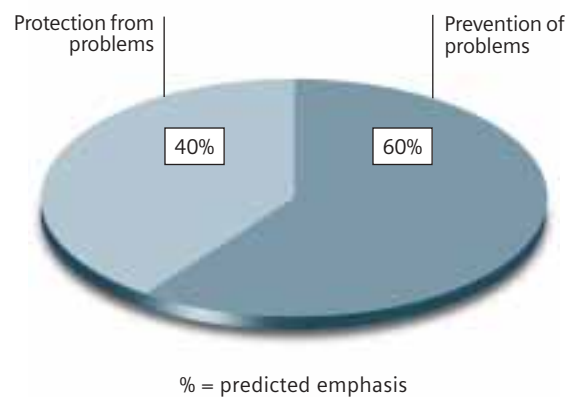
Towards proactive protection: How can the city protect itself against these threats? The survey indicates a greater focus on the threats themselves, rather than underlying causes. The leading ones they named were: crime itself (put first by 24%), corrupt or incompetent law enforcement (15%), poor planning/city management (10%), terrorism (9%), and natural disasters (9%). In other words, the causes of crime, terrorism and natural disasters are criminals, terrorists, and natural disasters, or incompetence in fighting them. Social issues such as unemployment and poverty are well down the list. The lack of a holistic approach to these threats is evident, possibly because security specialists in the survey feel that the underlying social causes of crime are outside their remit.

Asked how best the city could address security issues, the most popular response is additional officers and law enforcement

The most serious safety and security problem



Predicted approach of safety and security experts





capacity (28%), while the third is better preparedness and planning (17%). Emerging cities emphasize the former and Mature ones — which can already afford larger police forces — the latter, but the common message is more capacity, better used.

Over recent decades numerous police departments have shifted from a reactive approach to take the fight to the enemy. The survey results show this occurring worldwide. Respondents indicate that, given a two-way choice, the emphasis of security efforts would be towards preventing problems over protection from them (60% versus 40%). In another question they emphasize protecting the city from threats over responding to them (57% versus 43%).

The success of so-called “risk-based policing” has been dramatic. New York City’s ongoing, widely copied COMPSTAT program, which analyzes police data to indicate crime

hotspots, allowing frequent tactical resource reallocation, was important in that city’s drop in crime figures in the late 1990s. A similar initiative in Bogotá, and related efforts to reclaim crime-blighted public spaces identified by technology, were instrumental in reducing its murder rate by 48% between 1994 and 2005. A slightly different, but related approach, which has spread from the UK through Europe and Australasia is dubbed “intelligence-led policing”. In addition to crime data analysis, this involves the systematic collection of informant information describing the criminal environment and particularly the behavior of repeat offenders.

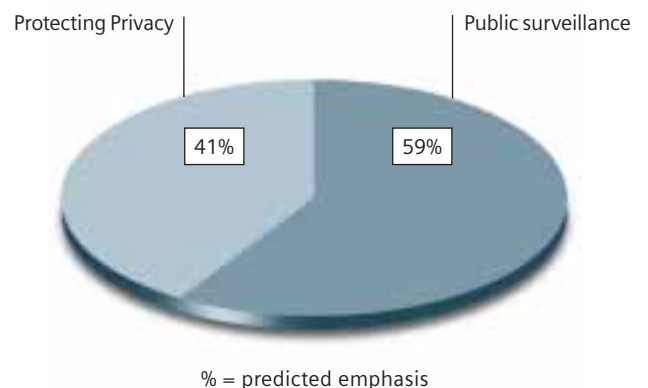
Safety over privacy: A strategy based on predicting crime has its controversial elements. Survey respondents thought that the emphasis on the need for public surveillance would far outstrip privacy concerns, a con-

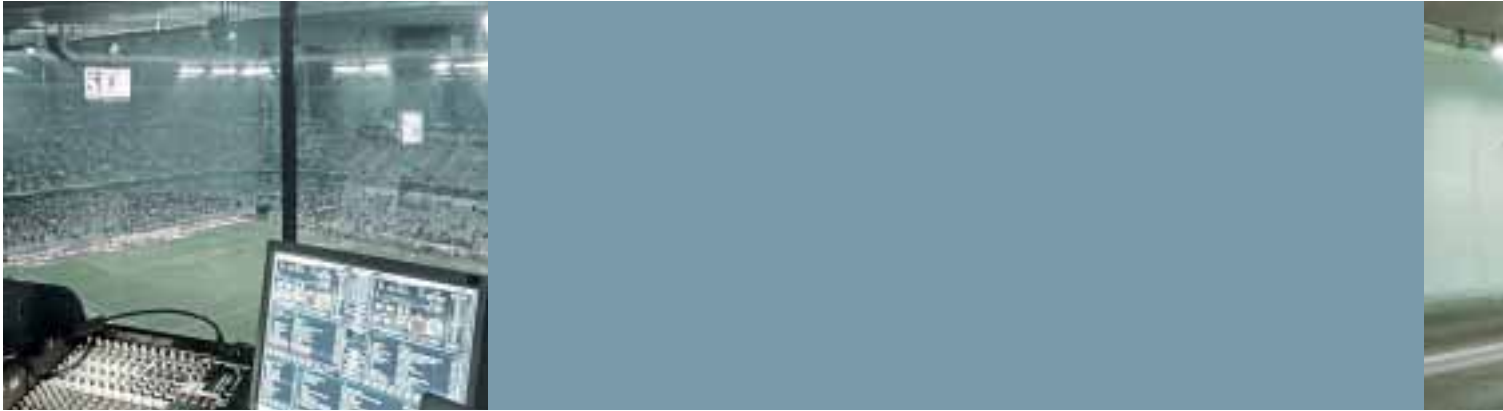
viction strongest in Transitional and Mature cities — where risk-based policing is most advanced.

In pursuing their campaign against criminals and terrorists, however, security stakeholders fully understand the need to maintain perspective. The most important factors influencing their decisions are impact on the economy and employment, appropriateness, public satisfaction and community impact. These all come well ahead of cost. The city’s protection cannot unduly constrain people’s lives and businesses — indeed the focus of decisions is to enhance the city’s economic competitiveness and quality of life.

Technology is essential for risk-based policing, and a vital tool for general surveillance in cities wishing to increase police capacity. Crime mapping is just one example. Another ubiquitous and sometimes very useful one is CCTV. Introduction of such a

Predicted approach of safety and security experts





system, for example, in central Johannesburg brought an 80% drop in crime in 2002 and was instrumental in the revival of a previously devastated downtown*.

The security stakeholders see technology's importance, expecting the emphasis on its purchase to be greater than investment in human resources (54% to 46%). This figure, though, also indicates that technology without having enough people to use it is insufficient. More strikingly, while 28% of respondents see more officers as the best way to promote security, only 4% wish to rely on more CCTV alone. Technology is seen as a crucial tool, not a complete solution.

Mobilizing citizens: The survey also indicates the international strength of another important shift in policing: enlisting the

community in efforts to promote its own security. After more enforcement capacity, respondents thought the best option for cities was increasing awareness/education/sense of community (18%). Combining these responses with those advocating the same measures specifically directed at youth raises the figure to just under one quarter.

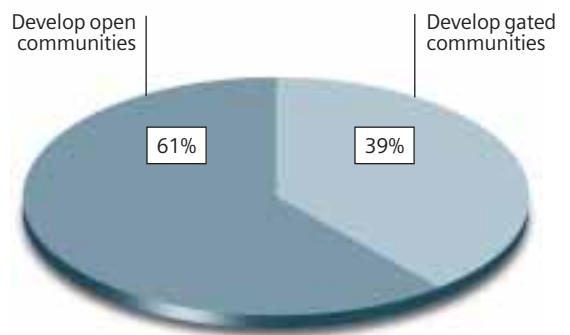
Community involvement can make a huge difference. A core part of Chicago's Alternative Policing Strategy has been mobilizing the public. From 1992-2002, robbery in the city declined by 58% — more than anywhere else in America — and more importantly fear of crime fell by 20% among the most vulnerable. Still more dramatic were efforts in São Paulo's Jardim Ângela, which the UN once labelled the world's most violent neighborhood. Efforts by the city and 26 NGOs to

Factors influencing city's decision making on safety and security



% saying important impact

Predicted approach of safety and security experts



% = predicted emphasis



increase community cohesion were crucial in reducing the murder rate there between 1999 and 2004 by over 73%.

Harnessing community strength, however, alters the relationship between the security forces and society. Safety is no longer simply a state-provided public good, but becomes partly the responsibility of individual citizens. Now, measures like Neighbourhood Watch or countless volunteer citizen patrols in North America — from New York's Guardian Angels to the South Cariboo Citizens on Patrol in rural British Columbia — are no longer branded as vigilantism but are often assisted by the police. Once people in a community feel that they have responsibility for their own safety and security, the incentive exists to turn to private security solutions if they consider public efforts insufficient.

The public and private sectors: The growth of a private-sector role in such a traditionally public field sparks some anxiety among those surveyed. Those most opposed are moved by more ideological arguments: this field is the role of the state (39%); the private sector is unaccountable (23%); and private security companies are elitist (16%). The much smaller number favoring greater private participation instead point to utilitarian justifications: such arrangements are credible and reliable, they attract investment, and are highly efficient.

Given such views, the surprise is that in developing solutions to the security problems of their cities over the next five to ten years, on average these respondents expect efforts to emphasize private versus public efforts by 33% to 67% — a finding that could be signifi-

cant in what is currently a state-dominated field.

Force of circumstance is driving this growth, in two areas. The first involves companies hired to perform specific, often not front-line, tasks by government agencies with a security role. This arouses relatively little controversy. Britain, for example, outsources part of its passport application process to Siemens Business Systems and many airports use private security firms to some degree.

The second category results from private individuals or companies exercising their responsibility for their own safety because their fears are insufficiently allayed by the state's efforts. An increasingly common form of this practice around the world is the gated community — protected by walls and, usually, its own private guards. Although most studies indicate that such neighborhoods enjoy about the same level of safety as their surroundings, the feeling of security within is invariably much higher.

Such private security procurement arouses some controversy. In our survey, respondents think that their cities will strongly emphasize developing open communities over gated communities (61% versus 39%). In emerging cities, however, with higher crime rates and fewer public resources, respondents are more inclined to predict an emphasis on gated over open communities (52% versus 48%). As crime rates drop and resources rise through Transitional and Mature cities, support for gated communities lessens.

Thus, where cities can provide for the security of their residents, or more importantly make them feel safe, the public sector will outsource some highly controlled tasks for reasons of efficiency and finance. Where they cannot, the private sector will of necessity do so for those who can afford it.

Beijing



Key findings

- **Economic growth and employment are the primary drivers in decision-making for specialists in city management**
- **Environmental issues are also important but are sometimes sacrificed in the race for growth**
- **Attempts to deliver holistic solutions are often undermined by a lack of strategic planning and poor coordination between different levels of government**
- **Many cities focus on increasing supply to cope with growth; demand management strategies have yet to be widely adopted**
- **Infrastructure will usually remain under public control, but the private sector has an important role to play in managing services for increased efficiency**

City Governance and Finance



Metropolitan governance has become increasingly complex as cities have morphed into agglomerations combining multiple administrative organizations and jurisdictions. This has led to calls for a complete reassessment of urban governance. Megacities also need innovative funding strategies to release much-needed investment to address the infrastructure challenges outlined in previous sections.

These requirements are widely acknowledged, but there is considerable debate about how to address them. As usual, a one-size fits all strategy is inappropriate: governance and finance structures must be adapted to meet the unique circumstances and needs of each city.



However, some strong themes and challenges emerge in the survey that provide an insight into how governance and finance strategies might evolve in megacities globally and at the three archetypal stages of development.

Growth and competitiveness are the primary drivers in decision-making. The clear priority for those stakeholders in the survey involved in city management is to grow the economy and create or protect jobs. When asked to rate the importance of ten factors in terms of their impact on the city's decision making today, 81% acknowledge the importance of the economy and employment, whereas smaller proportions cite the importance of responding to citizens (73%) or of considering community impacts (68%).

Competitiveness also emerges as an important consideration in decisions relating to specific infrastructures. Six in ten stakeholders think that their city places a high importance on making themselves competitive to attract private investment when deciding on infrastructure issues, a proportion that rises among elected officials and municipal employees.

A multitude of different factors combine to make a city competitive. Some are related to physical assets, others to the contribution made by the city's inhabitants*. As noted in previous sections, stakeholders are highly aware of the more tangible and direct factors — namely that a good transport infrastructure is vital for commerce. By contrast, other infrastructure areas covered by this report are seen as social or environmental problems in need of investment, but are rarely linked with city competitiveness. This may be an oversight. For example, a number of surveys of international executives by the Economist Intelligence Unit** indicate that the availability of skills is a decisive factor in attracting overseas investment from global businesses. Despite this, only

6% of respondents to this survey saw education as the most important area determining city competitiveness. Similarly, cities need a healthy workforce to achieve their economic potential, yet in the survey only 3% cited healthcare as the single biggest factor in city competitiveness. It is therefore worth stressing that the health, education and welfare of the city's inhabitants may be at least as big a factor in attracting investment and delivering growth as physical transport infrastructure.

Environmental concerns are important but are sometimes sacrificed for growth.

Respondents also have a high awareness of ecological factors: six in ten city managers in the survey think that their city's leadership recognizes the vital role that infrastructure decisions can play in protecting the environment. This echoes a wider sensitivity to environmental issues in the survey overall — for example, the desire to make transport greener by emphasizing mass transit solutions, or to place an increased emphasis on renewable energy sources to provide a greater proportion of power to the city.

Even so, when push comes to shove the search for economic competitiveness often wins out over environmental considerations. For example, 45% of respondents overall predict that their cities will increase infrastructure capacity at the expense of the environment. Stakeholders in the developing world are particularly likely to put capacity growth first: about 55% of respondents in Emerging and Transitional cities believe their cities will sacrifice environmental considerations for the sake of increased capacity, whereas only 14% of respondents in Mature cities believe that this will happen.

More resources need to be made available for the urban poor. A wealth of depressing



statistics drive home the scale of urban poverty. Worldwide, 18% of all urban housing units are non-permanent structures and at least 25% of all housing does not meet urban construction codes. Problems are especially acute in the Emerging cities and particularly in Sub-Saharan Africa, which has the highest slum growth rate.

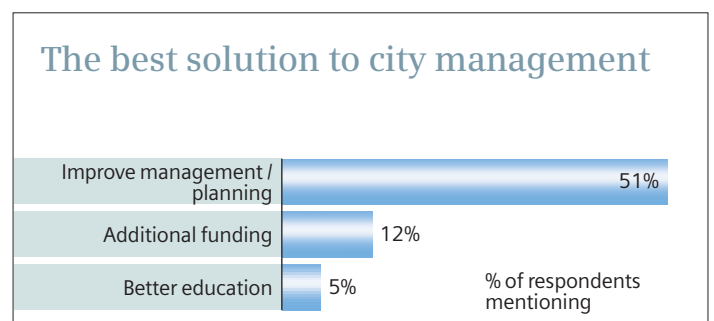
In the UN-HABITAT report, Kofi Annan comments that efforts to improve the lives of the urban poor have not kept up with the rate of urbanization. Many in the survey seem to agree: only 37% of stakeholders say that their city makes adequate infrastructure investments into the poorer areas. Respondents in Emerging cities are most likely to think that investment into poorer areas is inadequate.

It is not that stakeholders in the survey do not appreciate these problems. Education and housing are two areas where stakeholders say there is a high need for investment. However, Emerging cities often lack the resources to address these issues effectively.

Better performance begins with better governance. Stakeholders are aware that getting money to invest in improved services, though important, is not the only issue. Long-term strategic planning emerges as the single biggest problem facing city managers in the survey. When asked what the best solution is to the challenges they face, one-half of respondents in this area call for better planning, versus only 12% that cite the need for more funding. The call for better city governance is echoed in a related issue, the need for more efficiency in the management and implementation of infrastructure. Only half of all respondents to the survey say that the implementation of infrastructure decisions is currently done well, although that proportion rises to approximately two-thirds for public-sector employees and elected officials.

Finance is of course a major issue, and is cited as such when we asked the different infrastructure specialists about their challenges. What is clear, however, is that city management stakeholders see that good governance is a prerequisite for raising funds and achieving value for money. In this respect, good governance is the cornerstone of competitiveness. Poor governance also acts as a barrier to achieving the goals of sustainable development. Even in the more developed countries, recent OECD research* on metropolitan governance discusses how the current structures are not well-suited to balancing the needs of economic competitiveness and 'liveability'. The three main obstacles identified are a fragmentation of administrative jurisdiction; strain of the financial and fiscal abilities of local municipalities in metropolitan areas; and a lack of transparent, accountable, decision-making processes. The report goes on to identify certain features that can contribute to the dual goals of enhancing competitiveness and liveability of large metropolitan regions. These include stronger area-wide metropolitan government, improved coordination and integration of policies in metropolitan areas, and governance and strategic planning to support more sustainable urban development.

City management must become more transparent and accountable. Many stakeholders in the survey are aware of the need to improve transparency in municipal government. Only 44% of city management stakeholders agree that their city has transparent and consistent decision-making processes when it comes to investing in infrastructure, while 38% disagree, and the remainder are neutral on the subject. One-half of respondents believe that their city's bidding and tendering processes are major obstacles to the timely implementation of infrastructure projects. Once again, improvements in these areas are vital steps towards improving access to funding. Investment and lending is increasingly tied to clear measures of how money is being spent, and assurances that projects will be efficiently managed. When the World Bank signed a deal with Nigeria in 2006 to lend US\$200 million to improve drainage and solid waste management in Lagos, the agreement included clauses on transparency and financial reporting. Political reform at the metropolitan level has been a key factor in delivering improved infrastructure in Bogotá, Colombia. A recent case study** emphasized the importance of city-level leadership and an enabling political context, especially in a developing country.





Important measures included reforms that gave more authority to local officials and made them accountable to their constituents. Fiscal decentralization provided funding sources for local programs and initiatives. The combination of these factors and an enabling legal framework provided a window so that local officials could be more responsive to local issues, as well as needs of the poor in particular.

Silos and short-term thinking are holding megacities back. The underlying reason for poor planning, according to city managers in the survey, is poor coordination and a lack of leadership. While the influencers and private-sector respondents are especially critical, even one-third of the public-sector employees are not satisfied with their own performance in this regard. Poor coordination between departmental silos makes it hard for cities to provide a strategic response to complex infrastructure challenges across multiple jurisdictions. The interdependencies between different infrastructures are seemingly overlooked, judging by the survey — the fact that improved water and sanitation is rarely cited as a key step to preventative healthcare being a classic example.

There is a clear stakeholder emphasis on holistic urban management over separated responsibilities in the survey (61% versus 39%). But it appears that current structures for municipal governance often prevent this from happening. For example, another recent OECD report* analyzed the challenges posed by fragmented governance in Mexico City. The city's overall metropolitan area consists of four major governmental units: the Federal District (itself consisting of 16 sub-units); the state governments of Mexico and Hidalgo (with 59 municipal governments); and the federal government (which maintains substantial day-to-day responsibilities). The different governmental entities within the metropolitan area clearly

recognize the need for cooperation at the metropolitan level, as evidenced through the large number of coordinating bodies that have been created to manage specific issues, but the overall impact of these has been minimal. The overall impression is that these plans are poorly linked to the political channels through which investment decisions and budgetary allocation are determined. These problems resonate elsewhere. The city of São Paulo is one of 39 cities within the greater Metropolitan area, and the city government has major challenges in coordinating its activities with surrounding communities. The municipal government went through a process of decentralization in the 1960s that was necessary to address the problems of rapid growth but, as stated in a recent report from the Woodrow Wilson International Center for Scholars, better municipal coordination will now be vital for improving the effectiveness of metropolitan governance. Coordination is also a major issue in Mumbai, where there are multiple administrative agencies often with overlapping authority. It is estimated that, compared with other large cities, it takes more time in Mumbai to process typical municipal tasks such as building plans or construction regulation**. A government taskforce identified improved governance as a key step towards Mumbai becoming a World Class City***. This challenge of delivering holistic solutions that balance the needs of the city and the wider metropolitan region are acknowledged by some, but by no means all, of the stakeholders in the survey.

One implication of the research is that the traditional model of municipal government may need to be reconsidered. As opposed to having many departments based around a single discipline (for example, planning, transport and environment departments), cities might adopt "local area teams" that offer the multi-disciplinary skills required to deliver integrated



solutions at a local level. This would need to be combined with a central planning and delivery team with responsibility for delivering holistic solutions across the metropolitan region.

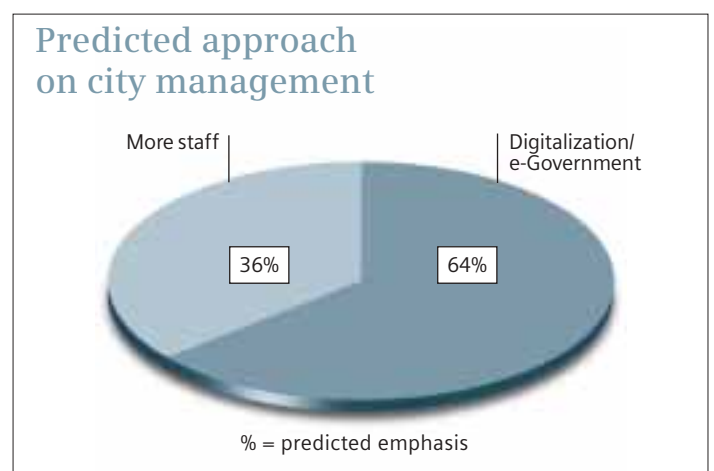
Cities emphasize supply over demand management. Faced by huge pressures on public services, cities tend to emphasize supply-side solutions. This does not necessarily mean building more roads, railways, hospitals and so on. On the contrary, there is often a preference to increase efficiency of existing infrastructure as opposed to building new capacity. For example, healthcare stakeholders make the case for integrated healthcare systems, those in transport emphasize the need for incremental improvements to existing systems, and city management stakeholders look to the efficiencies offered by IT. Where cities invest in new capacity, this tends to be combined with the desire for more efficient management of projects to achieve a better outcome. Demand management does get mentioned by a minority of respondents, but never emerges as a priority. This is true even of responses from specialists in particular infrastructure sectors — a finding that is perhaps surprising given that demand management has been a hot topic for several years. Despite the success of several road pricing schemes in cities such as London and Singapore, only a fraction of respondents cited demand management as a priority for solving their city's challenges. Demand management is even less likely to be cited as a key solution by stakeholders in the Water and Waste Water sector, despite the fact that many (including the UNDP) have argued for the benefits of metering and pricing water.

Information technology will help to drive transparency and performance. IT can play an important role in improving transparency, accountability and the efficiency of municipal

services. As a measure of transparency, the World Bank report on city governance and globalization looked at whether cities have a website that includes information on the city budget, and advice on how to start a business. Those that met these criteria tended to perform better across a range of public services. Of course, as well as increasing transparency, IT can improve cost-efficiency. In Denmark, the country that topped the Economist Intelligence Unit's e-readiness rankings in 2006, e-procurement is saving the country's taxpayers as much as US\$188m per year. Politicians elsewhere have also cottoned on to the benefits of e-government strategies. EU ministers have now decreed that by 2010, at least 50% of public procurement in member countries should be carried out electronically. The value of technology is well recognized by city management stakeholders in the survey. Eight in ten respondents think that their cities will increasingly integrate advanced IT into their administration and operations over the next five years. Moreover, respondents predict an emphasis on digitalization or e-government over recruiting more

staff by a ratio of 2:1. Interestingly, Emerging city respondents predict almost as much emphasis on e-government and digitalization as those in Transitional and Mature cities, suggesting that the benefits of IT are not restricted to the rich cities alone.

The private sector has a role to play in increasing efficiency. The survey provides a mixed picture on privatization. Generally, most respondents predict public ownership of infrastructure sectors and services. However, the majority of stakeholders also say that they are open to public-private partnerships (PPPs). Not surprisingly, private-sector respondents are the most likely to predict privatization. However, more than 70% of publics and electeds view PPP's as a viable means to implement infrastructure solutions and more than 60% believe that privatizing infrastructure would increase its efficiency. Surprisingly, respondents cite the main advantages of privatization as increased efficiency, rather than money. Given that PPP was traditionally perceived primarily as a way to tap the private sector for increased funding, this



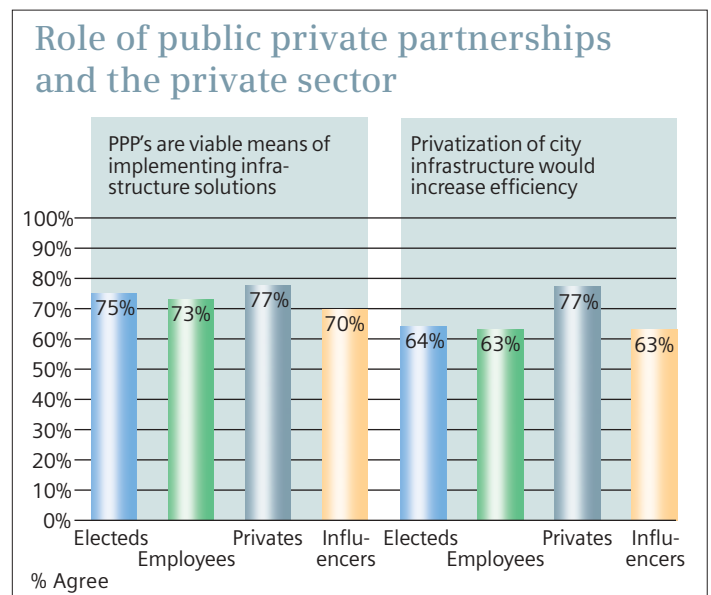


Pricing and Sustainability

may represent a significant shift in attitudes. By contrast, the main disadvantages of privatization are seen as potential higher user costs and inadequate supply for the broad population. A report from the World Bank acknowledges that, while there is growing empirical evidence of privatization's benefits, this often coincides with dissatisfaction and opposition among citizens and policymakers. It argues that rather than abandoning privatization, there should be a redoubling of efforts to privatize correctly. This entails tailoring privatization to local conditions. The report also warns against focusing solely on privatization transactions, arguing that instead cities need to create a framework in which public-private partnerships can succeed. This involves developing and protecting competitive forces, creating proper regulatory frameworks before privatization, introducing and enforcing transparency in the sales process, developing social safety nets for the adversely affected, and introducing innovative pricing and subsidy mechanisms that ensure access to affordable basic services. Get these admittedly complex issues right, and the efficiency gains from privatization can be compelling.

Megacities are calling for public leadership. It is clear that many stakeholders are open to the benefits of public-private partnership, but they are also reluctant to relinquish public control of services. If anything, our city management specialists call for stronger municipal government. As noted in the infrastructure sections of this report, stakeholders predict an

emphasis on public ownership. The need for strategic solutions at a city-wide level is also driving a shift towards greater central control and autonomy within municipal government. There is a clear emphasis on greater regulation rather than deregulation in the future (58% versus 42%), and a bias towards centralization rather than decentralization in city management (62% versus 38%). Thus it seems that government and the public sector will seek to provide strong leadership, but will bring in the private sector to manage and increase the efficiency of services.





“By raising the price [the seller of scarce corn] discourages the consumption, and puts everybody more or less, ... upon thrift and good management. ... If by not raising the price high enough he discourages the consumption so little that the supply of the season is likely to fall short of the consumption ..., he exposes the people to suffer ... the dreadful horrors of a famine.”

Adam Smith, Wealth of Nations, (1776) Book 4, Chapter 5

The link between supply, pricing and demand management has long been at the heart of economics. It has moved toward the heart of sustainable development strategy as well. Kyoto’s carbon emission trading provisions are just one example.

For megacities encountering water, fuel, or transport constraints, correct pricing can play an important role in building a sustainable infrastructure, by unleashing entrepreneurial ingenuity in support of the environmental trinity: reduce, reuse, recycle.

Beijing, for example, a city that faces serious water shortages and where low prices led to rampant waste, has seen nine price increases for water customers in the last 15 years, raising the price by some 3,000% – although still costing the average household only 1.8% of its total outlay. Between 2001 and 2005, the city’s overall use dropped by 15%. The EU has adopted this strategy too: its Water Framework Directive requires pricing by 2010 that encourages resource efficiency.

Prices can also affect electricity use and the types of fuel used for power. Denmark’s policies of selective taxation of fossil fuels throughout the 1990s were central to bringing about its vastly increased energy efficiency — its energy intensity, or energy used per unit of GDP — is 35% below the average of International Energy Association Member States, and its renewables sector now provides 25% of all its energy. Road pricing can have even more rapid results in transport. In its first six months, Central London’s Congestion Charge brought a drop of

30% in non-exempt vehicles entering the charging zone, most of the occupants of which had switched to more sustainable means of travel, such as public transport.

Success in this type of demand management, however, requires more than simply taking people’s money. First, new fees must be correctly targeted. Price increases work better in some places than others. For example, the market for indoor residential water use is relatively inelastic. For water, industrial and (often heavily subsidized) agricultural users — including gardeners — are much more responsive: higher prices led to a roughly 25% improvement in Chilean irrigation efficiency between 1975 and 1992, and numerous companies in water-poor Chennai (India), rather than pay for expensive private supplies, are treating their own wastewater. Even more importantly, such charges require groundwork to garner political support. Despite using market mechanisms, charges to promote sustainability are not market driven: a cyclical fall in crude oil prices is more likely to exacerbate global warming than reduce it, for example. Price setting, and its acceptance by consumers, is a process both deeply political and expensive when misjudged. The large Cochabamba water concession in Bolivia collapsed in 1999 over protests at charges for previously free water, putting an acrimonious end to plans for a new dam and purification plant; and in early 2005 the residents of Edinburgh voted three to one against a congestion charge modeled on London’s successful scheme, slowing the spread of such arrangements

to other cities in Britain. Doesn’t market pricing further disadvantage the poor? Some form of subsidized service for those who are simply destitute will be essential, but in practice the main beneficiaries of infrastructure charges are, when properly constructed, the least well off themselves. According to the UNDP, in megacities the people least likely to be connected to the water system are the poorest residents, especially those in slums who must pay exorbitant prices for bottled water of dubious quality. Meanwhile, subsidies often go to those connected to the municipal systems and able to afford water. In Bangalore and Kathmandu, 30% or more of these benefits go to the richest 20% of the population. Using water charges to fund expansion of the network to poor parts of cities, as the private water utility does in Abidjan, does far more to reduce costs to those less well off than would offering free water. Similarly, those in London who cannot afford its Congestion Charge probably cannot afford a car to begin with. Funds raised to improve the public transport that they use and improved air quality with reduced noise in their urban environment costs them nothing.

Thus, properly structured and targeted charges can lead to more sustainable infrastructure and thereby help with all three goals of urban leaders: a more competitive city, a better environment, and an improved quality of life for all residents. Adam Smith was right: getting the price right is as much a moral duty as an economic operation.



Dense, vast and complex, megacities pose challenges on an unprecedented scale for urban planners, city managers and those responsible for delivering basic services and infrastructure. It is clear that each city has its own unique issues and circumstances to address. However, this research has highlighted a number of common themes and trends that will shape the evolution of megacities over the coming years.

The majority of stakeholders see economic competitiveness as a priority. This is understandable: unless megacities can create wealth and attract investment, they will not create the number of jobs needed for their burgeoning populations, nor will they attract

the financial resources needed to address the huge challenges that they face. However, while areas like transport infrastructure are recognized as being vital to competitiveness, stakeholders often overlook the economic importance of other areas – in particular education, healthcare and basic services such as water.

City stakeholders do place significant importance on environmental considerations, and there is a clear aspiration to focus on more sustainable solutions in many of the infrastructure sectors. However, the survey also suggests that, when push comes to shove, ecological considerations can be sacrificed in the race for economic growth. In par-

particular in Emerging cities, economy and ecology are still often viewed as contradictions.

Can stakeholders' desire to deliver greener solutions be reconciled with the need to deliver growth? This is the question at the heart of the debate on sustainable development, and one that cannot be fully addressed in a paper of this size. However, a greater focus on demand management – a concept that the survey indicates has yet to gain global acceptance — would be one way that cities could develop more sustainable infrastructures. Failure to monitor and manage the use of many services (for example, road usage or water) also creates problems in raising rev-

Conclusions

enue. A key factor in this will be the correct pricing of services to support sustainable goals.

Delivering in each of these areas will require new governance structures and more efficient management. Stakeholders are highly aware of this, but delivery is tricky. Governance structures need to deliver holistic solutions across infrastructure sectors, which balance the needs of the city with the wider metropolitan area and take into account the interdependencies between the various infrastructures. This may mean a new non-departmental approach to the management of cities.

The search for improved efficiency may

require megacities to contract out the management of more services to the private-sector.

One of the more surprising findings in the survey is the fact that the main perceived advantage of private-sector operation is improved efficiency, more than access to funding.

Where cities do increase private sector involvement, they will need to create the right framework for success. There is a variety of models available, where ownership and operation of services can be shared. But when entering into partnerships with the private sector, the consequences must be well thought through, and success will require a

“context-sensitive” approach to privatization, with overall control (and responsibility) resting with the public sector.

Overall, the research indicates that megacities are moving from passive administration of services to active management of their infrastructures.

This entails a desire for strong public control of services and the ability to deliver a strategic, city-wide response to the challenges that they face. If comprehensive governance models and efficient management structures are put in place, economic attractiveness, environmental protection and quality of life for all citizens need not be contradictory goals.



This report studies infrastructure challenges and governance trends in the world's largest megacities. The research focuses on five critical infrastructure sectors – transportation, water, electricity, healthcare and safety & security. It also looks at how city management is evolving to address these challenges, based on the views of a range of municipal stakeholders.

The UN defines a metropolis as a “megacity” if it has a population of 10 million or more. This report focuses on 25 megacities and metropolitan areas, most of which were selected on the basis that they are the most populous cities in the world*.

Choices include some large metropolitan agglomerations like the German Ruhr (with a large number of independent municipalities). London, which has fewer than 10 million inhabitants, was chosen for its economic importance.

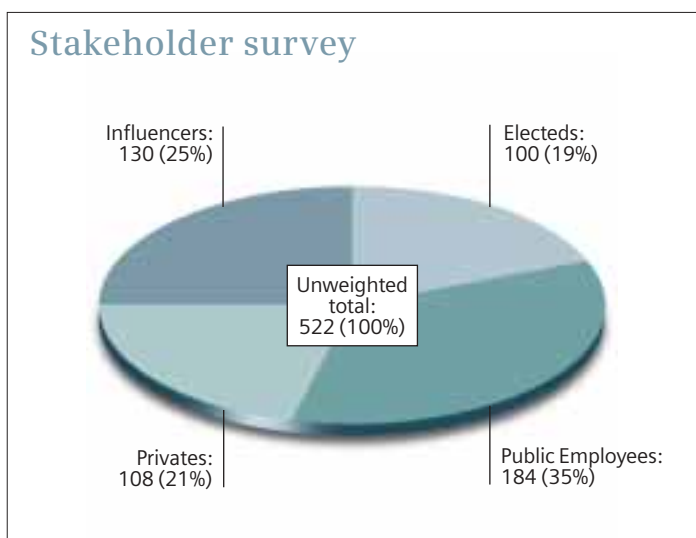
The findings in this report are primarily

based on the following research initiatives and methodology.

Stakeholder survey: The report is based on a survey of 522 stakeholders spread across 25 cities, with approximately 20 interviews per city**. The survey was conducted by Globe Scan*** between September 28 and November 17, 2006, either face-to-face or by telephone. Respondents include four stakeholder groups: elected political leaders (Electeds); employees of the municipality (Employees); private-sector infrastructure providers, construction company managers, and financiers (Privates); and people who are in roles that influence infrastructure decision makers and implementers such as thought leaders, academics, NGOs, and media (Influencers). Sixty-nine percent of respondents have at least ten years of experience in city infrastructure.

City diagnostics: MRC McLean Hazel under-

Methodology



took an analysis of critical infrastructure sectors in eight of the 25 cities covered by this report.

The megacities studied were: Istanbul, Turkey; Lagos, Nigeria; London, England; Moscow, Russia; Mumbai, India; New York, USA; Shanghai, China; and São Paulo, Brazil. The project relied exclusively on secondary data sources (ie. existing studies and data sets).

A primary goal of the project was to develop an understanding of the key functional characteristics of the megacities on a sector-by-sector basis, the level of service provided, critical challenges faced, solutions employed to overcome these challenges, and important barriers remaining to be overcome. Where possible, MRC McLean Hazel's research focused on the entire metropolitan region; where data availability issues preclude this full metropolitan perspective, focus is given to the core cities within the region.

City archetypes: It is recognized that cities are unique, as each city today is a reflection of its own unique mix of social, political and economic history. Nonetheless, as an organizing principle for the study of megacities, a second, and related, element of the MRC McLean Hazel study has been to undertake an analysis of whether there are logical, simplifying, groupings of megacities in order to facilitate an understanding of the processes and dynamics of urbanization on a global basis. These groupings should be powerful enough to undertake a first order generalization in order to simplify further analysis and provide a common understanding of key issues.

Our analysis is based on three major archetypes: Emerging Cities, Transitional Cities, and Mature Cities, using a simple two-axis grid based on readily available data.

The methodology employed uses a combination of absolute Gross Metropolitan Product (GMP) to position cities along a vertical axis

and a proxy for the level of social and physical development along the horizontal axis. GMP ranged from approximately 1,500 euros/capita for Emerging cities, to 5,000 euros/capita for Transitional cities, and 30,000 euros/capita for Mature cities.

The proxy for social and physical development was a composite measure that used national scores from the United Nations Human Development Index, city scores from Mercer Human Resource Consulting's 2006 Quality of Living Survey, and national scores from Transparency International's Corruption Perception Index.

Each index was brought to a common scale for the purpose of developing the composite measure. The composite index ranged from a typical value of 0.40 for Emerging Cities, 0.60 for Transitional cities, and 0.98 for Mature cities. Sensitivity testing, by varying the weightings of these three indices, revealed little change in the city groupings.

The UN Human Development Index is a standard comparative measure of well-being for countries. It employs measures of life expectancy, literacy, education, and standards of living for countries worldwide, and is used to assess a country's level of development and to measure the impact of economic policies on quality of life.

Mercer's city-level Quality of Life index is based on detailed assessments and evaluations of 39 key quality of living determinants, grouped into categories that include: political and social environment; economic environment; socio-cultural environment; medical and health considerations; schools and education; and public services and transportation.

The Corruption Perceptions Index ranks more than 150 countries by their perceived levels of corruption, as determined by expert assessments and opinion surveys.

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